Self-Anchoring and Differentiation Processes in the Minimal Group Setting

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In-group favoritism in the minimal group setting was hypothesized to be a function of 2 processes: a tendency to base in-group judgments on the self (self-anchoring) and a tendency to assume 1 group to be the opposite of the other (differentiation). In the first 3 experiments, in which the order of rating the self and target group was varied, categorized and uncategorized participants were given trait information about 1 group and were asked to estimate the level of those traits in the other group. In-group judges tended to base group ratings on the self, whereas out-group and uncategorized judges inferred the 2 groups to be opposite of one another. Experiment 4 attempted to directly assess the direction of inference between self and in-group by giving feedback about self or in-group on unfamiliar dimensions and found that participants were more willing to generalize from self to in-group than from in-group to self.

It is clear both from research and from experience in everyday life that people generally favor the group they belong to over groups they do not belong to. Ferguson and Kelley (1964) had two groups work independently on three tasks and found that participants judged their own group product more favorably than the other group product, irrespective of any objective differences in output between the two groups.

More surprising is the finding that in-group favoritism is also observed in a "minimal group" setting (Billig & Tajfel, 1973; Rabbie & Horwitz, 1969; Tajfel, 1970). Tajfel, Flament, Billig, & Bundy (1971) defined the following criteria for "minimal" differentiation: no face-to-face interaction among participants, within or between groups; anonymity of group membership; absence of any instrumental link between the basis for intergroup categorization and the response measure; and a response measure involving unfamiliar and significant choices but of no direct utilitarian value to the participant. In the Tajfel et al. (1971) study, two important allocation strategies were obtained: fairness (or equal allocations) and in-group favoritism, which is a confounded measure of maximizing own gain and maximizing relative gain (see Bornstein et al., 1983a, 1983b). A tendency to favor the in-group over the out-group was also observed in Rabbie and Horwitz (1969), in which the main dependent measure consisted of individual trait ratings. Overall, studies in the minimal group setting have used both evaluative and nonevaluative criteria for group classification. For example, participants were classified as good and bad guessers or as over- and underestimators of dots. In all cases, a tendency to favor the in-group over the out-group was found.

The minimal conditions necessary to obtain in-group favoritism in the minimal group paradigm (e.g., perceived similarity, common fate) are still not altogether clear. For example, Rabbie and Horwitz (1969) failed to obtain in-group favoritism when participants knew that they were randomly sorted into blue or greens for "administrative reasons," but obtained in-group favoritism when group members shared a randomly assigned common fate. On the other hand, Billig and Tajfel (1973) found in-group favoritism after telling participants that they would be assigned a code letter randomly (M or W). However, Howard and Rothbart (1980) noted that a previous categorization of participants into Klee and Kandinsky preferrers might have conferred meaning on the M versus W categorization, allowing participants to perceive greater similarity within than across groups. Overall, in-group favoritism in the minimal group paradigm is a well-established phenomenon, but the exact reasons for this favoritism remain unclear.

At least two processes underlying in-group favoritism in minimal group settings can be identified. The first process can be thought of as a self-anchoring process. To the extent that participants perceive themselves as forming a unit relationship with the in-group (Heider, 1958), the positive image of the self should generalize to the in-group. Antecedents to a self-anchoring process can be found in Tajfel's (1969) conceptualization of

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stereotyping and prejudice as a search for coherence. He argued that the "need to preserve the integrity of the self-image is the only motivational assumption we need to make in order to understand the direction that the search for coherence will take" (p. 92). This position shows a clear derivation from balance theory (see Abelson et al., 1968; Heider, 1958). According to the self-anchoring principle, in-group perception in the minimal group paradigm will be largely based on self-perception. The second process implicated in in-group favoritism can be thought of as a differentiation process, according to which people infer out-group characteristics to be different from in-group characteristics. Because the in-group is assumed to be favorable, different comes to mean unfavorable. Previous research has demonstrated that social categorization processes can be explained in terms of accentuation of category boundaries (Krueger & Clement, 1994; Krueger, Rothbart, & Sriram, 1989; Tajfel & Wilkes, 1963). We hypothesize that an oppositeness heuristic governs the inference of group characteristics, and the same heuristic applies to the perception of social categories in general as well as to in-group and out-group contexts. Judges should, on the basis of what they know about one group, tend to infer the opposite about another group, and this tendency should exist for judges whether or not they are members of the relevant target groups. An oppositeness heuristic can account for in-group favoritism if we make the reasonable assumption that participants look favorably upon themselves and thus the in-group. An out-group, by virtue of its difference from the in-group, is thus less favorable. According to this principle, if participants are made aware that the in-group is high on some unfavorable characteristic, they should then infer that the out-group is low on that same characteristic. If we assume that both self-anchoring and differentiation principles are implicated in people's judgments about minimal groups, the following basis for in-group favoritism in the minimal group paradigm can be specified: people generally possess favorable beliefs about themselves; people infer in-group characteristics from the characteristics of the self; and because self and in-group are regarded favorably, the out-group will be regarded, by a principle of differentiation, as less favorable.

This model assumes that the basis for intergroup differentiation in the minimal group setting, in which two mutually exclusive, dichotomous categories are created, is differentiation. That is, if we inform participants that people can be divided into two mutually exclusive categories, such as under- or overestimators of dots, and then provide them with information about one of the groups, say that the overestimators are friendly, by a principle of differentiation, or oppositeness, observers will describe underestimators as less friendly or perhaps unfriendly. The principle of differentiation predicts only the perception of difference or oppositeness but does not of itself predict that one group will be regarded more favorably than the other. Indeed, we would expect observers to assume oppositeness to an equal degree for both groups for both favorable and unfavorable characteristics. For participants who are identified with one of the two groups in the dichotomy, however, the principle of differentiation is constrained by the assumption that the in-group, like the self, possesses largely favorable attributes, resulting in the traditional finding of in-group favoritism. We refer to the link between self and in-group as a self-anchoring process, because it assumes that the self anchors judgments about the in-group, at least in minimal group settings.

The goal of this research was to examine self-anchoring and differentiation processes in the minimal group setting. An experimental paradigm was developed that presents both categorized and uncategorized participants with favorable and unfavorable information about one group and then assesses inferences about the other group on those same attributes. By using categorized and uncategorized participants, we are able to compare the inferences of in-group or out-group judges with those of participants who are not identified with either group.

Our model for explaining in-group favoritism in the minimal group setting has two components: (a) people generalize their self-image to the in-group and (b) the out-group is seen as different from the in-group and thus less favorable. Consistent with the first component of the model, it is predicted that in-group judges will show a pure self-anchoring process. Judgments about the in-group should be based on the characteristics of the self, thus being relatively favorable. Consistent with the second component of the model, it is predicted that uncategorized participants and out-group judges will show a differentiation effect, inferring one group to be high on an attribute when the other group is low on the same attribute and inferring one group to be low on an attribute when the other group is high on the same attribute. By the comparison between in-group and out-group ratings, it is predicted that the in-group will be viewed as more favorable than the out-group, resulting in the typical phenomenon of in-group favoritism.

One complication in predicting judgments about categorized judges is that they are familiar with their own favorable and unfavorable attributes. For example, out-group judges may ignore the given information about the in-group that conflicts with their own self-perception. For this reason, we varied the nature of the favorable and unfavorable traits presented, so that half were common and familiar to participants and half were unfamiliar trait concepts, contrived to sound novel to the participants. Although the content of the novel traits was unfamiliar, the favorability of the concepts was communicated to participants (and experimentally varied). One possible outcome is that judgments about the out-group will be based on a differentiation principle only for those traits unfamiliar to participants. A second possibility is that out-group judges, like uncategorized participants, will show a differentiation process on both familiar and unfamiliar traits. The distinction between familiar and unfamiliar traits has implications for in-group judges as well. Because participants will have no knowledge of their own standing on unfamiliar dimensions, a self-anchoring process based on the content of the trait would not make sense. One possibility is that in-group judges will base their judgments on a self-anchoring principle on familiar traits only. A second possibility is that participants will assume that the self is favorable on unfamiliar as well as familiar traits, thus showing self-anchoring in both domains.

The self-anchoring process is viewed as a tendency to derive the image of the in-group from one's self-image. This view is contrasted with that of Social Identity Theory (Tajfel & Turner, 1979), according to which people derive aspects of the self from group membership. According to Social Identity Theory, in-group favoritism, even in minimal group settings, is the result of people's tendency to enhance the self-image by enhancing the image of the in-group. Contrary to this view, we propose that in minimal group conditions participants will anchor their judgments of the in-group to their conception of the self. This will result in greater similarity between self and group for in-group judges than for uncategorized or out-group judges. By anchoring the image of the in-group to the self, the group should be a less extreme copy of the self-image. Because the self is typically regarded favorably, the in-group should be regarded somewhat less favorably. In principle, if the self were regarded unfavorably, the in-group should be regarded less unfavorably. One possible implication of the self-enhancement hypothesis proposed by Social Identity Theory is that, because in-group favoritism in minimal group settings is a way to enhance the self, in-group judgments should be more favorable than self-judgments. Contrary to this hypothesis, self-ratings are expected to be more favorable than group ratings.

In summary, the main predictions of this study are the following: in-group judges are expected to base their ratings about the in-group on their ratings about the self (and the latter should be more positive than the in-group ratings); and out-group judges, like uncategorized participants, are expected to base their judgments on a differentiation principle, inferring the traits of one group to be opposite from the given group.

Experiment 1

Method

Overview. All participants indicated their preferences for paintings associated with either Thompson or Cooper and were then either categorized as people who prefer Thompson paintings, categorized as people who prefer Cooper paintings, or uncategorized. Participants were provided with information about the attributes of people who prefer Thompson paintings or people who prefer Cooper paintings along 12 psychological traits, half of which were familiar traits and half of which were unfamiliar (novel) traits. Within each set of traits, half were favorable and half were unfavorable. For each trait, participants were told that one group (Thompson or Cooper) scored either low, medium, or high and were asked to make inferences about the other group on the same trait. Finally, participants were asked to rate themselves along the same traits.

Participants. Participants were 118 undergraduates (60 women, 55 men, and 3 of unknown gender) at the University of Oregon who volunteered to participate in this experiment in partial fulfillment of course requirements.

Procedure. Participants were presented with pairs of paintings projected onto a screen. For each of 10 pairs, they were asked to report which of the two pictures they preferred. Participants were told that each pair contained one painting by Cooper and one painting by Thompson. They were told that Cooper and Thompson were fictitious names chosen by the experimenter so as not to influence their choices and that all Cooper paintings originated from the same painter and all Thompson paintings originated from the same painter. At the end of this task, the experimenter left the room for approximately 5 min (allegedly to score participants' preferences). When the experimenter returned to the room, she gave each participant a packet for the following task. On the first page of the packet categorized participants read the following sentence: "As a result of the preferences that you have expressed, we have determined that you belong to a group of people who prefer paintings from Cooper (or Thompson)." The group label was written in big characters. Control or uncategorized participants performed the same preference task, but their packet did not contain any information about their group membership. In fact, all categorized participants were randomly assigned to the Thompson or Cooper condition, regardless of their actual preferences. After participants were categorized (or not, for the control participants) they were given trait information about either the Cooper or the Thompson group. Half of the participants received information about the Thompson group and half about the Cooper group, and all participants were asked to make inferences about the other group. Here are the instructions presented by tape to participants:

> It has been shown that artistic preference reveals important information about people. Research in psychology shows that people's artistic preferences are correlated with certain psychological characteristics. Shortly, you will receive information about the psychological characteristics for one of two groups, either those who prefer Thompson paintings or those who prefer Cooper paintings. These characteristics will be expressed in terms of average scores along 12 psychological scales, where each score represented the overall mean or average for that group on a single scale. The goal of this experiment is to analyze how good people are at making inferences about the other group of people on the same scales. Some of you will receive information about the Thompson group and will be asked to make inferences about the Cooper group. Some of you will receive information about the Cooper group and will be asked to make inferences about the Thompson group. There is no logical reason to assume that the Thompson and Cooper groups should necessarily score either the same or differently from one another. The two groups might score the same or might score differently along the same dimensions. Your task is to guess what their scores actually are. To summarize, you will first be given one score for one group on the first scale and then you will be asked to guess the score for the other group on the same psychological scale. Circle the score that you think best describes the other group of people. When you have finished the first page, turn the page and you will find another scale; please, repeat the same procedure again until all the pages are finished. Take your time, remember to consider one scale at a time, and please do not go back over the judgments that you have already made. If you have any questions, feel free to ask the experimenter at any time. Thank you for you cooperation.

Stimulus materials. For the first part of the experiment, 10 pairs of slides representing Klee paintings were projected onto a screen. For the second part of the experiment, participants received information about either the Thompson or Cooper group in the form of scores along 12 scales. Six 9-point scales measured the following psychological traits: energetic, artistic, understanding, irresponsible, irritable, and narrow-minded. Obviously the first three traits were favorable or high in social desirability and the last three were unfavorable or low in social desirability (see Hampson, Goldberg, & John, 1987, for social desirability ratings of traits). For each trait (referring to either the Thompson or the Cooper group) the numerical value 3, 5, or 7 was circled on a 9-point scale on which 1 = *very uncharacteristic,* 5 = *neither characteristic nor uncharacteristic,* and 9 = *very characteristic.* The marked score value (3, 5, or 7) interacted with the social desirability of the traits to yield favorable or unfavorable information about the Thompson or the Coo-

Table 1
Experiment 1: Attribution of Traits to a Minimal Group as a Function of Judge's Relation to the Group, Level of Trait Present in Other Group, Familiarity/Novelty of the Trait, and Favorability of the Trait

	Type of judge								
	In-group (n = 37)			Uncategorized (n = 36)			Out-group (n = 39)		
Type of trait	Low	Medium	High	Low	Medium	High	Low	Medium	High
Familiar traits									
Favorable									
M	6.00	6.19	6.16	5.75	5.31	4.86	5.05	4.56	4.69
SD	1.63	1.31	1.80	1.56	1.62	1.78	1.91	1.89	2.07
Unfavorable									
M	4.62	4.81	4.62	5.31	5.50	4.28	5.97	5.33	4.90
SD	1.91	1.39	1.77	1.93	1.77	1.83	1.90	1.75	2.25
Novel traits									
Favorable									
M	5.81	5.65	5.60	5.31	5.39	4.92	4.87	5.31	4.10
SD	1.22	1.53	1.40	1.85	1.54	1.71	1.79	1.54	1.41
Unfavorable									
M	4.41	4.81	5.00	5.42	4.94	4.53	5.72	5.28	5.13
SD	1.55	1.71	1.27	1.61	1.60	1.63	1.54	1.79	1.64
Average across all traits									
M	5.21	5.37	5.35	5.44	5.29	4.65	5.40	5.12	4.71
SD	1.73	1.56	1.67	1.73	1.63	1.74	1.83	1.76	1.89

Note. Participants are given information about one of the minimal groups and asked to make inferences about the other group. *Level* refers to the magnitude of the trait in the given group, and the dependent measures are participants' judgments about the inferred group. Thus, in-group judges are given information about the out-group and make inferences about the in-group, whereas out-group judges are given information about the in-group and make inferences about the out-group. Mean scores are based on 9-point rating scales on which 1 = *very uncharacteristic*, 5 = *neither uncharacteristic nor characteristic*, and 9 = *very characteristic*.

per group. For each participant, then, two scales provided favorable information (e.g., 7 for understanding, 3 for narrow-minded), two scales provided unfavorable information (e.g., 7 for irresponsible and 3 for artistic), and two scales provided information at medium levels of favorability (e.g., 5 for irritable, 5 for energetic) about the Thompson or the Cooper group.

We also presented participants with information about Thompson or Cooper on six scales about which they could have no familiarity but in which the descriptions varied in social desirability. These unfamiliar scales, fabricated by the authors, referred to psychological characteristics that would be unknown to the participant: Clustering in Digit Span Recall, Parallel Information Processing, Global Orientation in Design Construction, Modality Dominance in Synesthesic Perception, Brain Lateralization in Language Comprehension, and Field Orientation in Problem Solving. For each scale, the meaning and the favorability of the scale was defined by the experimenter. For example, participants were told that a high level of clustering digit span leads to good (or bad) memory performance. As for the six familiar traits, half of the unfamiliar traits were favorable and half were unfavorable. Again, the marked score interacted with the social desirability of the traits to yield favorable or unfavorable information. After looking at each marked scale, participants had to judge the degree to which the same trait was characteristic or uncharacteristic of the other group. At the very end, participants were presented with the same 9-point scales and asked how they thought they would personally score on each dimension.

Results

Participants were given information about the attributes of either the Thompson or Cooper group and were asked to infer the same traits about the other group. Participants themselves were either Cooper, Thompson, or uncategorized. Because there was no difference between judgments expressed by Thompson participants judging the Thompson group and Cooper participants judging the Cooper group, we collapsed data across these two conditions and will refer to this group of participants as in-group judges, that is, participants judging the in-group after receiving information about the out-group. Also, because there was no difference between judgments expressed by Thompson participants judging the Cooper group and Cooper participants judging the Thompson group, we collapsed data across these two conditions and will refer to this group of participants as out-group judges, that is, participants judging the out-group after receiving information about the in-group. Finally, because there was no difference between judgments expressed by uncategorized participants judging the Cooper group and uncategorized participants judging the Thompson group, we collapsed data across these two conditions and will refer to this group of participants as the control or uncategorized group. Similarly, because no gender effects were found, the data will be presented collapsed across gender.

A 3 × 2 × 3 × 2 analysis of variance (ANOVA) was performed on the participants' judgments, with judges (in-group, out-group, or control) as the first (between-subjects) factor, favorability of the traits (favorable or unfavorable) as the second (within-subjects) factor, level of the given score (low = 3, me-

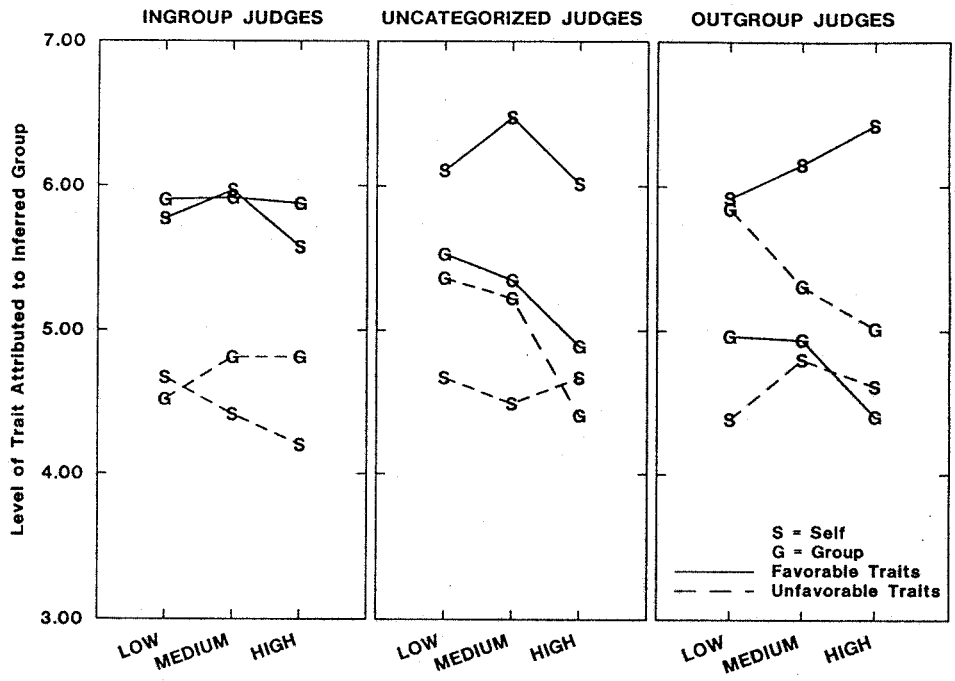

Figure 1. Attribution of traits to the inferred group and to the self as a function of judge's relation to the group, level of trait associated with the given group, and favorability of the trait for Experiment 1.

dium = 5, or high = 7) as the third (within-subjects) factor, and familiarity of the traits (familiar or novel) as the fourth (within-subjects) factor.

Table 1 shows the scores attributed to the judged group as a function of judge's relation to the group (in-group, uncategorized, or out-group), level of traits present in other group (low = 3, medium = 5, or high = 7), familiarity or novelty of the traits (familiar or novel), and favorability of the traits (favorable or unfavorable).

Evidence for a differentiation principle would be apparent if, as level of trait increased for the given group, it decreased for the inferred group. There was a significant main effect of level, $F(2, 218) = 6.5$, $p < .002$, indicating that, as the level of the trait increased from 3 to 5 to 7 for the given group, the level ascribed to the judged group decreased ($M = 5.35$, 5.25, and 4.89, respectively). However, as is apparent from the bottom row of Table 1, the effect of level varied with the type of judge, resulting in a significant interaction, $F(4, 218) = 2.60$, $p < .05$. Figure 1 also shows the effect of level on favorable and unfavorable trait attributions for different types of judges.

Uncategorized and out-group judges showed a strong tendency to differentiate between the given and inferred group, whereas in-group judges showed no such tendency. For each group of judges (in-group, uncategorized, and out-group), a test for simple effects was performed to analyze the effect of level. Uncategorized and out-group judges showed a significant linear trend, $F(1, 218) = 11.5$, $p < .001$, and $F(1, 218) = 9.5$, $p < .01$, respectively, suggesting the use of the oppositeness heuristic. In-group judges, on the contrary, did not show a significant linear trend, $F(1, 218) = .37$, *ns*, suggesting that inferences about the in-group were independent of information given about the out-group.

As there was evidence that judgments were based on differentiation, other effects were also present. As predicted, a highly significant interaction between type of judge and favorability of the traits (favorable or unfavorable) was found, $F(2, 109) = 19.5$, $p < .0001$. As is apparent from Figure 1, favorable traits were considered to be more applicable by in-group ($M = 5.90$) than out-group ($M = 4.77$) judges, with uncategorized participants falling in the middle ($M = 5.26$). Similarly, unfavorable traits were considered to be more applicable by out-group judges ($M = 5.38$) than in-group judges ($M = 4.71$), with uncategorized participants falling in the middle ($M = 5.00$). Finally, a main effect of favorability of the traits was found, $F(1, 109) = 5.22$, $p < .05$, with groups overall rated higher on favorable ($M = 5.3$) than unfavorable ($M = 5.04$) traits. In summarizing the results of Figure 1, a number of effects should be noted. First, for uncategorized participants there is a clear differentiation effect such that low scores for the given group are associated with high scores for the inferred group, and vice versa. There is also a tendency to attribute more favorable than unfavorable traits, a finding consistent with the general bias to view favorable traits as more prevalent than unfavorable traits (Kanouse & Hansen, 1971; Matlin & Stang, 1978; Zajonc, 1968). Second, judgments about the out-group also show a differentiation effect. In addition, contrary to expectations, out-group judges were less favor-

able than uncategorized participants and saw unfavorable traits as more prevalent than favorable traits.[1] Third, in-group judges clearly showed no differentiation effect at all. Favorable traits were ascribed at a consistently high level, and unfavorable traits at a consistently low level, independent of out-group attributes.

As is apparent from Table 1, evidence for in-group favoritism was present for both familiar and novel traits. Trait familiarity did not show any significant main effect or interactions with any of the other variables. Recall that trait familiarity was varied to determine whether self-anchoring and differentiation processes were specific to familiar or unfamiliar traits. In-group favoritism, assumed to reflect a self-anchoring process, was present for both familiar and unfamiliar traits. Similarly, out-group and uncategorized participants showed a differentiation effect for both familiar and novel traits.

Self versus in-group ratings. In-group favoritism provides indirect support for a self-anchoring process, because the self-image is also favorable. More direct evidence for the self-anchoring process comes from the self-ratings (see Figure 1).

Consistent with the self-anchoring principle, it was predicted that self-ratings would be more favorable than in-group ratings. Because no gender effects were found, we will present the data collapsed across gender. A 2 (self or in-group) × 2 (trait favorability) × 2 (trait familiarity) ANOVA was performed on in-group participants' ratings. The prediction that self-ratings should be more favorable than in-group ratings was supported by ratings on familiar traits only. A three-way interaction was found among target, favorability, and familiarity of traits, $F(1, 32) = 8.6$, $p < .01$. For familiar traits, the self was rated more favorably ($M_{\text{favorable}} - M_{\text{unfavorable}} = 2.40$) than the in-group ($M_{\text{favorable}} - M_{\text{unfavorable}} = 1.42$). For unfamiliar traits, the self was rated less favorably ($M_{\text{favorable}} - M_{\text{unfavorable}} = .30$) than the in-group ($M_{\text{favorable}} - M_{\text{unfavorable}} = .81$). However, it should be noted that participants' self-ratings on novel traits are difficult to interpret. When participants were presented with the last task of ratings themselves, the definitions of the scales were not included. It is possible that participants might have forgotten the meaning of the novel traits presented earlier. Although the next studies will present the definitions at the time of self-ratings, the effects involving unfamiliar traits in Experiment 1 should be interpreted with caution. Overall, the self was rated more favorably than the in-group on familiar traits, suggesting that a self-anchoring rather than a self-enhancement process was present.[2]

To assess the similarity between self and group, we computed the average of within-subject squared differences between participants' self-ratings and inferred group ratings. d^2 were first calculated within subjects for each individual trait and then averaged across traits. Table 2 shows d^2 averages for different types of judges and for different experiments. The lower the d^2, the stronger the similarity between self-ratings and group ratings.[3] As predicted, in-group judges showed the greatest similarity between self and inferred group, with the lowest d^2, followed by control and out-group participants. A one-way ANOVA was performed on the d^2 scores, with judges being the between-subjects factor. A main effect of judges was found, $F(2, 114) = 7.65$, $p < .001$, and the linear trend was also significant, $F(1, 114) = 15.0$, $p < .001$, showing that the similarity between self- and group ratings increased from out-group ($d^2 = 8.62$) to in-group ($d^2 = 5.28$) judges, with uncategorized participants falling in the middle ($d^2 = 7.4$).

Table 2
Average d^2 Between Self-Ratings and Inferred Group Ratings for Experiments 1, 2, and 3

Experiment no. and order of tasks	Type of judge		
	In-group	Uncategorized	Out-group
Experiment 1 (group–self)			
M	5.28	7.40	8.62
SD	3.50	3.58	4.20
N	39	39	40
Experiment 2 (self–group)			
M	3.86	7.16	7.57
SD	2.82	3.21	4.00
N	40	35	37
Experiment 3 (group–self)			
M	4.62	6.22	7.42
SD	3.31	3.66	4.00
N	41	39	42
Experiment 3 (self–group)			
M	3.06	7.34	8.37
SD	1.92	3.99	4.25
N	41	39	42

Note. In Experiment 1, participants rated the self after receiving information about one group and rating the other group. In Experiment 2, participants rated the self before receiving or inferring information about groups. In Experiment 3, half of the participants rated the self after receiving information about one group and rating the other group and the other half of participants rated the self before receiving or inferring information about groups. Mean scores represent the average of within-subject squared differences between self-ratings and inferred group ratings. d^2 were first calculated within subjects and then averaged across traits.

[1] A single measure of group favorability was obtained by calculating the difference between the ratings for favorable minus unfavorable traits. A 3 (in-group, uncategorized, out-group judges) × 3 (level of trait) × 2 (trait familiarity) ANOVA was performed on these difference scores. A significant effect of judges was found, $F(2, 109) = 19.2$, $p < .0001$. Post hoc Tukey tests show that in-group judges were more favorable ($M = 1.90$) than uncategorized participants ($M = .26$, $p < .01$), and uncategorized participants were more favorable than out-group judges ($M = -.62$, $p < .05$).

[2] Further analysis showed that the tendency to rate the self more favorably than the group was also present for out-group and uncategorized participants.

[3] d^2 scores were used as a measure of similarity (see Cronbach & Gleser, 1953) because they combine elevation, scatter, and shape similarity. Pearson correlation coefficients were not used as the main measure of similarity because they only represent shape similarity, disregarding similarity in elevation and scatter between profiles. However, the pattern of correlation between self and inferred group replicated, albeit less strongly, the pattern of d^2 scores. Partial correlations were computed between self and inferred group judgments, with the effects of given group scores partialed out. Partial correlations were as follows: in-group $r = .24$, uncategorized participants $r = -.04$, out-group judges $r = -.24$.

Discussion

Both a differentiation and self-anchoring process were proposed to account for group judgments in the minimal group paradigm. We hypothesized that uncategorized and out-group participants would use an oppositeness principle in making group judgments and that in-group participants would use a self-anchoring principle, in which the judgments of the in-group are linked to the participants' own characteristics. The results of Experiment 1 clearly show that both uncategorized and out-group judges used an oppositeness heuristic in their group judgments. Contrary to expectations, out-group judges also showed a tendency to view the group less favorably than uncategorized participants, a result that was not replicated in the following studies. As predicted, in-group judges did not show any tendency toward differentiation, and rated the in-group in a consistently favorable way independent of the information received about the out-group. Consistent with the self-anchoring principle, self-ratings were more favorable than in-group ratings. However, the issue of whether the self-ratings were based on group ratings or vice versa will be addressed in Experiment 4. More directly relevant to the self-anchoring principle is the finding that group ratings were closer to self-ratings (lower d^2 between self and group ratings) for in-group judges than for uncategorized and out-group judges. If it is true that in-group judgments are anchored to self, then the effects of self should increase as the salience of the self is increased. To test this hypothesis, a second experiment was conducted in which participants rated themselves before making inferences about a group, in contrast to the first experiment in which self was rated after group judgments were made. Having participants rate themselves before rating the in-group should increase the similarity between self- and in-group ratings.

Experiment 2

In Experiment 1, self-ratings were completed after participants made inferences about the group, providing evidence for both a differentiation and a self-anchoring process. If judgments about the in-group are anchored to the self, then making the self more salient before rating the group should further increase the similarity between group and self. In Experiment 2, self-ratings are made at the very beginning of the experiment, and it is predicted that this simple manipulation should increase the similarity between self- and in-group ratings.

Method

Participants. Participants were 112 undergraduates (73 women, 37 men, and 2 of unknown gender) at the University of Oregon who volunteered to participate in this experiment in partial fulfillment of course requirements.

Procedure and materials. The procedure used in Experiment 2 was identical to the procedure used in Experiment 1, with the exception that the self-rating task was presented as the first rather than last set of judgments. After receiving feedback about their group membership (Thompson or Cooper) or, in the case of uncategorized participants, being given no feedback, participants performed the self-rating task. Immediately after the self-rating task, they were told that one group (Thompson or Cooper) scored either low, medium, or high on each trait and were asked to make inferences about the other group on the same trait, as described in Experiment 1's procedure section. The materials used in this experiment were identical to the materials described in Experiment 1, except that the definitions for both familiar and unfamiliar traits were present in the self-rating as well as in the group rating task.

Results

As shown in Table 2, in-group judges again showed the strongest self-anchoring process, with the lowest d^2, followed by control and out-group participants. A one-way ANOVA was performed on the d^2 scores, with judges as the between-subjects factor, resulting in a main effect for judges, $F(2, 109) = 14.09$, $p < .0001$. The linear trend was also significant, $F(1, 109) = 23.3$, $p < .0001$, showing that the similarity between self and group was highest for in-group ($M = 3.86$) and lowest for out-group ($M = 7.57$) participants, with uncategorized participants falling in the middle ($M = 7.16$).

The d^2 results from Experiment 2 can be compared with the results from Experiment 1 (see Table 2). As predicted, there was a significant increase in similarity between self and in-group ratings from Experiment 1 ($d^2 = 5.28$) to Experiment 2 ($d^2 = 3.86$), $t(71) = 1.97$, $p < .05$, suggesting that increasing the salience of the self increases the role of self in judgments of the in-group. Concurrently, the d^2 for uncategorized and out-group judges did not decrease from Experiment 1 to Experiment 2. However, self-ratings in Experiment 1 and Experiment 2 are not directly comparable. In Experiment 1, participants rated the self at the very end, but the definitions of unfamiliar traits were not repeated. Nevertheless, when only familiar traits were used to compute d^2 scores between the self and the inferred group, a significant increase in similarity from Experiment 1 ($d^2 = 6.87$) to Experiment 2 ($d^2 = 4.30$) was still found, $t(1, 63) = 2.19$, $p < .05$. When unfamiliar traits only were used to compute d^2 scores, the difference between Experiment 1 ($d^2 = 3.64$) and Experiment 2 ($d^2 = 3.39$) was not significant.[4]

Group ratings. The general pattern of results obtained for Experiment 2 was similar, but not identical, to the pattern of results obtained in Experiment 1. Because no reliable gender effects were found, the data will be presented collapsed across gender. As in Experiment 1, a 3 (in-group, out-group, or control) × 2 (trait favorability) × 3 (level of trait) × 2 (trait familiarity) ANOVA was performed on the participants' group ratings.

Table 3 shows that as in Experiment 1, level produced a significant main effect, $F(2, 216) = 3.9$, $p < .05$, consistent with a differentiation principle. As level of the trait increased (from 3 to 5 to 7) for the given group, the level of the ascribed trait decreased for the inferred group ($M = 5.41$, 5.37, and 5.06, respectively). Also consistent with Experiment 1, the effect of level varied with type of judge, as is apparent from the last row in Table 3. Unlike Experiment 1, however, the interaction between type of judge and level was not significant, $F(4, 216) = .85$, *ns*. Figure 2 also shows the effect of level for different types of judges.

For each group of judges, a test for simple effects was performed

[4] As in Experiment 1, the pattern of correlation between self and inferred group replicated, albeit less strongly, the pattern of d^2 scores. Partial correlations were as follows: in-group $r = .67$, uncategorized participants $r = .20$, out-group judges $r = .11$.

Table 3
Experiment 2: Attribution of Traits to a Minimal Group as a Function of Judge's Relation to the Group, Level of Trait Present in Other Group, Familiarity/Novelty of the Trait, and Favorability of the Trait

	Type of judge								
	In-group (n = 40)			Uncategorized (n = 35)			Out-group (n = 36)		
Type of trait	Low	Medium	High	Low	Medium	High	Low	Medium	High
Familiar traits									
Favorable									
M	6.58	6.55	6.38	6.11	5.63	5.23	5.44	5.44	5.17
SD	1.47	1.28	1.55	1.49	1.42	2.10	1.92	1.58	1.83
Unfavorable									
M	4.40	4.83	4.25	4.83	5.03	4.54	5.08	5.17	5.03
SD	1.65	1.48	1.74	1.74	1.92	1.65	1.71	1.73	1.61
Novel traits									
Favorable									
M	5.90	6.05	6.03	6.06	5.60	5.03	5.75	4.94	5.17
SD	1.32	1.38	1.29	1.41	1.27	1.84	1.46	1.47	1.44
Unfavorable									
M	4.78	4.80	4.45	4.77	5.43	4.63	5.19	4.83	4.67
SD	1.51	1.51	1.47	2.18	1.65	1.96	1.55	1.18	1.55
Average across all traits									
M	5.41	5.56	5.27	5.44	5.42	4.86	5.37	5.10	5.01
SD	1.71	1.60	1.77	1.83	1.58	1.90	1.67	1.51	1.61

Note. Participants are given information about one of the minimal groups and asked to make inferences about the other group. *Level* refers to the magnitude of the trait in the given group, and the dependent measures are participants' judgments about the inferred group. Thus, in-group judges are given information about the out-group and make inferences about the in-group, whereas out-group judges are given information about the in-group and make inferences about the out-group. Mean scores are based on 9-point rating scales on which 1 = *very uncharacteristic*, 5 = *neither uncharacteristic nor characteristic*, and 9 = *very characteristic*.

to analyze the effect of level. As in Experiment 1, uncategorized participants showed a significant linear trend, $F(1, 216) = 5.4$, $p < .05$. Unlike Experiment 1, out-group judges did not show a significant linear trend, $F(1, 216) = 2.26$, *ns*, even though the data show a tendency for out-group judges to also use an oppositeness heuristic. As in Experiment 1, in-group judges did not show a significant linear trend, $F(1, 216) = 1.35$, *ns*.

As in Experiment 1, evidence was also found for in-group favoritism. A highly significant interaction between type of judge and favorability of the traits was found, $F(2, 108) = 13.2$, $p < .0001$. As is apparent from Figure 2, favorable traits were ascribed more to the in-group ($M = 6.25$) than to the out-group ($M = 5.32$), with uncategorized participants falling in the middle ($M = 5.61$). Similarly, unfavorable traits were ascribed more by out-group judges ($M = 5.0$) than in-group judges ($M = 4.58$), with uncategorized participants falling in the middle ($M = 4.87$). As shown in Table 3, this pattern of results was present for both familiar and novel traits and is consistent with the findings of Experiment 1. As in Experiment 1, familiarity did not show any significant main effect or interaction with any of the other variables. Finally, as in Experiment 1, a main effect of favorability of the traits was found, $F(1, 108) = 67$, $p < .0001$, with participants rating groups as higher on favorable ($M = 5.75$) than unfavorable ($M = 4.81$) traits. Unlike Experiment 1, and consistent with our prediction, out-group judges were not less favorable than uncategorized participants.[5]

Self versus in-group ratings. Because no gender effects were found, we will present the data collapsed across gender. As in Experiment 1, in-group self-ratings were more favorable than in-group ratings. A 2 (self or in-group target) × 2 (trait favorability) × 2 (trait familiarity) ANOVA was performed on in-group participants' ratings. A Target × Favorability interaction was found, $F(1, 38) = 24.11$, $p < .0001$, with the self being rated higher than the in-group on favorable traits (self $M = 6.8$ and in-group $M = 6.27$) and the self being rated lower than the in-group on unfavorable traits (self $M = 4.03$ and in-group $M = 4.59$) (see also Figure 2). This pattern was present for both familiar and unfamiliar traits. Note that, unlike Experiment 1, the definitions of unfamiliar traits were present for the self-rating task in Experiment 2. Clearly, the prediction that self-ratings should be more favorable than group ratings was confirmed and, unlike Experiment 1, this tendency was present for both

[5] A single measure of group favorability was obtained by calculating the difference between the ratings for favorable minus unfavorable traits. A 3 (in-group, uncategorized, out-group judges) × 3 (level of trait) × 2 (trait familiarity) ANOVA was performed on these difference scores. A significant effect of judges was found, $F(2, 108) = 13.2$, $p < .0001$. Post hoc Tukey tests show that in-group judges were more favorable ($M = 1.66$) than uncategorized participants ($M = .74$, $p < .01$), and uncategorized participants were as favorable as out-group judges ($M = .32$, *ns*).

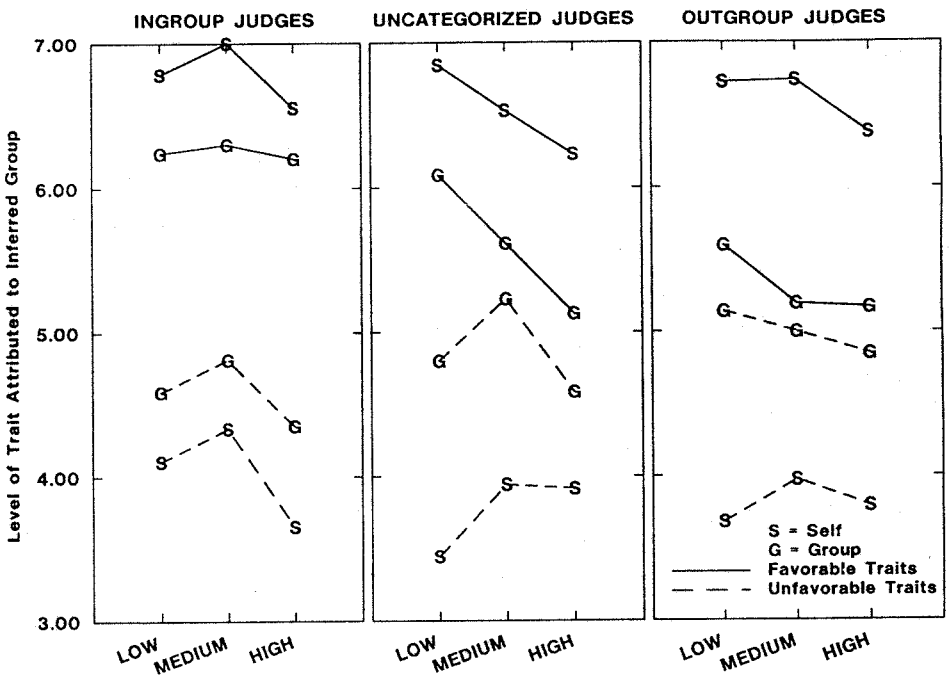

Figure 2. Attribution of traits to the inferred group and to the self as a function of judge's relation to the group, level of trait associated with the given group, and favorability of the trait for Experiment 2.

familiar and unfamiliar traits, although it was stronger on familiar traits.[6] As in Experiment 1, the self was rated more favorably than the in-group, suggesting again that a self-anchoring rather than a self-enhancement process was present.

Discussion

The results from Experiment 2 confirm the general pattern of results found in Experiment 1: uncategorized judges based their inferences on a differentiation principle; in-group judges based their inferences on a self-anchoring process; and out-group judges based their inferences, albeit weakly, on a differentiation principle. Unlike Experiment 1 and consistent with our predictions, out-group judges rated the group as favorably as uncategorized judges. As predicted, by having participants rate the self before the group, similarity between self and in-group became significantly higher than in Experiment 1, consistent with a self-anchoring interpretation of in-group judgments.

However, the results from Experiments 1 and 2 leave a number of questions unanswered. First, in Experiment 2 out-group participants showed a weaker differentiation process in their group judgments than in Experiment 1. One possibility is that rating the self before the group weakens participants' willingness to differentiate between groups. However, our model predicts that the differentiation process should be independent of the self-anchoring process. To clarify this issue, a third study was designed, in which the self and group order of the ratings was manipulated within the same experiment, with one group of participants rating the group first and the self after (as in Experiment 1) and the second group of participants rating the self first and the group after (as in Experiment 2). It is predicted that out-group judges will be equally willing to use a differentiation principle in the two order conditions. With respect to the self-anchoring process, we again predict that in-group judges will show the greatest similarity between self and group ratings and the similarity between self and group will be greater when the self is salient (i.e., when self-ratings precede group ratings).

Second, the role of trait familiarity remains unclear. Experiments 1 and 2 showed that the differentiation process was equally strong for familiar and unfamiliar traits, but the role of unfamiliar traits in self-anchoring remains unclear. Although in-group favoritism was found on both familiar and unfamiliar traits for both experiments, the role of self-ratings on unfamiliar traits could not be fully assessed in Experiment 1 because the definition of unfamiliar traits was not included. Therefore, the increase in self-anchoring from Experiment 1 to Experiment 2

[6] The tendency to rate the self more favorably than the in-group was stronger on familiar ($M_{favorable} - M_{unfavorable} = 3.52$ for self and $M_{favorable} - M_{unfavorable} = 2.04$ for in-group) than on unfamiliar traits ($M_{favorable} - M_{unfavorable} = 2.01$ for self and $M_{favorable} - M_{unfavorable} = 1.32$ for in-group), resulting in a three-way interaction among target, favorability, and familiarity of traits, $F(1, 38) = 7.43$, $p < .01$. Tests for simple effects showed that the tendency to view the self more favorably than the in-group was also present for unfamiliar traits, but only when the targets were rated along favorable traits ($M_{self} = 6.62$ and $M_{in\text{-}group} = 6.01$, $p < .0001$); no significant difference was found for ratings along unfavorable unfamiliar traits ($M_{self} = 4.61$ and $M_{in\text{-}group} = 4.69$). Further analysis showed that the tendency to rate the self more favorably than the group was also present for out-group and uncategorized participants.

was limited to familiar traits. To clarify the role of self-ratings on unfamiliar traits, in the next study unfamiliar traits will be accompanied by their definitions.

Third, our model predicts that the differentiation process should naturally occur when people are given information about one group and asked to make inferences about another group. However, the instructions in Experiments 1 and 2 specifically stated that "research in psychology shows that people's artistic preferences are correlated with certain psychological characteristics." This statement may have biased participants' responses by pushing them into inferring differences between people who prefer Thompson paintings and people who prefer Cooper paintings, although the instructions explicitly stated "there is no logical reason to assume the Thompson and Cooper groups should necessarily score either the same or differently from one another." To exclude this possibility, in the next study the instructions to participants will not refer to the correlation between artistic preference and psychological characteristics. Nevertheless, we expect to replicate the finding that uncategorized and out-group participants will base their inferences on the differentiation principle.

Fourth, in Experiments 1 and 2, we found stronger similarity between self- and group judgments for in-group than out-group and uncategorized participants. However, it is important to determine whether the similarity between self and in-group is the same for both favorable and unfavorable traits. To test this hypothesis, participants in this study will also be asked to rate the social desirability of each trait. This will allow us to calculate partial correlations between self- and in-group ratings with social desirability partialed out and to test the hypothesis that the self-anchoring process is present for different levels of trait favorability.

Experiment 3

In Experiment 3, one group of participants provided inferences about the group before making inferences about the self and a second group of participants made inferences about the group after making inferences about the self.

Method

Participants. Participants were 250 undergraduates (136 women, 108 men, and 6 of unknown gender) at the University of Oregon who volunteered to participate in this experiment in partial fulfillment of course requirements.

Procedure and materials. The overall procedure used in Experiment 3 was identical to the procedure used in Experiment 1 for one group of participants (group ratings first, self-ratings after) and identical to the procedure used in Experiment 2 for a second group of participants (self-ratings first, group ratings after). However, at the very end of the experiment, all participants rated the desirability of the 12 traits used in the previous tasks. The materials used in this experiment were identical to the materials described in Experiment 2, except for the instructions provided to participants before the presentation of Thompson and Cooper pictures. The instructions for Experiment 3 were identical to the instructions presented in Experiments 1 and 2, except for the sentence "Research in psychology shows that people's artistic preferences are correlated with certain psychological characteristics," which was omitted in the instructions for the present experiment. For the social desirability task, participants were asked to rate the desirability of the psychological characteristics on a 9-point scale that ranged from *very undesirable* (1) to *very desirable* (9). For the unfamiliar traits, the definitions and the favorability of the traits were provided.

Results

As shown in Table 2, as in Experiments 1 and 2, in-group judges showed the strongest self-anchoring process, with the lowest d^2, between self- and inferred group ratings, followed by control and out-group participants. A factorial ANOVA was performed on the d^2 scores, with order (group–self or self–group) being the first between-subjects factor and judges (in-group, out-group, or control) being the second between-subjects factor. A main effect of judges was found, $F(2, 244) = 28.28$, $p < .0001$, with similarity between group and self being stronger for in-group judges ($d^2 = 3.85$) than for out-group judges ($d^2 = 7.89$), with control participants falling in the middle ($d^2 = 6.75$). As expected, an interaction between order of the task and type of judges was also found, $F(2, 244) = 3.62$, $p < .05$ (see also Table 2). Simple tests were performed to test the effect of judges in each order condition. As predicted, the linear trends were significant both in the group–self order condition, $F(1, 244) = 11.75$, $p < .001$, and in the self–group order condition, $F(1, 244) = 42.41$, $p < .0001$, with the similarity between self and group increasing from the out-group to the in-group judges, with uncategorized participants falling in the middle (see Table 2). To test the self-anchoring hypothesis that increasing the salience of the self should increase the similarity between self and in-group, we compared d^2 ratings in the two order conditions. Orthogonal contrasts were performed to test the effect of order within each judge condition. As predicted, the similarity between self and in-group was greater (i.e., d^2 was lower) when the self was rated before than after the group ($d^2 = 3.06$ vs. $d^2 = 4.62$), $F(1, 244) = 3.89$, $p < .05$, whereas there was no significant difference in d^2 as a function of order for the uncategorized and out-group participants.[7]

Social desirability ratings. To determine whether the self-anchoring principle is limited to socially desirable traits, we computed within-subject partial correlations between self-ratings and in-group ratings, with social desirability ratings partialed out. As predicted, partial correlations between self- and in-group ratings were still significantly different from zero ($r = .42$, $p < .0001$), although they were significantly lower than the zero-order correlation between self and in-group ($r = .55$, $p < .0001$), $t(159) = 2.9$, $p < .01$.

[7] The pattern of within-subject correlations between self and inferred group paralleled the pattern of d^2 in both order conditions. When the self was rated after the group, the following increase in similarity between group and self was found: out-group $r = .04$, control $r = .19$, and in-group $r = .55$. When the self was rated before the group the following increase in similarity between group and self was found: out-group $r = .01$, control $r = .29$, and in-group $r = .64$. The pattern of correlations also paralleled the pattern of d^2 in that the similarity between self and in-group increased from the order condition group–self ($r = .54$) to the self–group order condition ($r = .64$), although the difference between these two conditions was not significant.

Table 4
Experiment 3: Attribution of Traits to a Minimal Group as a Function of Judge's Relation to the Group, Level of Trait Present in Other Group, Familiarity/Novelty of the Trait, and Favorability of the Trait

	Type of judge								
	In-group (n = 40)			Uncategorized (n = 35)			Out-group (n = 36)		
Type of trait	Low	Medium	High	Low	Medium	High	Low	Medium	High
Familiar traits									
Favorable									
M	6.04	6.33	6.42	6.11	6.07	5.58	5.51	5.42	5.62
SD	1.66	1.46	1.65	1.89	1.58	1.91	1.93	1.66	1.90
Unfavorable									
M	4.54	4.53	4.78	5.24	4.78	4.70	5.18	5.14	4.64
SD	2.00	1.75	1.96	1.97	1.61	1.82	1.73	1.66	1.76
Novel traits									
Favorable									
M	5.97	5.76	5.82	5.46	5.23	4.79	5.76	5.27	5.25
SD	1.28	1.35	1.62	1.50	1.38	1.72	1.46	1.51	1.69
Unfavorable									
M	4.31	4.60	5.00	5.16	5.29	4.60	5.21	5.07	4.61
SD	1.58	1.37	1.79	1.79	1.32	1.52	1.78	1.24	1.61
Average across all traits									
M	5.22	5.30	5.50	5.49	5.42	4.92	5.41	5.23	5.03
SD	1.86	1.67	1.87	1.83	1.54	1.78	1.74	1.53	1.79

Note. Participants are given information about one of the minimal groups and asked to make inferences about the other group. *Level* refers to the magnitude of the trait in the given group, and the dependent measures are participants' judgments about the inferred group. Thus, in-group judges are given information about the out-group and make inferences about the in-group, whereas out-group judges are given information about the in-group and make inferences about the out-group. Mean scores are based on 9-point rating scales on which 1 = *very uncharacteristic*, 5 = *neither uncharacteristic nor characteristic*, and 9 = *very characteristic*.

Group ratings. The overall pattern of results obtained for Experiment 3 generally replicated those obtained in Experiments 1 and 2, with some differences. As in Experiments 1 and 2, no reliable gender effects were found, and the data were collapsed across gender. A 3 (in-group, uncategorized, and out-group) × 2 (group–self or self–group) × 2 (trait favorability) × 3 (given trait level) × 2 (trait familiarity) ANOVA was performed on group ratings. As predicted, the variable order of the tasks did not produce any significant effect or interactions with any other variable. Therefore, Table 4 presents the results collapsed across the two types of order.

Table 4 shows that, as in Experiments 1 and 2 and consistent with the differentiation principle, level produced a marginally significant main effect, $F(2, 448) = 2.87$, $p < .06$. As the level of trait increased (from 3 to 5 to 7) for the given group, the level of that trait ascribed to the judged group decreased (M = 5.37, 5.32, and 5.15, respectively). Also consistent with Experiments 1 and 2, the effect of level varied with type of judge, as is apparent from the last row in Table 4. Consistent with Experiment 1, the interaction between type of judge and level was significant, $F(4, 488) = 4.04$, $p < .01$. Figure 3 also shows the effect of level for different types of judges.

For each group of judges, a test for simple effects was performed to analyze the effect of level. As in Experiments 1 and 2, uncategorized participants showed a significant linear trend, $F(1, 418) = 11.49$, $p < .001$; as in Experiment 1, out-group judges also showed a significant linear trend, $F(1, 418) = 5.39$, $p < .05$. As in both previous experiments, in-group judges did not show a significant linear trend, $F(1, 418) = 2.63$, *ns*.

As in Experiments 1 and 2, evidence was also found for in-group favoritism. A highly significant interaction between type of judge and favorability of the traits was found, $F(2, 244) = 16.0$, $p < .0001$. As is apparent from Figure 3, favorable traits were considered to be more applicable by in-group (M = 6.05) than out-group judges (M = 5.47), with uncategorized participants falling in the middle (M = 5.56). Similarly, unfavorable traits were considered to be more applicable by out-group judges (M = 4.98) than in-group judges (M = 4.63), with uncategorized participants falling in the middle (M = 4.96). Consistent with our predictions, unlike Experiment 1 and as in Experiment 2, out-group judges were as favorable as uncategorized participants.[8]

[8] A single measure of group favorability was obtained by calculating the difference between the ratings for favorable minus unfavorable traits. A 3 (in-group, uncategorized, out-group judges) × 3 (level of trait) × 2 (trait familiarity) ANOVA was performed on these difference scores. A significant effect of judges was found, $F(2, 245) = 15.45$, $p < .0001$. Post hoc Tukey tests show that in-group judges were more favorable (M = 1.43) than uncategorized participants (M = .63, $p < .01$), and uncategorized participants were as favorable as out-group judges (M = .50, *ns*).

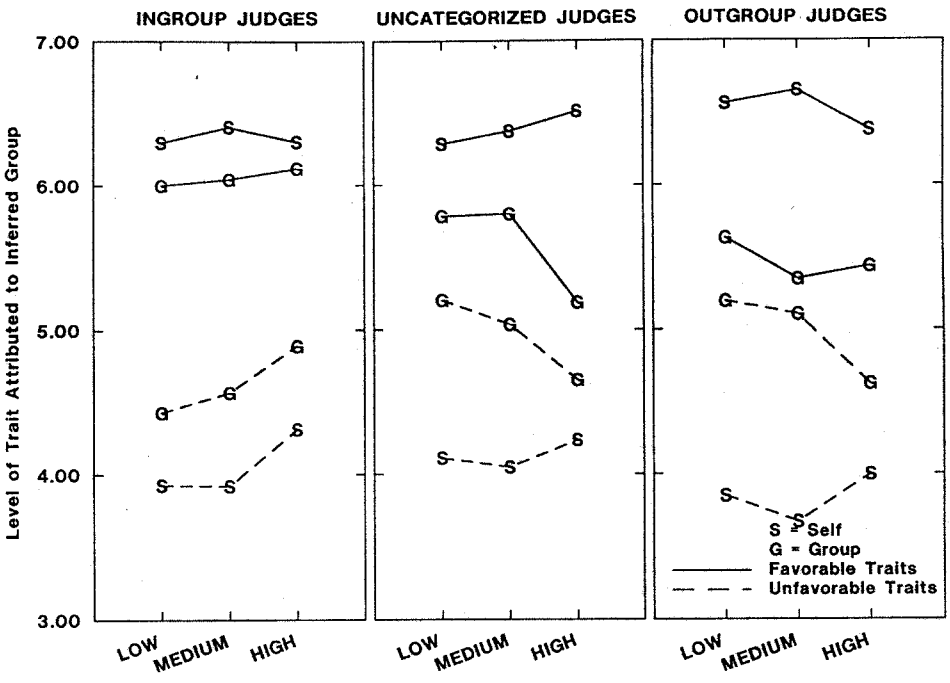

Figure 3. Attribution of traits to the inferred group and to the self as a function of judge's relation to the group, level of trait associated with the given group, and favorability of the trait for Experiment 3.

Unlike Experiments 1 and 2, the familiarity of the traits produced some effects (see Table 4). A main effect of familiarity was found, $F(1, 244) = 11.0, p < .001$, with groups being rated higher on familiar than unfamiliar traits. Most importantly, a significant interaction between familiarity and favorability was found, $F(1, 244) = 34.0, p < .0001$, with groups generally rated more favorably on familiar traits ($M_{favorable} - M_{unfavorable} = 1.06$) than on unfamiliar traits ($M_{favorable} - M_{unfavorable} = .64$). As shown in Table 4, unlike Experiments 1 and 2, in-group favoritism was stronger on familiar than unfamiliar traits, resulting in a significant three-way interaction among judges, valence, and familiarity of the traits, $F(2, 244) = 3.60, p < .05$. Finally, as in Experiments 1 and 2, a main effect of favorability of the traits was found, $F(1, 244) = 142.0, p < .0001$, with participants rating groups as higher on favorable ($M = 5.70$) than unfavorable ($M = 4.86$) traits. However, familiarity did not interact with level, suggesting that the differentiation process was equally present for familiar and unfamiliar traits.

Self versus in-group ratings. Because no gender effects were found, we present the data collapsed across gender. As in Experiments 1 and 2, in-group self-ratings were more favorable than group ratings. A 2 (group–self or self–group) × 2 (self or in-group target) × 2 (trait favorability) × 2 (trait familiarity) ANOVA was performed on in-group participants' ratings. As in Experiment 2, a Target × Favorability interaction was found, $F(1, 81) = 4.5, p < .05$, with the self being rated higher than the in-group on unfavorable traits (self $M = 6.33$ and in-group $M = 6.05$) and the self being rated lower than the in-group on unfavorable traits (self $M = 4.05$ and in-group $M = 4.63$; see also Figure 3). Clearly, as in Experiments 1 and 2, the prediction that self-ratings should be more favorable than in-group ratings was confirmed. This pattern was present for both familiar and unfamiliar traits, although it was stronger for familiar traits.[9]

Discussion

The results from Experiment 3 confirm and strengthen the general pattern of results found in Experiments 1 and 2: uncategorized and out-group judges based their inferences on a differentiation principle, whereas in-group judges based their inferences on a self-anchoring process. As in Experiments 1 and 2, when participants rated the self before the group, the similarity between the self- and in-group ratings was significantly stronger than in the condition in which the self was rated after the group, confirming the importance of self in in-group judgments. It is important to note that by varying the order of the

[9] As in Experiments 1 and 2, a three-way interaction among target, favorability, and familiarity of traits was also found, $F(1, 81) = 5.35, p < .05$: the tendency to rate the self more favorably than the in-group was stronger on familiar ($M_{favorable} - M_{unfavorable} = 2.78$ for self and $M_{favorable} - M_{unfavorable} = 1.65$ for in-group) than on unfamiliar traits ($M_{favorable} - M_{unfavorable} = 1.79$ for self and $M_{favorable} - M_{unfavorable} = 1.21$ for in-group). However, tests for simple effects showed that the tendency to view the self more favorably than the in-group was also present for unfamiliar traits, but only when the ratings were made along unfavorable unfamiliar traits ($M_{self} = 4.22$ and $M_{in\text{-}group} = 4.64, p < .001$); no significant difference was found for ratings along unfamiliar favorable traits ($M_{self} = 6.0$ and $M_{in\text{-}group} = 5.85$). Further analysis showed that this pattern of results did not vary by judges.

tasks (self-ratings before or after group ratings), we were able to affect the degree of self-anchoring without affecting the differentiation process, suggesting that the two processes are independent of one another.

Experiment 3 also clarifies the role of unfamiliar traits in group and self-judgments. As in Experiments 1 and 2, the differentiation process was not affected by the familiarity of the traits. Uncategorized and out-group participants were equally willing to differentiate between groups on familiar and unfamiliar traits. As in Experiments 1 and 2, the self-anchoring process, as shown by in-group favoritism and self–in-group similarity, was present on both familiar and unfamiliar traits, although, unlike Experiments 1 and 2, it was stronger on familiar than unfamiliar traits.

Finally, although the instructions in Experiment 3 made no reference to the correlation between artistic preference and psychological characteristics, uncategorized and out-group participants still showed a clear tendency to use an oppositeness heuristic, consistent with the idea that social categorization leads both categorized and uncategorized judges to assume differences between groups. Experiment 3 also clarifies the role of trait favorability in self-anchoring by showing that the self-anchoring process is present for different levels of trait favorability.

Although Experiments 1, 2, and 3 provide results consistent with the idea that the self plays a causal role in in-group judgment, the d^2 scores provide only indirect support for the hypothesis that in-group judgments were derived from self-judgments. To further test the degree to which in-group perception is derived from self-perception and self-perception is derived from group attributes, a fourth experiment was designed in which the information about both in-group and self were experimentally varied and the effects on inference assessed. By giving a group of participants feedback about the self and then assessing their inferences about the in-group and by giving another group of participants feedback about the in-group and examining their inferences about the self, we are able to determine the direction of influence between self and in-group similarity.

Experiment 4

The main focus of this study is to compare the inductive and deductive inference processes occurring when the self is involved. We predict that participants given feedback about the self will be more willing to generalize information about the self to the in-group (induction with self-reference) than participants given feedback about the in-group are to generalize information about the in-group to the self (deduction with self-reference). Note, however, the different nature of these two tasks: the first group of participants is engaging in induction (from individual to group), whereas the second group of participants is engaging in deduction (from group to individual). To assess the effects of type of inference alone (induction vs. deduction), our design includes induction and deduction control groups, in which the inference between individual and group does not involve the self.

Method

Overview. After being categorized as Cooper people, participants were either given novel information about the in-group and asked to make inferences about an individual or given novel information about an individual and asked to make inferences about the in-group. For half of the participants, the individual was self; for the other half, another in-group member. Information was given to participants along six unfamiliar psychological dimensions.

Participants. Participants were 153 undergraduates (85 women, 66 men, and 2 of unknown gender) at the University of Oregon who volunteered to participate in this experiment in partial fulfillment of course requirements.

Procedure. Using the same basis for categorization as in Experiments 1, 2, and 3, all participants were assigned to the Cooper group. After participants were categorized, they then performed four cognitive tasks involving attention, memory, and mental assembling skills. At the end of the four tasks, the experimenter left the room for 5 min, allegedly to score the participants' performance. When the experimenter returned to the room, she gave each participant a packet for the next task. Participants were randomly assigned to one of the following four conditions: (a) one group of participants received information about how they scored on the previous tasks and were asked to make inferences about the Cooper group as a whole (induction with self-reference), (b) a second group of participants received information about how the Cooper group as a whole scored on the previous tasks and were asked to make inferences about the self (deduction with self-reference), (c) a third group of participants received information about how an individual member of the Cooper group scored on the previous tasks and were asked to make inferences about the Cooper group as a whole (induction without self-reference), and (d) a fourth group of participants received information about how the Cooper group as a whole scored on the previous tasks and were asked to make inferences about an individual member of the Cooper group (deduction without self-reference).

In all conditions, information was provided in the form of scores (3, 5, or 7) along six favorable but unfamiliar psychological dimensions. Scores were randomized across traits for each participant. After looking at each marked scale, all participants had to judge the degree to which the same dimension was characteristic or uncharacteristic of the inference target. Here is an example of instructions provided to participants in Condition 4:

> On each of the following six pages, you will be given information about six psychological characteristics derived from the tasks that you performed earlier. On each page, you will first receive the score that the Cooper group as a whole received on that measure. Underneath that information, we would like you to estimate, as best as you can, how an individual member of the Cooper group might have scored on the same measure. The single individual that you are being asked about was in this experiment on a previous day, but at the same time as yourself.

Stimulus materials used for the cognitive tasks. The materials relevant to the four cognitive tasks were presented by slides. For the first task, the slide contained a pattern of seven large letters (one *A*, one *C*, two *D*s, two *E*s, one *F*), each of them made of small alphabet letters (for example, a big *A* could be made of small *D*s). Participants were then asked questions like How many times did you see a big *A*? How many times did you see a letter composed of small *A*s? For the second task, participants were presented with a slide showing a list of color words (for example, *black, red,* and *green*) written in different colors. Participants were then asked questions like How many words were written in white? How many times did the word *white* appear (regardless of the color it was written in)? For the third task, participants were presented with a slide showing a list of 15 nouns, 5 of which were animals, 5 trees, and 5 tools. At the end, participants were simply asked to write down as many of the words from the list as they could recall. For the fourth and final task, participants were presented with a slide containing 15 visual shapes (e.g., a sphere, a wire, a cross, and a flat

square). For each of the three trials that made up the fourth task, the experimenter named three parts and asked participants to mentally assemble them to make an interesting and potentially useful object. For each trial, participants had to close their eyes for 1 min to mentally assemble the parts and then draw the object without being allowed to look at the slide until they were done.

Stimulus materials for the inference task. Participants were presented with six 9-point scales measuring the following psychological dimensions: Parallel Information Processing, Clustering in Semantic Recall, Global Orientation in Pattern Construction, Modality Dominance in Synesthesic Perception, Lateralization of Brain Functions in Mental Assembling, and Image Orientation in Constructive Skills. For each scale, the meaning of the scale was defined by the experimenter. For example, participants were told that high scores on the Clustering in Semantic Recall Scale indicate good performance in recall and recognition tasks. After looking at each marked scale, participants had to judge the degree to which the same dimension was characteristic of the target.

Results

For each participant, we computed an average difference score (average d^2) representing the average of the squared differences between the given and the inferred scores. Because gender did not produce any main effects nor interactions with any other variable, we will present the results collapsed across gender. A 2 × 2 between-subjects ANOVA, with type of inference (induction or deduction) as the first factor and type of individual (self or other) as the second factor, was performed on the average d^2 scores. The interaction between type of inference (induction or deduction) and type of individual (self or other) was marginally significant, $F(1, 149) = 3.79$, $p < .054$, indicating that different inferential strategies (inductive vs. deductive) were used by participants depending on whether the self or another individual was involved in the generalization process. As is apparent from the d^2 scores shown in Table 5's first row, participants were willing to infer more similarity from self to in-group ($d^2 = 2.62$) than from in-group to self ($d^2 = 3.84$). The pattern of d^2 scores was reversed when inferences did not involve the self (see Table 5, last row), with a slight preference for deduction ($d^2 = 2.40$) over induction ($d^2 = 2.72$).[10] Two planned orthogonal contrasts were performed on d^2 scores to test for simple effects. The first contrast, comparing the in-group to self with the self to in-group conditions, was significant, $F(1, 149) = 4.91$, $p < .05$, confirming our prediction that participants are more willing to generalize from the self to the in-group than from the in-group to the self. The second contrast, comparing the pure deduction with the pure induction condition when the self was not involved, did not show significant differences, indicating that participants did not use significantly different inference strategies when the self was not involved. Nevertheless, as mentioned before, there was a slight tendency to generalize more from the group as a whole to a single individual than from a single individual to the group as a whole.

Table 5
d^2 Scores as a Function of Type of Inference (Induction vs. Deduction) and Type of Individual (Self vs. Other) for Experiment 4

Type of individual	Type of inference: Induction (individual → group)	Type of inference: Deduction (group → individual)
Self		
M	2.62	3.84
SD	1.67	3.38
N	39	39
Other		
M	2.72	2.40
SD	2.24	2.10
N	36	39

Note. Mean scores represent the average of within-subject squared differences between self-ratings and inferred group ratings. d^2 were first calculated within subjects for each individual trait and then averaged across traits.

Discussion

The data from Experiments 1, 2, and 3 did not allow us to draw any conclusion about the causal direction between self- and in-group ratings. Experiment 4, in which feedback about self and about group on unfamiliar dimensions was manipulated, showed that participants are more willing to generalize information from self to in-group than from in-group to self. This preference for induction was (nonsignificantly) reversed when the inference did not involve the self. This result clarifies the causal direction of the similarity between self- and in-group perception found in Experiments 1, 2, and 3, suggesting that in-group perception in minimal group settings is largely derived from self-perception rather than self-perception being derived from in-group perception.

General Discussion

The results from these studies show evidence for both a differentiation and a self-anchoring process as mediators of in-group favoritism in minimal group settings. Participants were asked to make judgments about one of the groups in a mutually exclusive, dichotomous categorization, based only on information given to them about attributes of the other group. To make this judgment, uncategorized and out-group participants used an oppositeness or differentiation principle and assumed one group to be the opposite of the other. On the contrary, in-group judges ignored the information given about the out-group and based judgments about the in-group solely on characteristics of the self.

Although results from Experiments 1, 2, and 3 were consistent with the idea that self-perception is an important mediator in judging groups in the minimal group paradigm, it was important to determine to what degree in-group perception was derived from self-perception and self-perception was derived from in-group perception. Results from Experiment 4 showed that participants are more willing to generalize information

[10] The interaction between type of inference (induction or deduction) and type of individual (self or other) was also present for the within-subject correlations, $F(1, 142) = 4.92$, $p < .05$ (r self to group = .77, r group to self = .55, r individual to group = .70, and r group to individual = .77).

about the self to the in-group than to generalize information about the in-group to the self. These results support the idea that the causal direction is from self to group, rather than from group to self. Our results seem inconsistent with the interpretation of in-group favoritism in the minimal group paradigm proposed by Social Identity Theory (Tajfel & Turner, 1979). Tajfel and Turner suggested that to maintain or enhance one's self-esteem, the in-group must be perceived as positively differentiated from the out-group. One possible implication of the self-enhancement hypothesis proposed by Social Identity Theory is that, because in-group favoritism in minimal group settings is a way to enhance the self, in-group judgments should be more favorable than self-judgments. The finding that the self-image was consistently more favorable than the image of the in-group is inconsistent with the self-enhancement explanation and consistent with the self-anchoring explanation. *Social identity* is defined as "those aspects of individual's self-image that derive from the social categories to which he perceives himself as belonging" (Tajfel & Turner, 1979, p. 40). Although for naturally existing groups it is reasonable to hypothesize a self-identity based on in-group perception, we believe that there is no evidence that in a minimal group context participants internalize some aspects of group membership as part of their self-concept, as Social Identity Theory suggests (cf. Horwitz & Rabbie, 1989). On the contrary, the results from these studies show that in minimal group conditions, when almost no information about the groups is available, in-group perception tends to be based on self-perception rather than self-perception being based on in-group perception.

One important finding in our data is related to the effects of familiar versus novel traits. We originally reasoned that participants' pattern of inferences might be different for traits known to be characteristic (or uncharacteristic) of the self and for those in which the applicability to self is unknown. The novel traits were specifically created so that relevant prior beliefs about the self would not exist, although the favorability of these traits was experimentally manipulated and communicated to the participants. In fact, the pattern of inferences was similar for familiar and unfamiliar traits. First, the differentiation process did not show any differences between familiar and unfamiliar traits: out-group judges (as well as uncategorized participants) were equally willing to differentiate between groups on familiar and unfamiliar traits. This finding is consistent with the result that out-group judges showed the lowest similarity between self and group and suggests that out-group judges were not affected by the familiarity of the traits simply because the self was not relevant to their judgments. Second, the self-anchoring process, as shown by in-group favoritism and self–in-group similarity, was present for both familiar and unfamiliar traits, although it was stronger on familiar than unfamiliar traits. Two possible explanations seem plausible. One possibility is that people simply generalize their favorable self-perception from familiar to unfamiliar domains. Certainly with respect to perception of others, research has shown that when favorable information about a person is available in one domain, there is a tendency to rate that person favorably in other domains as well (Dion, 1972; Dion, Berscheid, & Walster, 1972). This hypothesis is consistent with the findings that the self was rated more favorably on familiar than unfamiliar traits, and self-perception was more favorable than group perception on both familiar and unfamiliar traits. An alternative interpretation of this finding is that people assume novel favorable traits to be characteristic of the self to enhance their self-image. Testing the difference between a generalization and a self-enhancement hypothesis may be difficult indeed, and our data clearly do not allow us to distinguish between these alternative explanations.

Our model proposes differentiation and self-anchoring as baseline processes for explaining in-group favoritism in minimal group settings. Therefore, it is important to define the limits and applicability of this model. First, past research in the minimal group paradigm has found in-group favoritism as measured by both trait ratings and reward allocation strategies. Although our model has been primarily designed to explain in-group favoritism at the level of trait ratings, it may also have application to reward allocation tasks. According to the self-anchoring process, if in-group members are assumed to be similar to the self, allocation strategies toward in-group members should be similar to allocation strategies toward the self. One can predict that participants will allocate the greatest amount of resources to the self, somewhat less to the in-group and even less to the out-group. Turner (1978) had participants allocate point or money matrices to self and in-group members or to self and out-group members (see also Turner, 1972, 1973, 1975). Although Turner stated that "self-favoritism was the most influential strategy" (p. 116), self-interest (i.e., allocation to self) was always confounded with one other allocation strategy (e.g., either maximum differentiation, maximum joint interest, or fairness), making it difficult to draw strong conclusions. Further research is needed to clarify the relationship between self, in-group, and out-group allocations.

Second, other research (Brewer & Weber, 1994) has shown that under certain conditions (e.g., in a minority and majority context), minority participants tend to assimilate their self-ratings to the characteristics of another in-group member. In this study, a distinctive minority membership had clearly important effects on participants' self-image. We believe that the level of identification with a group is an important mediator of people's willingness to modify their self-image. Therefore, the level of identification should be manipulated, and its effects should be assessed against the model's baseline processes.

Third, according to our model, there is no need to postulate a self-enhancement process as a general explanation for in-group favoritism in minimal group settings. However, it should be clear that when motivational needs are elicited, self-enhancement processes should be expected in minimal group settings. For example, in a study by Hogg and Sunderland (1991), participants given failure feedback on an individual task showed more intergroup discrimination as compared with participants given success feedback. Again, we believe that motivational needs should be manipulated and their effects on in-group favoritism assessed against the model's baseline processes, rather than assuming that in-group favoritism is a motivational process per se.

Fourth, under some circumstances in-group favoritism is not found in minimal group settings. For example, when participants perceive themselves to be dependent on members in the other social category for maximizing their monetary outcomes, out-group favoritism is found (see Horwitz & Rabbie, 1989; Rabbie, Schot, & Visser, 1989). It is reasonable to assume that, under such a condition of interdependence with the out-group, there will be no tendency to view the in-group more favorably than the out-group. It would be interesting to test whether out-group favoritism would also be present at the level of trait ratings, and if so, whether out-group judgments would then be anchored to the self.

Overall, our model proposes a general framework for explaining in-group favoritism in minimal group settings, upon which other important variables (e.g., self-enhancement needs or level of identification) can be manipulated to assess their effects on in-group favoritism. Although we have proposed both a differentiation and a self-anchoring process to account for in-group favoritism in minimal group settings, the generalizability of our findings to naturally existing groups remains open. It seems plausible to assume that the observed tendency to differentiate between groups also exists in real group contexts. More complicated is the relationship between self- and in-group perception. In minimal group conditions there was evidence for generalization from self- to in-group perception, but in naturally existing groups, information about both the self and the in-group is typically available, making it difficult for researchers to unravel the causal link between self and group attributes. One can only speculate that some degree of generalization from self to in-group still occurs and that the perception of the in-group will also influence self-perception. An ingenious study by Smith and Henry (in press) is relevant to this point by showing that the mental representations of the self and the in-group are directly linked. Participants were first asked to fill out a questionnaire rating the self, the in-group (e.g., students belonging to the Greek system), and the out-group on a variety of traits. Later, participants were asked to rate the self on a computer task. Reaction times showed that participants were faster in their self-descriptions on traits for which the self and the in-group descriptions matched. The authors concluded that the in-group attributes become part of the self-image, thus facilitating the accessibility of self-information. However, a condition measuring reaction times on in-group ratings (as opposed to self-ratings) was not included in this study, preventing us from determining whether in-group ratings would also be facilitated when the self- and in-group descriptions match. If this were the case, one would need to conclude that the self attributes also become part of the in-group, and more generally, self- and in-group perceptions are linked in a bidirectional relationship.

This research is consistent with research on social projection (see Krueger & Zeiger, 1993; Mullen, Dovidio, Johnson, & Copper, 1992) showing that people tend to perceive one's attitudes and behavioral choices as more prevalent among in-group members (false consensus effect) than among out-group members. As for the self-anchoring principle, social projection was not limited to favorable choices, but people tended to ascribe both favorable and less favorable choices to in-group members.

This research also corroborates the important role of self-perception in judgments about the in-group and the out-group found in other research. Judd and Park (1988) found, for example, that knowledge about the self may be central to the perception of out-group homogeneity effects, at least in minimal group conditions. Clarifying the relation between self- and group perception remains an important challenge for future research on intergroup relations.

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