Out-Group Homogeneity Effects in Natural and Minimal Groups

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This article reviews literature relevant to the out-group homogeneity effect. The review assesses whether the effect emerges in both natural- and minimal-group contexts. Data relevant to the out-group homogeneity effect are examined for 3 types of dependent measures. Whereas strong support for the effect is obtained across all measures in natural-group settings, no consistent effect is observed in minimal-group settings. Some theories (need-based motives, salience of self, and generalized homogeneity beliefs) predict the occurrence of the effect in both natural and minimal groups, whereas others (group-specific homogeneity beliefs and information encoding and retrieval) predict the occurrence of the effect only for natural groups. The question of whether conditions exist under which the out-group homogeneity effect can be produced in the minimal-group setting is addressed.

Group membership dramatically affects social perception and categorization. Pioneering research by Tajfel (1969; see also Tajfel, 1982b) on the accentuation principles showed that group membership leads to accentuation of intergroup differences and accentuation of intragroup similarities. One important offspring of this research reflects the asymmetrical accentuation of intergroup differences in favor of the own group. That is, people tend to be more favorable, in terms of affective reactions and resource allocation, to members of their own group (the in-group) than to members of other groups (the out-group)—a phenomenon termed *ethnocentrism* or *in-group favoritism* (Brewer, 1979; Tajfel & Turner, 1986). The second offspring of Tajfel's (1969) pioneering research reflects the asymmetrical accentuation of intragroup similarities in favor of out-group homogeneity. That is, people judge members of out-groups as more similar to one another than they do members of in-groups. Males may perceive females as more similar to one another than they perceive males and vice versa. Pro-lifers may judge pro-choicers to be more similar to one another than they judge pro-lifers to be and vice versa. Academicians may perceive business people to be more similar to one another than they perceive fellow academicians and vice versa. This phenomenon is known as the *out-group homogeneity effect* and is the focus of the present article.

The out-group homogeneity effect can be considered a special case of stereotyping. In the early phases of stereotyping research, stereotypes were conceptualized in terms of the prototypic trait dimensions of a given social group (Gilbert, 1951; Karlins, Coffman, & Walters, 1969; Katz & Braly, 1933). Stereotypes were viewed as the perceived central tendency of the

group on prototypic trait dimensions. As stereotyping research moved away from content to process issues (Park, Judd, & Ryan, 1991), new questions were asked: Is the perceived central tendency of the group more likely to be used when judgments of the out-group are made than when judgments of the in-group are made? Is the out-group viewed as more homogenous than the in-group?

A substantial body of literature has accumulated that demonstrates the existence of the out-group homogeneity effect. Six recent reviews (Linville, Salovey, & Fischer, 1986; Messick & Mackie, 1989; Mullen & Hu, 1989; Park et al., 1991; Quattrone, 1986; Wilder, 1986) support the robustness of this effect over a variety of group identities, measures of perceived variability, and social settings.

Perceptions of group homogeneity have implications for perceptions of individual group members. Out-group (but not in-group) members may be viewed as exemplifying the group's central tendency, especially in the absence of individuating information. To the extent that cognitive content guides social perception and behavior, such out-group members may be evaluated or even treated unfavorably (see Park et al., 1991, pp. 213-215, for a relevant discussion). Understanding the determinants and circumstances of the occurrence of the out-group homogeneity effect has implications for understanding intergroup behavior at a societal level.

Traditionally, investigations of the out-group homogeneity effect have relied on natural groups. Minimal (i.e., artificially created in the laboratory) groups were used mostly for the study of in-group favoritism. Recently, however, there has been a persistent trend to examine the out-group homogeneity effect in the context of minimal groups.

The purpose of this article is threefold. The first is to reexamine the conclusion that out-group homogeneity effects are reliably obtained under minimal-group conditions. This conclusion has been asserted in empirical articles on the topic (e.g., Brown & Smith, 1989; Judd & Park, 1988), in introductory text summaries of the phenomenon (e.g., Sears, Peplau, & Taylor, 1991, pp. 410-411), and in previous reviews of the literature (e.g., Mullen & Hu, 1989). The emergence of this effect under

minimal-group conditions is relevant to establishing the validity of several theories in this domain.

The second purpose of the article is to review the theories that have been proposed to explain the out-group homogeneity effect and to develop a taxonomy of the various explanatory processes. This review directs particular attention to whether the theories predict the presence of out-group homogeneity effects under minimal-group settings.

The final purpose of the article is to critically examine the theory, the research methods, and the existing set of empirical findings to identify conditions under which the out-group homogeneity effect may be produced in minimal-group settings.

Natural Versus Minimal Groups

Natural and minimal groups have very different characteristics. The features of each are described in this section.

Minimal Groups

The minimal-group paradigm (Tajfel, Billig, Bundy, & Flament, 1971) creates a sense of group membership without any accompanying knowledge about any one particular group member. It was developed to study group identification processes in a context in which the perceiver does not have differential information (either in terms of number of acquaintances or length of acquaintanceship) about members of the in-group versus members of the out-group. This is accomplished by randomly assigning group labels to respondents. From the respondents' point of view, membership ostensibly was derived from their performance on an ambiguous task (e.g., labeling respondents as *overestimators* or *underestimators* on the basis of a dot estimation task).

Tajfel et al. (1971) specified six criteria the minimal-group paradigm should satisfy to ensure that intergroup categorization, by itself, is responsible for any observed in-group versus out-group differences. Four of the six criteria are relevant to the study of out-group homogeneity (the other two are related specifically to the study of ethnocentrism). First, there should be no face-to-face contact between the respondent and members of either the in-group or the out-group. Second, there should be complete anonymity of group membership. Third, respondents outcomes should be unaffected by their responses. Fourth, the responses under investigation should be viewed as important by the respondents.

Previous claims of support for the out-group homogeneity effect in the minimal-group paradigm (Mullen & Hu, 1989) have not examined the extent to which the setting of those experiments satisfied the Tajfel et al. (1971) criteria. As will be shown, there is considerable variation in the characteristics of the various minimal-group experiments in this area. The present review includes all minimal-group experiments that randomly assigned respondents to groups.

Natural Groups

The natural-group approach to studying out-group homogeneity effects looks at preexisting group memberships. Gender (male vs. female), nationality (American vs. Irish), and age

(young vs. old) are examples of some natural groups in which out-group homogeneity effects have been studied.

A special design issue arises in the study of natural groups because of the possibility that such groups may differ in their actual degree of variability. For example, there is almost certainly less variability in physical agility among old people than among young people. This means that if only young people were sampled, the out-group homogeneity effect would emerge as an artifact of a true difference. If just old people were sampled, the data would likely show a reversal of the predicted effect.

When using a natural-groups design, respondents should be selected from both groups to counterbalance the potential effects of such differences. A corollary of this concern is that the same number of subjects be selected from each group. This prevents the differences from one group contributing more to the overall out-group homogeneity effect than differences from the other group. Such precautions are sometimes difficult to implement and so are not always taken (e.g., Brown & Smith, 1989; Denhaerinck, Leyens, & Yzerbyt, 1989; C. Kelly, 1989; Triandis, 1990). The natural-group experiments included in this review are restricted to ones that used the requisite counterbalancing.

A Taxonomy of Theories

A variety of theoretical explanations for out-group homogeneity effects have been proposed in recent years. However, there has as yet been no attempt to summarize and contrast those alternative explanations. Previous reviews (Linville et al., 1986; Messick & Mackie, 1989; Mullen & Hu, 1989; Quattrone, 1986; Wilder, 1986) focused more on summarizing the empirical findings than on examining the theoretical bases of the effect. Other research overviews (e.g., Park et al., 1991; Simon, in press) highlight just one or two types of theory to exclusion of others.

The present section provides an overview of existing theories of the out-group homogeneity effect. Investigators in this area have tended to focus on their own conceptual orientation, without explicitly discussing how the alternative approaches might account for their findings. One function of this overview is to identify and describe the key models that have been advanced in this area. A second purpose is to provide a taxonomy that allows the similarities and differences among the theories to be highlighted. The third purpose is to examine the implications of the different taxonomic processes for predicting whether the out-group homogeneity effect should be observable under minimal-group conditions. We show that certain classes of explanations appear to predict the existence of this effect.

Need-Based Theories

A variety of motivational processes have been proposed as explanations for the out-group homogeneity effect. Several basic social needs suggest that people are motivated to perceive either the out-group as homogeneous or the in-group as heterogeneous.

The need for a *positive social identity* (Tajfel, 1978, 1982a) can lead a person to ascribe positive characteristics to the self as

well as to groups with which he or she identifies (i.e., in-groups). Individual complexity and heterogeneity are two such positive characteristics (at least in Western cultures) that become especially salient when respondents are presented with questions regarding in-group and out-group homogeneity. Of course, there are circumstances in which group heterogeneity is not necessarily a positive characteristic, as in the case of political and religious affiliations (see C. Kelly, 1989).

The need for *uniqueness* (Quattrone & Jones, 1980; Snyder & Fromkin, 1980) can lead people to minimize differences among out-group members as a way to enhance one's own individuality. Deindividuating the out-group facilitates personal uniqueness without having to challenge the complexity and heterogeneity of the in-group. A variant of the uniqueness explanation holds that people view the in-group as more heterogeneous than the out-group as a means for asserting their own individuality and justifying their freedom from constraining group norms and expectations (Jones, Wood, & Quattrone, 1981; Quattrone & Jones, 1980).

The need for *predictability* (Irwin, Tripodi, & Bieri, 1967), especially in the face of external threat, can lead people to place all out-group members into a single category. People may overestimate out-group homogeneity for the sake of illusory predictability. By viewing all out-group members as sharing common attributes, the person may feel better prepared to cope with those members in future interactions. This, in turn, should minimize anxiety when anticipating such future interactions. Note, however, that a reversal of the out-group homogeneity effects could be predicted when threat motivates the person to pay closer attention to which of the out-group members is most dangerous (Irwin et al., 1967; Stephan, 1977).

Another basic social need is the need to *justify in-group favoritism and out-group hostility* (Wilder, 1986). Deindividuation of the out-group may facilitate the use of aggressive and even brutal responses to threatening out-group members by dehumanizing them and portraying them as uniformly evil. Such needs may be especially prominent at times of physical conflict (e.g., world wars and turf battles among urban gangs).

Salience of Self

The self, by definition, is always a member of the in-group. If variability judgments are made by thinking about typical members of the in-group and the out-group, it is likely that the self will be an especially salient member of the in-group. Park and Judd (1990) reported that the self is thought of more frequently in the context of in-group judgments than in the context of out-group judgments. To the extent that the self is perceived as especially unique and differentiated, this self-perception might be generalized to other members of the in-group.

Stored Beliefs About Homogeneity

People may have cognitively stored previously acquired beliefs about group homogeneity and access those beliefs when making homogeneity judgments (Park & Judd, 1990). Such *group-specific* beliefs could develop automatically on an online basis (Park & Hastie, 1987) as the perceiver encounters information about each group and its members. Alternatively,

they could be acquired directly in the form of third-party communication about the characteristic level of homogeneity of a group (e.g., "the guys in that fraternity are all alike").

Several factors could lead stored beliefs to assert greater homogeneity for the out-group. Greater familiarity with the in-group would lead a person to encounter a wider variety of persons from the in-group than the out-group. Furthermore, the level of intimacy of interaction with the in-group (and therefore increased familiarity with more diverse aspects of each member) is likely to be greater. Both considerations would lead to greater on-line exposure to variability in the in-group than in the out-group.

The argument above pertains to the storage of beliefs about specific groups with which one has experience. However, it is possible that more global beliefs about out-group homogeneity are developed, stored, and then accessed when making variability judgments. For example, Wilder (1984) has suggested that people develop an expectancy of greater homogeneity for out-group members that is generalized across all out-groups. Indirect support for this *generalized expectancy* prediction is provided by Perdue, Dovidio, Gurtman, and Tyler (1990), who found that the use of group-nonspecific words that refer to in-groups and out-groups (e.g., *us* and *them*) can unconsciously activate intergroup biases.

Information Encoding and Retrieval

As a result of experience, people acquire and cognitively store a variety of facts, observations, and inferences about group members. This category of explanations for the out-group homogeneity effect derives from the manner in which people process those items of information.

Nature of the encoded information. One approach focuses on the question of what information about groups and their members becomes encoded and thus may be used as the raw data when variance estimates are requested. Even when no actual differences in variability exist between the groups, this approach identifies factors that could produce an out-group homogeneity effect.

One possible factor is the *number of exemplars* from each of the in-group and out-group categories one encounters (Linville, Fischer, & Salovey, 1989). Perceptions of variability will psychologically increase with an increase in the number of different people or distinct category subtypes one has met or with the number of different social encounters one has had.[1] (That is, we

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[1] That perceived variability increases with sample size makes intuitive sense, although the notion is empirically untested. In the text, we referred to different people, distinct category subtypes, and different social encounters. Thus, we assume that perceptions of variability are not just a function of exemplar number, but mainly a function of differences among exemplars (i.e., among people, subtypes, or social encounters). We believe that larger samples are more likely to contain highly differentiated exemplars than smaller samples. Consistent with our assertion, frequency and statistical variability are naturally correlated in the real world: On the average, large samples display greater variance than small samples, even though they are drawn from the same population.

define exemplars in terms of people, category subtypes, or social encounters.) Because experience leads us to know more in-group members than out-group members, an out-group homogeneity effect will result from estimating variability on the basis of the two sets of stored exemplars.

A second possible factor is the degree of *intimacy of interaction* with group members (Wilder, 1984, 1986). Perceptions of group homogeneity will be reduced when the quality of interaction allows us to know and cognitively store the unique and individuating characteristics of each group member. To the extent that interactions with in-group members are less superficial, are less driven by social norms, are more enduring, and occur in a greater variety of social contexts than with out-group members, this process will yield the out-group homogeneity effect.

A third possible factor is the *differential structure* through which in-group versus out-group information is stored. Ostrom, Carpenter, Sedikides, and Li (in press) have found that information about in-group members is stored in person categories, whereas information about out-group members is stored is stereotype-related attribute categories. Searching such chronic cognitive structures will yield individuated information for the in-group and attribute-based similarities in the case of the out-group.

Nature of the retrieval processes. Alternative retrieval-based explanations have not been well delineated in the literature. This approach suggests that people engage in selective retrieval of stored information. The selectivity assumption is in contrast to other models (e.g., Linville et al., 1989) that assume an exhaustive search of all model-relevant information. The alternatives described below differ primarily in terms of the type of stored information being accessed.

The out-group homogeneity effect may derive from the differential nature of accessed exemplars. It is possible that the most readily accessible exemplars for the out-group are the ones most prototypical (i.e., highly stereotypical) of the category, whereas the most accessible exemplars for the in-group are based on recency or frequency of contact. This difference could produce an out-group homogeneity effect through either of two routes. First, it could lead the retrieved exemplars to be more similar to one another for the out-group than for the in-group. Second, the retrieved exemplars may be compared with the category prototype (or feature list) sequentially as they are accessed. In-group exemplars would differ more from the prototype than would the out-group exemplars.

Some measures of out-group homogeneity invite a certain pattern of selective retrieval. Subjects are sometimes given an attribute scale (e.g., aggressiveness) and asked to rate how high the highest person in the group is and how low the lowest person in the group is. This explicitly invites a memory search for extreme members on the designated attribute.

A directed search for extreme exemplars would not, by itself, produce an out-group homogeneity effect, given that the stored information bases for the in-group and out-group did not differ in variability. However, it is possible that the *search rule* differs for the in-group versus the out-group. People may search more exhaustively for extreme exemplars for in-group ratings than for out-group ratings. This could be driven, for example, by the

judge experiencing more positive affect (i.e., fondness, bemusement, and sympathy) when being reminded of in-group "characters" than of out-group "deviants." The out-group homogeneity effect would result from respondents ultimately retrieving more extreme exemplars for the in-group than for the out-group.

People may retrieve cognitive products other than exemplars of the two groups. It is possible that homogeneity judgments are based on the *retrieval of behaviors* (and other person features) that are diagnostic of the attribute being judged. For example, judgments of how variable males are on the attribute of aggressiveness might involve retrieval of aggressive acts done by males, without reference to exactly which male did them (e.g., a male doing a mugging and a male kicking a dog).

The several issues of selective retrieval discussed above in regard to exemplars apply equally well to behaviors. However, shifting to behaviors as the cognitive product opens up an additional basis of selectivity (Ostrom et al., in press). Behaviors may be cognitively categorized either by the person who did them or according to stereotypical taxonomic categories. Examples of such taxonomic categories for males are college major (e.g., engineering and chemistry), household duties (e.g., yard work and car maintenance), and favorite sports (e.g., football and basketball).

Any particular behavior may be selectively encoded (see the earlier section, Nature of the encoded information), or it may be dually encoded. Dual encoding would mean that any particular behavior (e.g., noticing your neighbor mowing his lawn) could simultaneously be placed in a category corresponding to the neighbor (a person category) and in a category corresponding to male household duties (a stereotypical taxonomic category). From a storage point of view, then, an item could be accessed through either category system.

The concern here is with the question of whether in-group versus out-group membership will influence which retrieval route is used under conditions of dual encoding. It is possible that the *in-group* label selectively activates retrieval routes to the person categories and the *out-group* label selectively activates retrieval routes to the stereotypical taxonomic categories. In such a case, the categories themselves will emphasize individuality in the case of an in-group search and group similarities in the case of an out-group search.

Role of the Minimal Group in Theory Testing

The proposed taxonomy summarizes a number of potential determinants of the out-group homogeneity effect. An effort was made in each case to highlight the unique fundamental characteristics of each conceptual process. All the theories predict the existence of an out-group homogeneity effect in natural-group settings. Our primary question in this section is on which theories do and which do not provide a basis for expecting the effect in minimal-group settings.

In developing these predictions, we focus primarily on the implications of the fundamental concepts described in the taxonomy. We ask the extent to which these "first principles" lead directly to the prediction of an out-group homogeneity effect

under minimal-group conditions. We have deferred discussion of the situational potency of these principles and the possible contribution of other forces to later in the article.

Need-Based Theories

Need-based theories predict the appearance of out-group homogeneity effects in minimal groups. The identified needs are assumed to be important for the self, and so they should be present at some level in all contexts, including the minimal-group setting. For example, the need for a positive identity should be active when people are seeking to discover what it means to be an overestimator by the experimenter's standards.

Salience of Self

The minimal-group setting provides little or no individuating information about the other members. There is only one person about whom the respondent has detailed information, and that is the self. Consequently, salience of the self should be especially important in the minimal-group setting. This leads to the prediction that out-group homogeneity effects should be obtained in minimal groups.

Stored Beliefs about Homogeneity

One criterion of the minimal-group approach is that there be no face-to-face contact between the respondent and the in-group or the out-group members. Under such circumstances, it would be impossible to develop group-specific beliefs about group variability on an on-line basis. The respondent has no information base on which to form such beliefs. Furthermore, the minimal-group approach does not allow any third-party communication about the characteristics of the groups. Although theories regarding the storage of group-specific homogeneity beliefs provide a basis for predicting the out-group homogeneity effect in natural groups, they do not predict such an effect in minimal groups.

The situation is different in the case of the generalized-expectancy prediction. If respondents have such an expectancy about out-groups, then it should influence the variability judgments made of out-groups in the minimal-group settings.

Information Encoding and Retrieval

Explanations that involve encoding and retrieval processes come into play only when the respondent has acquired information about the group or its members. Consequently, these processes provide no basis for predicting an out-group homogeneity effect under minimal-group conditions. This is because the group label (and its accompanying description) is assigned randomly to the minimal groups, and therefore no differences in informational variability will exist.

Theoretical Vulnerabilities

Several of the theoretical categories contain no basis for predicting the emergence of out-group homogeneity effects in the minimal-group setting (i.e., stored group-specific beliefs about out-group homogeneity and information encoding and retrieval). Should a reliable effect be found under minimal-group circumstances, difficulties would be created for these classes of theory. At a minimum, a reliable effect would establish that they were not the sole basis of the effect and that one or more of the other processes were critical constituents of the eventual explanation. Furthermore, such an outcome would leave open the possibility that these two categories of process played no role in the effect whatsoever.

The remaining categories of theory (i.e., need-based theories, salience of self, and generalized expectancies about out-group homogeneity) are expected to operate in both natural-group and minimal-group settings. Although from a statistical point of view, one cannot formally accept the null hypothesis, it is possible to cast doubt on its rejectability (Greenwald, 1975). Should no convincing evidence emerge for the out-group homogeneity effect under minimal-group conditions, the validity (or at least the potency) of these three categories of explanation would be seriously questioned.

Review of the Literature

This section reviews the empirical literature on the out-group homogeneity effect. A variety of perceived variability measures have been used in the study of this phenomenon. Park and Judd (1990) have identified three clusters of such measures, each of which have yielded out-group homogeneity effects. These are stereotype endorsement, perceived dispersion, and perceived similarity. It is appropriate, then, to examine each cluster of measures separately.[2]

Clusters were viewed by Park and Judd (1990) as unitary latent variables. However, it is possible (as Park and Judd pointed out) that the cognitive mechanisms contributing to one measure in a cluster differ from the cognitive mechanisms underlying other measures involved in the same cluster. This is of

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[2] Several studies used indexes of the out-group homogeneity effect that are not easily classifiable according to the Park and Judd (1990) categories. Quattrone and Jones (1980) examined the extent to which people will generalize from the behavior of a single member to the group as a whole. Higgins and Bryant (1982) examined whether people would be more likely to use consensus information in explaining an out-group member versus an in-group member's choice behavior. A line of research has focused on accuracy in recognition of in-group versus out-group faces (see Anthony, Copper, & Mullen, 1992, for a review). Stephan (1977) used the variance of each subject's ratings of the group across 10 separate rating scales, as an index of differentiation of group-level attributes (what Quattrone, 1986, termed *taxonomic variability*). Simon, Glassner-Bayerl, and Stratenwerth (1991) derived factor scores after subjecting range, standard deviation, and probability of differentiation to a principal-components analysis. Finally, Ostrom, Carpenter, Sedikides, and Li (in press) used clustering in free recall to assess the tendency to individuate in-group over out-group members. The out-group homogeneity effect emerged in all but the Stephan (1977) study.

special concern, because the Park and Judd analysis was conducted only with natural-group data and used only a single natural group. It is possible that a different configuration of relations among measures could emerge with other natural groups or with minimal groups.

The present review accepts the three-variable clustering of measures identified by Park and Judd (1990). This has the advantage of providing a broader picture of any differences between natural and minimal groups. However, we provide a separate analysis of each measure within each of the three groupings.

Stereotype Endorsement

The first cluster of measures, stereotype endorsement, relates to perceptions of the extent to which group members conform to the group stereotype. In their first experiment, Park and Judd (1990) found that this latent variable was marginally related ($p < .10$) to out-group homogeneity, with out-groups receiving stronger endorsements than in-groups.

Stereotype percentage. One index of stereotype endorsement was provided by asking respondents to estimate the percentage of group members who had a particular stereotypic or counterstereotypic characteristic. Higher percentage ratings of stereotypic characteristics and low percentage ratings of counterstereotypic characteristics indicated higher stereotype endorsements.

This stereotype percentage measure has been used in five natural-group experiments, two by Park and Rothbart (1982, Experiments 1 & 2), two by Park and Judd (1990), and one by Judd, Ryan, and Park (1991). In all cases, a significant out-group homogeneity effect was obtained. A higher percentage of out-group members was perceived as having stereotypic characteristics, and a lower percentage was perceived as having counterstereotypic characteristics. Unfortunately for the purposes of this review, no minimal-group experiments used this index.

Stereotype strength. Stereotype strength has been measured in two ways. One index was based on respondents' ratings of the average group member on scales in which the endpoints were labeled with the presence versus absence of a stereotype-relevant characteristic. More extreme stereotype ratings indicated higher stereotype endorsement. A variant on this index was a distribution task in which respondents were asked to distribute 100 randomly selected members of the group across the categories of the rating scale. The mean of that perceived frequency distribution provided another index of stereotype strength.

Indexes of stereotype strength have been examined in three experiments to assess perceptions of group variability (Judd et al., 1991; Park & Judd, 1990, Experiment 1; Quattrone & Jones, 1980), all of which used natural groups.[3] Quattrone and Jones (1980) asked Princeton and Rutgers undergraduates to rate the average undergraduate man at their own and the other university on bipolar scales that were relevant to the stereotypes about the two schools. They found that the strength of the stereotype rating was greater for the out-group than for the in-group.

A natural-group experiment by Park and Judd (1990, Experiment 1) used both task variants (i.e., direct ratings and percent distribution) described above. Both indexes were significantly

related to the latent variable of stereotype endorsement in the structural equations analysis.

The picture is slightly less clear when examining Park and Judd's (1990) separate analyses of each index. Two of the three failed to reach significance. Two versions of the distribution task were given, one in which respondents distributed dots of different sizes and one in which respondents distributed percentage frequency estimates. The dot distribution task was the first of five variability measures and yielded a significant out-group homogeneity effect. The percentage distribution task was fourth in the sequence and showed nonsignificant results. The third index, direct stereotype ratings, was collected third in the sequence and also did not reach significance. It is impossible to determine whether the nature of the different tasks or their order in the sequence was responsible for the pattern of significance.

Another possibility is that the weak results were due to the use of gender-defined groups. The third natural-group experiment (Judd et al., 1991) used business and engineering majors and yielded a strong out-group homogeneity effect for both the direct rating and the dot distribution task.

The stereotype strength index has been ignored in several out-group homogeneity studies, despite the fact that the relevant data had been collected. For example, Karasawa and Brewer (1989), Judd and Park (1988), Park and Judd (1990, Experiment 2), and Park and Rothbart (1982, Experiment 3) obtained the requisite data but did not present the relevant analyses.

Summary of stereotype endorsement findings. Overall, the evidence provides clear support for an out-group homogeneity effect on stereotype percentage measures and stereotype strength measures. Unfortunately, the findings pertain only to natural groups; no corresponding findings are available for minimal groups.

Note one serious difficulty with the use of these indexes as measures of perceived variability. Ethnocentrism pressures lead respondents to ascribe desirable attributes to the in-group and undesirable attributes to the out-group (Brewer, 1979). Consequently, a stereotype endorsement index consisting of only negative attributes could produce more extreme ratings for the out-group because of ethnocentrism effects rather than out-group homogeneity effects. If only positive attributes are used

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[3] Three other potentially relevant studies were not included in this analysis. Linville, Fischer, and Salovey (1989, Experiments 1–3) asked their subjects to rate the in-group and the out-group on several attributes. On the basis of these ratings, Linville, Fischer, and Salovey derived central tendency scores. In principle, central tendency scores can be construed as indexes of stereotype strength. In this case, however, the attributes were not adequately pretested for age (Experiment 1), nationality (Experiment 2), and gender (Experiment 3), despite the authors' effort to correct for this problem (see Linville, Fischer, & Salovey, 1989, p. 170, footnote 4). In Experiment 3, where there was a basis for distinguishing between gender stereotypic and nonstereotypic attributes, no analyses were conducted for the separate groups of attributes. We conclude (in agreement with the Linville, Fischer, & Salovey interpretation) that the central tendency results in this article should be interpreted as ethnocentrism effects rather than as stereotype strength effects.

in the index, ethnocentrism effects could cancel out (or even reverse) the out-group homogeneity effect. For indexes of stereotype endorsement to be most informative, they should contain an equal number of positive and negative attributes for each of the two groups (Park & Rothbart, 1982).

Perceived Dispersion

The second latent variable identified by Park and Judd (1990) was perceived dispersion. This variable significantly reflected the out-group homogeneity effect in their structural equations analysis. Measures of perceived variability present respondents with the same kinds of response scales as are used in the stereotype endorsement cluster but assess a different property of the respondents' perceptions. Whereas the stereotype endorsement measures focus on the mean of the ratings, the perceived dispersion measures focus on the variability of the ratings. Three types of perceived dispersion measures were used.

Range. The range measure uses one or more rating scales that reflect attributes of the group. Respondents are asked to indicate for each scale where the highest group member would fall and where the lowest group member would fall. The difference between these two ratings provides the index of perceived range. One variant is to measure the interquartile range instead of the full range. In this case, respondents are asked to indicate the 2 points on the scale between which 50% of the group members fall.

The range measure has been used in four natural-group experiments. Three of the studies supported the predicted effect. Park and Judd (1990, Experiment 1) and Judd et al. (1991) had respondents rate groups (males and females and business and engineering majors, respectively) on eight scales. All scales were relevant to the group stereotypes. Jones et al. (1981) had Princeton undergraduates rate members of their own and three other "Eating Clubs" on eight scales that varied in their relevance to the several clubs. All three studies obtained significant support for the out-group homogeneity effect.

One natural-group study yielded negative results. Brown and Smith (1989) had 37 academic staff members from a British university provide range estimates for a variety of groups on a variety of scales. They reported the data from three scales for gender. No significant out-group homogeneity effect was found for any of the scales. Directional support was found for one scale but not for the other two. Averaging over all three scales, the direction was opposite to prediction.

Two considerations are relevant to interpreting these findings. First, the three scales in this study appear irrelevant to gender stereotypes. Second, this is the only study to have respondents rate multiple groups. The perceptual focus could have been on differentiating among the several out-groups rather than differentiating the in-group from a single out-group.

The range measure has been used in three minimal-group experiments. Wilder (1984, Experiment 1) had respondents rate either in-group or out-group members on scales that were supposedly relevant to the basis of group membership (preference for Klee versus Kandinsky paintings). Respondents were told that half the people ($n = 10$) in the testing room were from each group. Group membership was anonymous, and no individuat-

ing information of any kind was provided regarding any of the other respondents in the room. Wilder (1984) obtained significant support for the out-group homogeneity effect from ratings on two of the scales; the third scale was in the predicted direction but did not reach significance.

The range measure was also used by Simon and Brown (1987). Respondents were assigned to a blue or green group ostensibly on the basis of the accuracy of their responses to blue versus green patterns of dots. Respondents provided range estimates on four scales, three relevant and one irrelevant. Data were collected in large groups ($n = 50$), but group membership was kept anonymous.

Simon and Brown (1987) conducted a multivariate analysis on the four scales and found no significant out-group homogeneity effect. Univariate analyses on the separate scales indicated a significant effect for one relevant scale but no significant effect for any of the remaining three scales. In fact, the means for the three nonsignificant scales were all opposite to prediction.

The results of the Simon and Brown (1987) experiment require some elaboration. This experiment introduced a variation in perceived group size; the in-group was described as being either a minority or a majority, numerically speaking, in comparison with the others in the testing room. The pattern of significance described in the preceding paragraph was for the overall in-group versus out-group main effect in that design.

It was possible to examine the means for just the conditions in which in-group size was described as equaling out-group size (i.e., the condition in which both groups included about 50% of all participants and the condition in which both groups were in a minority). These are the conditions that are most comparable to the other minimal-group studies covered in this review. These means showed exactly the same pattern described previously for the main effect, including the reversal of prediction for three of the four scales. Summing across all four scales (or even just the three relevant scales) yields an overall reversal of the predicted effect for these equal-sized groups.

The third minimal-group experiment that examined range was conducted by Karasawa and Brewer (1989, footnote 5). This experiment involved respondents (3–5 per session) being assigned to overestimator or underestimator groups on the basis of their responses to a dot estimation task. Before providing variability data, respondents were asked to read a set of 36 behavior descriptions that characterized members of the two groups, with the dual goal of forming an impression of the two groups and remembering as many behaviors as possible. Some behaviors ranged from *intelligent* to *stupid;* others ranged from *warm* to *cold.*

The range measure used by Karasawa and Brewer (1989) involved two rating scales, one anchored by *intelligent–stupid* and the other by *warm–cold.* No significant effect was found, and in fact the average range was greater for the out-group than for the in-group (M. B. Brewer, personal communication, March 1990).

Data were potentially available from an experiment by Judd and Park (1988). They had respondents rate all 4 members of the in-group and of the out-group on two relevant scales. Range could be directly calculated from these data. Unfortunately, no analyses of this index were reported.

Relatively strong support for the out-group homogeneity effect was found for the natural-group experiments using the range index. But, only weak support emerged from the minimal-group experiments, with one experiment yielding statistically significant support and the other two experiments finding a nonsignificant reversal in the overall pattern of means. This index does not provide convincing evidence for the existence of out-group homogeneity effects in the minimal-group setting.

Standard deviation. The standard deviation is one of two indexes derived from the distribution task. The other index, probability of differentiation, is described in the next section. The distribution task has respondents estimate the percentage of people in the target group that fall into each category of a rating scale. Two to eight scales are typically used for each group, with each scale having about seven categories. The score for each respondent is calculated by computing the standard deviation (sometimes the variance is used) for each rating scale and averaging them across the several scales given to the respondent. The higher the standard deviation, the higher the perceived variability.

The standard deviation index was used in six natural-group experiments. Linville et al. (1989) conducted three experiments that used age (young or old), nationality (Irish or American), and gender as the bases of group membership. The rating scales used in the distribution task included attributes both relevant and irrelevant to the group stereotypes. Significant effects were found only for the age study. The predicted effect was not significant for nationality and was actually reversed (nonsignificantly) for gender.

Park and Judd (1990) reported two relevant experiments, the first of which used gender-based groups. Only relevant scales were used for the distribution task. Subjects responded to both versions of the distribution task in this experiment. Both loaded significantly on the latent variable of perceived dispersion (which, in turn, showed the predicted effect). In separate univariate analyses, significant confirmation of the effect was obtained in the first of their series of measures (distributing dots into the rating scale categories), but the effect did not reach significance when the measure was given fourth (distributing percentages into the rating scale categories).

Park and Judd's (1990) other experiment used college major as the basis of group identity (business vs. engineering). Using the percentage distribution task, the predicted effect was found to be marginally significant ($p < .10$). In a replication of this study (Judd et al., 1991) that used the dot distribution task, the effect was significant.

Over all six natural group experiments, the out-group homogeneity effect was reasonably well supported. It was in the predicted direction for five of the six experiments. Three reached statistical significance, and one was marginally significant.

Five minimal-group experiments have used the standard deviation index. Judd and Park (1988) used an embedded figures task to assign people to Type F versus Type G. Of the 8 persons in each session, 4 were assigned to each type. They were all seated at one table with the Type Fs placed at one end and the Type Gs at the other. A brief description of the characteristics of each group type was provided, and each respondent wrote a list of individuating information items on a blackboard. The standard deviation index derived from the distribution task did not show a significant out-group homogeneity main effect, although the means were in the predicted direction. The experiment also included a second standard deviation index. Respondents rated each of the 4 in-group members and the 4 out-group members on several scales relevant to group identity. The standard deviations of these ratings were analyzed. Again, no significant out-group homogeneity effect was found. In fact the means were opposite to prediction. As a final analysis, the group-level and individual-level standard deviations were combined into a repeated measures analysis; no overall effect was obtained.

There was one hopeful note to this experiment. Subjects were assigned to either a cooperative condition (in which the in-group and out-group were to work together in competition against external groups) or a competitive condition (in which the in-group and out-group were to compete against each other). It was expected that competitive groups would show a stronger out-group homogeneity effect than cooperative groups. Statistically significant support for this prediction was found for the group-level index. However, that support did not extend to the individual-level or repeated measures analyses.

A reasonable argument can be made to give greatest weight to the group-level index over the individual-level index. The focus of the out-group homogeneity effect is on perceptions of the group as the unit of analysis rather than on any idiosyncratic subset of the group. Also, all the other measures covered in this review adopt the group as the unit of analysis. These considerations lead to a more positive interpretation of the Judd and Park (1988) results.

Three minimal-group experiments were reported by Karasawa and Brewer (1989). They were all similar in design to the one described in the previous section. In none of the three experiments was a significant out-group homogeneity effect observed for the standard deviation index (M. B. Brewer, personal communication, March 1990). In fact, the means were opposite to prediction in two of the three experiments. The one experiment that showed positive results (Experiment 1) also manipulated whether respondents viewed the groups as being equal or different in size. Examination of the means from these more relevant equal-sized conditions revealed a reversal of the predicted effect.

The fifth minimal-group study was conducted by Simon (1990). Subjects were classified into two groups ostensibly on the basis of their preferences for one of two painters (A or B). Subjects were next presented with two other pairs of paintings and were informed that one was by painter A and one by painter B. Subjects were subsequently asked to imagine 100 people who preferred painter A and another 100 people who preferred painter B and to also estimate the number of these hypothetical people that would like each painting. Subjects distributed these people in 7 boxes labeled from *not at all* to *extremely.* The standard deviation of these frequency distributions was calculated. The out-group homogeneity effect was nonsignificant and in the opposite direction.

Unlike the natural-group results, the minimal-group findings for the standard deviation index are exceptionally weak. None of the five experiments produced a significant overall effect. One produced supportive findings, and four found the opposite effects. The only encouraging results occurred under

conditions of intergroup competition, but even that result requires replication to assure its reliability. Note also that although a competitive orientation may be a necessary prerequisite for obtaining the effect with minimal groups, it appears not to be necessary for natural groups.

Probability of differentiation. The probability of differentiation index was used by Linville et al. (1989) in conjunction with their PDIST computer simulation of perceived variability, which represents a cognitive model of out-group homogeneity effects. The model assumes that people cognitively access specific group members as well as subcategories of members of the target group when making group variability judgments along specified dimensions. For example, some exemplars may be high on the rating scale and others may be low, with none in the middle. This process can potentially lead to a perceived distribution that is multimodal. In such cases, the standard deviation will be less sensitive in representing variability. Maximum variability for the probability of differentiation measure is produced by a rectilinear distribution, whereas for the standard deviation it is produced by a bimodal distribution.

The same six natural-group experiments reviewed for standard deviation were also scored for probability of differentiation. Linville et al. (1989) found significant effects in both their age and nationality experiments. But, like before, the effect for gender was nonsignificant and in the wrong direction. Park and Judd (1990) did not find significant effects, either in their gender or their college major experiments when using univariate analyses on this index. However, the two probability of differentiation measures used in the gender experiment (from the dot distribution and percentage distribution tasks) both loaded significantly on the perceived dispersion latent variable, which, in turn, significantly showed the out-group homogeneity effect. Judd et al. (1991) reported that the probability of differentiation measure showed the predicted effect, but its level of significance was weaker than that for the standard deviation index. Like the standard deviation, the probability of differentiation index appears to show the predicted effect in natural groups.

The probability of differentiation index was used in six minimal-group experiments. Judd and Park (1988) found no significant effects with this index. The pattern of means, however, did mirror that found for the standard deviation index. M. B. Brewer (personal communication, March 1990) reported that no significant effect for the probability of differentiation index was obtained in any of the three experiments conducted by Karasawa and Brewer (1989). The pattern of means was the same as for the standard deviation index; the means were opposite to prediction in Experiments 2 and 3 as well as in the equal group size conditions of Experiment 1. Similarly, Simon (1990) obtained a nonsignificant reversal of the out-group homogeneity effect.

Simon and Pettigrew (1990) reported a study that used the probability of differentiation index (but provided no parallel analyses for the standard deviation index). The conditions of greatest relevance to this review are the ones in which subjects were given no information about the numbers of people in the in-group and out-group. Two kinds of in-groups were studied: well defined and ill defined. Well-defined in-groups were operationalized as those in which the people all preferred the same painter. Ill-defined in-groups were those in which the people did not prefer the same painter, with no knowledge about the painters they did like. The findings appeared to differ according to which type of group was being judged.

For well-defined groups, a reversal of the out-group homogeneity effect was obtained for all four attributes judged, with one reaching one-tailed statistical significance. For the ill-defined in-groups, a reversal was found for two attributes, and the out-group homogeneity effect was found for the other two attributes, with the latter two reaching one-tailed significance. No multivariate or repeated measures test was performed to assess the overall reliability of these differences, but a summary of the eight comparisons shows six reversals (with one being significant) and two supportive differences (with both being significant). Averaging across the eight comparisons shows an overall reversal of the predicted effect.

Over the six minimal-group studies that used the probability of differentiation measure, none showed a significant overall effect, and the direction of means was opposite to prediction in five of the six cases.

Summary of perceived dispersion findings. All three indexes of perceived dispersion (range, standard deviation, and probability of differentiation) show reasonably strong out-group homogeneity effects for natural groups. This held up over a variety of group memberships. The range index seems a bit more robust than the other two measures. This claim is supported both by the experiments reviewed in this section and by the latent structure analysis conducted by Park and Judd (1990). They found that range loaded much higher on the latent variable (coefficient = .76) than did standard deviation (coefficients = .42 and .36) or probability of differentiation (coefficients = .27 and .26).

The picture for the minimal-group experiments is much more bleak. The weight of the evidence across the eight experiments using perceived dispersion indexes argues against the existence of a strong out-group homogeneity effect. Overall, two of the experiments produced directionally supportive data (one reaching significance), and six were opposite to the prediction (none being significant).

Perceived Similarity

Perceived similarity was a third variable included in the structural equations analysis of Park and Judd (1990). It is normally measured by having respondents rate group members on a scale anchored by phrases such as *all completely different from one another* and *all pretty much alike.* The more similar the members are viewed as being to one another, the greater the perceived similarity.

Perceived similarity was not identified by Park and Judd (1990) as a separate latent variable distinct from stereotype endorsement and perceived dispersion but rather a measured variable that overlapped with both the other two latent variables. However, their structural equations analysis involved only one index of perceived similarity and so could not have identified it as being a unique latent variable. Because of its distinct measurement operations and because of the uncertainty regarding its redundancy with the other latent variables, we have given it separate treatment in this review.

Six studies examined similarity ratings in natural-group settings. Quattrone and Jones (1980) reported data from three relevant experiments. A significant effect was found for two of the three (premedical vs. nursing students and students with rightist vs. leftist political orientations) but not for a third (Princeton vs. Rutgers undergraduates).

The lack of significant results in this third experiment was surprising in that a significant out-group homogeneity effect had been found for the same respondents when analyzing the stereotype strength index. One possible explanation could be that the perceived homogeneity index in this experiment was the last of a long set of ratings. Fatigue and the many intervening activities could diminish the effects of group membership. A second possibility could be that question sequence activates the "given-new contract" (Clark, 1985; Haviland & Clark, 1974), in which speakers should provide new information rather than information that has just been provided. Such effects are known to emerge in surveys (Strack, Martin, & Schwarz, 1988). In the present study, it was possible that the perceived homogeneity index was interpreted to reflect sources of variability other than those conveyed in response to the earlier questions. A third possible explanation could be that the stereotype strength findings may have been an artifact of ethnocentrism. The stereotyped attributes used in that task appear to have more negative connotations for the out-group than for the in-group.

A fourth relevant experiment was reported by Park and Rothbart (1982, Experiment 3). Women made ratings of women in their own and other sororities. The predicted effect was obtained. The fifth experiment was conducted by Park and Judd (1990) using gender as the basis of group membership. As mentioned previously, this index was marginally related to the two latent variables of stereotype endorsement and perceived dispersion. However, it did not significantly show the out-group homogeneity effect when analyzed alone. But like the Quattrone and Jones (1980) experiment, it was given to respondents last in a long series of ratings. Finally, the sixth experiment was reported by Simon, Glassner-Bayerl, and Stratenwerth (1991), using gay and heterosexual men as subjects. The perceived-similarity measure revealed a significant out-group homogeneity effect. Notably, the effect was obtained although the measure appeared quite late in a rather long series of ratings.

Four other natural-group experiments provided similarity-rating data, but their results should be regarded cautiously. First, all used opinion similarity instead of group membership as the basis of in-group versus out-group assignment. Social identity may be less based on attitude than on group membership. This first concern also applies to the study of leftists and rightists by Quattrone and Jones (1980) described previously. Second, several of these experiments included an "undecided" option. Whereas there may be some attitudes that may provide a source of group identity (e.g., being in favor of women's liberation), it is dubious that having no opinion would act in a similar way.

A third problem is that these experiments were primarily interested in the false-consensus bias (Ross, Green, & House, 1977). This led them to precede the similarity-rating scale with judgments of the percentage of people that held the respondent's own (vs. other) attitudes. This allows the possibility that

inflated consensus estimates for one's own attitude could, by themselves, lead to higher ratings of dissimilarity for people holding that attitude.

Goethals, Allison, and Frost (1979) reported three experiments, all of which supported the predicted effect. People holding different attitudes were rated as more similar to one another for attitudes toward the women's movement (Experiment 1), President Carter's job performance (Experiment 2), and the university divesting stock in companies doing business in South Africa (Experiment 3).

Finally, Manstead (1982) reported an experiment in which each respondent reacted to four attitude issues (participation in the Moscow Olympics, women's movement, Prime Minister Thatcher's job performance, and government spending cuts). Separate analyses were conducted for each issue. Although the predicted pattern was obtained for all four issues, only the women's movement issue reached significance. The data, then, were marginally supportive of the prediction.

Of the 10 experiments using natural groups, only 2 failed to obtain significant support for the out-group homogeneity effect: the experiments by Park and Judd (1990) and by Quattrone and Jones (1980). However, in both of those cases, the similarity rating was the last of a series of response scales. And in both cases, measures of perceived variability administered earlier in the series did show significant effects. This set of experiments provides convincing support for the effect in natural groups, especially given the heterogeneity of memberships across the experiments.

Seven experiments tested similarity ratings in minimal-group settings. Brown and Ross (1977) report three such studies. Experiment 1 involved 124 grade school students who were randomly assigned to groups. After being given a reasoning test, one group was told they had done better, and the other group was told they had done poorer, than the other. Global similarity ratings showed no significant out-group homogeneity effect, with a small mean difference in the predicted direction.

Experiment 2 (also reported in Brown & Ross, 1982) also assigned grade school children ($n = 90$) to groups (X and Y) on an explicitly random basis. As in Experiment 1, each group was given a reasoning test to complete and were later told their group performed either inferiorly or superiorly to the other group. Ratings of similarity showed a statistically significant reversal of the out-group homogeneity effect.

Brown and Ross's (1977) Experiment 3 randomly assigned 44 grade school children to two classrooms on the basis of unstated criteria for the purpose of participating in a perceptual abilities task. Both groups were told later that they did not do as well as the other group on the perceptual task. Global similarity ratings showed statistically significant support for the out-group homogeneity effect.

Two experiments in the Karasawa and Brewer (1989) paper included a similarity index. No significant effect was obtained in either case; the direction of means was supportive for one experiment and contradictory for the other (M. B. Brewer, personal communication, March 1990).

Simon and Pettigrew (1990) included two indexes of perceived similarity toward the end of their set of dependent measures. One was the typical rating of similarity and differences; the other was a rating of "how easy would it be to make predic-

tions about the personality of someone who belongs" to the targeted groups. No significant differences were found for either index when analyzing the data from subjects in the conditions with no information about group size. Directionally speaking, one index favored the prediction, and the other went against it.

In the seventh minimal-group experiment (Simon & Mummendey, 1990), subjects were assigned to two groups (V and W) allegedly on the basis of their interests in various domains, such as music, art, and sports. The reported out-group homogeneity effect was significant.

In summary, substantial evidence for out-group homogeneity was found in the natural-group experiments. In contrast, four out of seven minimal-group tests yielded no statistically significant effects. Of the three effects that were significant, two were in the supportive direction, and one was in the opposite direction.

It is possible that the absence of significant effects arose from the placement of the similarity measure. In all but one of the experiments (Simon & Mummendey, 1990), the scale was near the end of a long series of dependent variables. This concern about scale placement was supported by the fact that the two natural-group experiments that yielded nonsignificant results also placed the measure at or near the end.

Overall Summary

Three types of measures for perceived variability were identified by Park and Judd (1990). In the case of natural groups, all three yielded strong evidence for the existence of out-group homogeneity effects. Data were available for two of the three types of measures for the minimal-group setting. Here, the evidence for the out-group homogeneity effect was quite meager.

Comparison With Mullen And Hu (1989)

Mullen and Hu (1989) reported a weak, but significant, out-group homogeneity effect for the minimal-group setting in their meta-analysis. Their conclusion has been echoed in both empirical papers and textbook summaries on the topic. In contrast to their conclusion, the present review finds little evidence to support the emergence of this effect in minimal groups. There are several reasons for the conflicting conclusions.

First, whereas our minimal-group analyses were based on 12 studies, theirs contained only 4. Also, none of the experiments they included used the standard deviation or the probability of differentiation indexes. Both of these measures yielded weak results.

Second, the most stringent tests should involve only groups that are equal in size, because perceived size can have a separate effect on perceived variability. For example, we omitted the two unequal-sized conditions from the Simon and Brown (1987) experiment, whereas Mullen and Hu (1989) retained them. Mullen and Hu's data show that the equal-sized conditions, when considered alone, yielded a net reversal of the predicted effect.

Third, three of the minimal-group studies reviewed by Mullen and Hu (1989) were taken from a technical report by Brown and Ross (1977). We were able to obtain more recent analyses for those studies (R. J. Brown, personal communication, June 1990) and discovered that the statistical values used by Mullen and Hu were incorrect. The most important difference was for Experiment 2. Mullen and Hu reported it as favoring the predicted effect, $F(1, 40) = 4.25$, whereas the new analyses show it as contradicting the prediction, $F(1, 72) = 8.51$.

Theoretical Implications

Although we cannot formally accept the null hypothesis of no out-group homogeneity effects under minimal-group conditions, this review does allow us to conclude that if such effects exist, they are very weak. This finding questions the validity of those theories that predict the existence of this effect. First, the social needs for a positive social identity, for uniqueness, and for predictability seem not to be influential, either singly or in combination, in contributing to this effect. Second, the salience of self as a referent when making variability judgments seems not to contribute to the effect. And, third, generalized expectancies about out-group homogeneity appear not to have much effect.

Refinement Rather Than Rejection

The absence of the out-group homogeneity effect casts a shadow on several classes of theory (i.e., need based, salience of self, and the generalized homogeneity beliefs). But it would be inappropriate to simply discard these theories. After all, each has proved fruitful in other domains. It should be far more productive to speculate about what modifications would be required to improve the capacity of these theories to account for the weak effects under minimal-group conditions.

Need-based theories. In their original form, the motivational processes guided by social needs were assumed to operate in a chronic manner in any group setting. However, it is possible that social needs are not invoked unless some specific event arouses them. For example, the need for uniqueness can be activated by providing feedback that the respondent is highly similar to others (Snyder & Fromkin, 1980). It may be that such activation is a precondition to this need contributing to out-group homogeneity effects in the minimal group.

Salience of self. Accessing the self as a member of the in-group may require more than simple categorization. The minimal-group approach often provides the members with merely an abstract label accompanied by no meaningful category features. Salience of self may not be invoked unless the category possesses defining properties that relate to areas for which the respondent is self-schematic (e.g., Bargh & Thein, 1985). Another possibility is that the setting may have to arouse some motivation to engage in social comparison processes with other in-group members.

Global homogeneity beliefs. People may hold generalized beliefs that out-group members tend to be similar to one another but not spontaneously access that belief when making variability ratings in minimal-group settings. At least two routes are possible. One is to increase the accessibility of the belief by having it invoked in reference to one or more out-groups that are irrelevant to the minimal-group context. Another is to impart a greater reality or relevance to the out-group.

It may be necessary to emphasize that the members of the out-group have a dynamic reality (beyond merely sharing a common label), that they share a common history, that they have interacted in the past, or that there is some expectation of future interaction.

Hybrid conceptions. Little work has been done at the interface of the motivational approaches and the more cognitively based categories of salience of self and generalized homogeneity beliefs. Exactly what are the cognitive consequences of arousing, for example, need for uniqueness at the time of making homogeneity ratings? It is possible that arousing such needs may increase the salience of self or the accessibility of generalized homogeneity beliefs. It may ultimately be necessary to work at the interface of several categories of theoretical processes in accounting for out-group homogeneity effects for both natural and minimal groups.

Processes Responsible for the Effect in Natural Settings

Even if one concludes that processes relevant to the theories discussed above play no crucial role in the minimal-group setting, this does not necessarily mean that they are equally irrelevant to natural-group settings. An examination of this possibility can provide critical information about the ways these processes may operate in natural groups. We illustrate this point for each of the three implicated processes.

It may be, in the case of social needs, that they require time and repeated exposure to each specific group before they can become a determinant of homogeneity perceptions. Similarly, the salience of the self may require previous experience in comparing oneself to other members of the in-group as a precondition for playing a role in this effect. Generalized beliefs about out-group homogeneity may only be applied to certain kinds of natural groups, such as those with a common history or those characterized by extended face-to-face interaction. The current findings, then, encourage a more differentiated analysis of these potential determinants of the out-group homogeneity effect.

The negligible minimal-group effects lend greater credence to the categories of explanation that are based on stored group-specific beliefs about homogeneity and based on information encoding and retrieval. These categories draw on information-processing concepts as the basis of their explanations. However, this does not mean that they are devoid of social content. It is the social milieu that determines the nature of the experiences, the categories, and the beliefs we have about groups and their members. It will be necessary to explore the role of developmental experiences and the role of group-relevant conversational exchanges in shaping how these cognitive mechanisms produce the out-group homogeneity effect.

One further level of complexity needs to be raised in discussing the mechanisms underlying this effect. It is reasonable to speculate that in-group judgments involve different processes than out-group judgments. For example, Judd and Park (1988) suggested that people draw on stored beliefs about homogeneity when judging the out-group but revise those beliefs on the basis of exemplar retrieval for the in-group. This may occur because people are likely to acquire information about the out-group that is based on only a limited number of prototypic members but are likely to acquire information about the in-group that is based on a larger number of individual group members, including the self (Park et al., 1991).

Given people's known flexibility as information processors and decision makers, it is likely that some hybrid approach will ultimately prove most fruitful. The present analysis should facilitate that future by better articulating the wide variety of primitive components that may play a role in such a complex interplay of processes.

Methodological Considerations

It would be premature to conclude that out-group homogeneity effects cannot emerge in minimal-group settings. The reported studies have used a wide variety of methodological approaches, some more rigorous than others. One useful by-product of our review is that it highlights a number of ways that research methodologies can be improved in this area. Such improvements should increase the likelihood that future researchers will uncover a significant effect.

Construct Sensitivity of the Dependent Measures

Three classes of dependent measures have been used in the study of out-group homogeneity effects: stereotype endorsement, perceived dispersion, and perceived similarity (Park & Judd, 1990). Strong out-group homogeneity effects have been obtained in natural-group settings for all three types. This establishes that the measures used for each class are sufficiently reliable indicators of the construct to detect the presence of the effect. However, improving their reliability should facilitate the detection of out-group homogeneity effects in minimal-group settings.

Stereotype endorsement. No minimal-group findings were available for the stereotype endorsement latent variable. Given that this class of measures yields strong effects in natural groups, the two variations (stereotype percentage and stereotype strength) studied in natural groups definitely should be explored in the minimal-group setting. But as noted earlier, caution must be taken when selecting attributes for this measure to control for the evaluative quality of the scale end labels. The procedures used by Park and Rothbart (1982) should be standard practice.

Perceived dispersion. Three measures of the perceived-dispersion variable have been used in the minimal-group setting (range, standard deviation, and probability of differentiation). Of the three, the data were slightly more optimistic for range. It would seem advisable to include range along with the distribution measures in future experiments. This way they could be analyzed as multiple indicators of the same latent variable. This would increase the power of the experiment to detect out-group homogeneity effects on the perceived-dispersion latent variable.

Perceived similarity. The third type of measure identified by Park and Judd (1990) was perceived similarity. Many of the experiments that examined perceived similarity used only a global index, often a single-item rating scale anchored by labels such as *different from one another* and *similar to one another* (e.g., Park & Rothbart, 1982, Experiment 3). Two alternatives

exist. Some studies provide one scale for rating similarities and another scale for rating differences (e.g., Simon & Mummendey, 1990; Simon & Pettigrew, 1990) and then combine them into a single index. A second approach is to use the bipolar similarity–difference scale for each of several stereotyped attributes (Park & Judd, 1990, Experiment 1).

Such multiple-item scales should provide a more reliable index for beliefs about global homogeneity. They also have the advantage of being analyzable as multiple indicators of the homogeneity variable using structural equations analyses.

Design Sensitivity

With robust phenomena, investigators do not take the time and trouble to implement the most sensitive experimental designs. The reasonably strong out-group homogeneity effects obtained in natural-group settings display just such a resilient character. However, this clearly is not the case in the minimal-group setting. Our review of the literature leads us to conclude that the rigor of designs used in minimal-group settings can be improved considerably.

Counterbalancing of dependent-measure order. Nearly all experiments of out-group homogeneity use multiple dependent variables. In some experiments, the investigators are interested in other constructs besides perceived variability. Most often, the measures of perceived variability are put after the indexes of the other constructs. They have followed judgments of group size in some experiments (e.g., Goethals et al., 1979; Manstead, 1982) and direct attribute ratings of the groups in other experiments (e.g., Brown & Ross, 1982; Karasawa & Brewer, 1989, Experiment 1). In the case of perceived range, the two experiments where it was administered first (Simon & Brown, 1987; Wilder, 1984) yielded the most promising findings. If indexes of perceived homogeneity are to be combined with measures of other constructs, care should be taken to either put the perceived-homogeneity measures first or to counterbalance order of presentation.

There were several experiments that included multiple measures of perceived variability. Some of the experiments required a lengthy sequence of judgments from the respondents. For example, Judd and Park's (1988) respondents made a total of 176 responses (96 to measure group variability and 80 to measure individual variability). Similarly, 233 responses were required from each respondent by Park and Judd (1990, Experiment 1). This many responses could lead to fatigue and malaise later in the series.

There is some evidence that out-group homogeneity effects are masked when the measures appear late in the sequence. Quattrone and Jones (1980) found significant support for the effect with their stereotype strength index (which came first) and no support from their perceived-similarity index (which was at the end). Judd and Park (1988) obtained their strongest evidence for the effect (under conditions of anticipated competition) with the group variability index (which came first) than with the individual variability index (which came later). Finally, Park and Judd (1990, Experiment 1) used five different tasks to assess perceived variability. Significant effects were obtained with the first three, but nothing was significant for the last two tasks.

Current design practices in this field confound the measure-

ment task with its serial position, making it difficult to determine whether the different indicators are differentially sensitive to the out-group homogeneity effect. Latin square counterbalancing is the most efficient approach for minimizing serial position and carryover effects. If five measurement tasks are involved (as was the case for Park & Judd, 1990, Experiment 1), only five different task orders are needed. Furthermore, the Latin square approach does not demand any increase in sample size because the counterbalancing can be ignored for data analyses. Improved understanding of these different indicators will require routine use of such counterbalancing.

Of course, Latin square counterbalancing is effective with a relatively limited number of dependent measures. When confronted with the possibility of dozens or even hundreds of measures, researchers will need to make choices. Criteria for choice can be whether the measure reflects important theoretical concerns (i.e., how well the measure represents theoretical constructs) and pragmatic concerns (i.e., how likely the measure is to yield strong effects). In the final analysis, the psychophysical model (obtaining a few highly precise measures) may be more appropriate than the psychometric model (averaging multiple and relatively noisy measures).

Within-subjects and between-subjects designs. In some experiments, respondents evaluate both the in-group and the out-group (a within-subjects design), and in other experiments they evaluate only one of the two groups (between-subjects design). Within-subjects designs are usually regarded as more sensitive in that they minimize the contribution of individual differences to the error term; they also require fewer subjects. These considerations appear to have been persuasive: only five of the reviewed experiments used between-subjects designs (Linville et al., 1989; Park & Judd, 1990, Experiment 1; Park & Rothbart, 1982, Experiments 1 & 2; Wilder, 1984).

Linville et al. (1989) raised a concern about the use of within-subjects designs to study out-group homogeneity effects. Presenting identical scales for rating different groups makes the respondents aware that the experimenter will be comparing their reactions to the two groups. This may lead respondents to make highly similar ratings of the two groups to avoid appearing prejudiced. We concur that between-subjects designs reduce such suspicions and may be necessary when race and gender are involved.

Of all the minimal-groups experiments reviewed here, only Wilder (1984) used a between-subjects design. This was the only one of those experiments to provide strong evidence in favor of out-group homogeneity effects.

One advantage of within-subjects designs is that the data for the first group responded to (i.e., the in-group or the out-group) can be analyzed in the form of a between-subjects design. As long as there was counterbalancing of group order in the within-subjects design, a between-subjects analysis of the out-group homogeneity effect could be conducted. One unexamined possibility, then, was that a more reliable effect would have appeared if the existing within-subject minimal-group experiments were reanalyzed in a between-subjects manner.

Except in cases in which a very large number of responses is required for each group (e.g., Park & Judd, 1990, Experiment 1), it is advisable to use a within-subjects design (counterbalancing the order in which the two groups are presented). It takes very little additional effort to obtain the data for the second group.

This permits the data to be analyzed both in a within-subjects and a between-subjects manner.

Moving From "Whether" to "When?"

A major focus of our review up to this point has been on whether the out-group homogeneity effect occurs under minimal-group conditions. This has also been a concern of several of the previous reviews on this effect. However, the present review goes beyond them in several ways. First, our more comprehensive summary shows that the effect rarely emerges under minimal-group conditions. Second, we examined the implications of this result for refining several taxonomic categories of theory. Third, we offered several methodological improvements that should improve our ability to detect the effect. Fourth, and most important, we believe that a far more fruitful approach is to stop doing just another minimal-group study to see if the effect emerges and to start searching for conditions under which the effect will emerge. We prefer the question of when over the question of whether.

It is useful to examine this research area from a condition-seeking and design perspective (Greenwald, Pratkanis, Leippe, & Baumgardner, 1986). *Condition seeking* refers to identifying the limiting conditions of a known phenomenon. Although this review suggests that the minimal-group setting represents such a limiting condition for the out-group homogeneity effect, we are not yet prepared to accept that conclusion. Instead, we encourage adoption of the design approach proposed by Greenwald et al. This approach invites the question of whether there exist any minimal-group conditions under which the effect could be produced. The preceding two sections have already offered some theoretical and methodological guides to this end. In this section, we discuss several leads that are based on a closer examination of the minimal-group studies.

Role of Individuating Information

Tajfel et al. (1971) specified several features of the minimal-group setting designed to ensure that categorization of self and others was the sole factor involved in responses to the in-group and out-group. The first two features involve respondents being anonymous and not engaging in face-to-face interaction with any other group members. The two features were satisfied in seven experiments (Brown & Ross, 1977, Experiments 1, 2, & 3; Simon & Brown, 1987; Simon & Mummendey, 1990; Simon & Pettigrew, 1990; Wilder, 1984) but not in four others (Judd & Park, 1988; Karasawa & Brewer, 1989, Experiments 1, 2, & 3). The later experiments provided individuating information about both in-group and out-group members.

It is possible that introducing individuating information is a design variation that weakens the effect. The results were somewhat more favorable in the experiments that presented no individuating information. It is possible, on the other hand, that individuating information could strengthen the effect. The Linville et al. (1989) model suggests that for individuating information to have an effect on the distribution task, it must include an explicit link between the group exemplar and the attributes being judged. No minimal-group experiment has yet introduced this feature. Future experiments could highlight the presence and absence of pertinent attributes when providing exemplar information.

Response Importance

Tajfel et al. (1971) emphasized that the responses to the in-group and out-group be important to the respondent. That is, the minimal-group categorization should have some motivational significance. A strict interpretation of this requirement is that the perceived-variability judgments, in and of themselves, have important consequences for respondents. This has not been true for any of the experiments conducted thus far.

A less strict interpretation of this feature is that the group activities, in general, be personally involving. In seven of the experiments, this appeared not to be the case. Respondents merely received information and made a number of judgments. But four experiments included a manipulation potentially affecting personal importance. Two of the Brown and Ross (1977) experiments included intergroup exchanges that contained high versus low competitive and insulting information from the other group, and the third experiment contained a reward for superior group performance. Judd and Park (1988) led respondents to anticipate either cooperative or competitive interaction between their group and the group at the other end of the table.

These studies yielded mixed results regarding the role of personal involvement. Somewhat encouraging findings were reported by Judd and Park (1988). Stronger evidence for out-group homogeneity emerged in the competitive condition. However, comparable findings were not observed when competitive exchanges actually occurred (Brown & Ross, 1977).

Group Size

Group size appears to moderate the out-group homogeneity effect. Mullen and Hu (1989) found that the effect was strongest when the in-group was larger than the out-group. This effect was also obtained by Simon and Brown (1987), Simon and Mummendey (1990), and Simon and Pettigrew (1990) in the minimal-group setting. People may use knowledge of group size as a heuristic in estimating group variability, with large groups viewed as more heterogeneous than small groups. Nevertheless, it appears that when the in-group is in the numerical minority, in-group homogeneity is likely to be obtained rather than out-group homogeneity. (For a persuasive treatise that the topic of group homogeneity should be broadened to include in-group homogeneity as well as out-group homogeneity, see Simon, in press).

Karasawa and Brewer (1989) report findings that are in conflict with the group size effect. Their experiment, unlike those reviewed by Mullen and Hu (1989), provided respondents with a number of exemplars of in-group and out-group behavior. Karasawa and Brewer argued that respondents are more likely to retrieve exemplars for small groups than for large groups and that exemplar-based dispersion judgments are likely to be more variable. However, the data, although directionally supportive, are not very strong. Karasawa and Brewer found partial evidence for the reverse group size effect in two of the three experiments reported.

The minimal-group setting provides an ideal context in which to investigate group size effects. It permits the investigator total control over the respondents' perceptions of relative size of the group, both in terms of the persons physically present and in the population at large. Furthermore, as in the Kara-

sawa and Brewer (1989) experiments, the investigator can control the amount and quality of exemplar information provided respondents. But the most strict tests of out-group homogeneity effects should not be confounded by differences in group size.

Typicality of Judged Attributes

The typicality of the judged attributes or dimensions to group members' social identity appears to be another moderator of out-group homogeneity. Simon (1990) found, in a minimal-group setting, that the out-group was perceived as homogenous on typical out-group attributes but the in-group was perceived as homogenous on typical in-group attributes. This effect was obtained using both standard deviation and probability of differentiation.

However, the results of several experiments indicate that attribute typicality does not serve as such as moderating factors. Judd and Park (1988) included attribute typicality as a factor in their analysis of the standard deviation index; the same pattern of results was obtained for both types of scales. Simon and Brown (1987) obtained their strongest indication of the out-group homogeneity effect with a low-typicality scale and actually found a reversal of an out-group homogeneity prediction for two high-typicality scales and one irrelevant scale. Parenthetically, one natural-groups experiment (Brown & Smith, 1989) applied the range measure to three stereotype-irrelevant attributes and found no significant out-group homogeneity effects for any.

Wilder (1984) concluded that out-group homogeneity effects were found for typical scales but not for the irrelevant scale. However, one may question whether any of the scales in that experiment were typical to group membership. Respondents were told that one group preferred paintings by Klee and other group preferred paintings by Kandinsky. One scale was anchored by liking versus disliking of cubism, and the other was anchored by liking versus disliking of reactionary political views. Because both artists are associated with modern abstract art (and assuming the respondents in this experiment were knowledgeable about modern art), neither scale is differentially related to the minimal-group definitions. The supportive data from this experiment, then, is from scales irrelevant to the differential group stereotypes.

The question of scale typicality has important theoretical consequences. If perceived-dispersion differences derive from accessing stereotyped attributes and the exemplars or behaviors associated with them (as would seem to be the case with the stereotype endorsement latent variable), then effects should be observed just on the stereotype-typical scales. If, on the other hand, the differences derive from a global, nonspecific belief that members of the out-group are all alike, then effects should be obtained for both stereotype-typical and stereotype-irrelevant scales.

A definitive experiment on this question would unconfound the nature of the specific attributes from their level of stereotype typicality. This would require a research design involving two independent sets of in-groups and out-groups. Attributes typical of one pair of groups should be irrelevant to the other. This could be done with minimal groups (e.g., creative or uncreative vs. trustworthy or untrustworthy) and with natural groups (e.g., freshmen or seniors vs. males or females).

Concluding Observations

The article makes a number of substantive contributions to our understanding of the out-group homogeneity effect. The first set of contributions has to do with the theoretical explanations for the effect. First, we have provided a compact review of the theoretical principles that have been advanced in this area. Second, we have organized those principles into a taxonomy that highlights their similarities and differences, with particular reference to predictions for the out-group homogeneity in natural versus minimal groups. Third, we have shown how those theories can be improved in response to the outcome of our literature review.

The four-category taxonomy of theory proposed in this article may have generality beyond the out-group homogeneity effect. There are a large number of social phenomena to which this taxonomy may apply (e.g., aggression, attribution, impression formation, and interpersonal attraction). It would also provide a useful basis for reexamining other phenomena studied in the minimal-group setting (Brewer, 1979; Diehl, 1990). The taxonomy has the virtue of highlighting motivational theories (which tend to have been ignored in recent years) and encouraging (through the hybrid argument) an examination of their interface with cognitive theories.

The second set of contributions has to do with the discoveries made in our review of the empirical literature. First, we show that the accumulated evidence is decidedly mixed, despite the fact that the effect is widely regarded as an undisputed truism. Second, the data show that the primary factor that divides the significant from the nonsignificant studies is whether the natural or minimal groups were used. Most studies of minimal groups have failed to obtain the effect. Third, this difference between natural and minimal groups holds up over the several different classes of dependent variables that have been used.

The third set of contributions pertain to the search for a replicable out-group homogeneity effect with minimal groups. Guidelines for this quest emerged from examining relevant theory, feasible methodological refinements, and empirical patterns from the body of research itself.

The minimal-group setting provides a provocative challenge to scholars interested in the out-group homogeneity effect. Although the empirical findings have been disappointing to date, the paradigm offers provocative opportunities to refine and test basic theories of group perception.

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