Journal of Personality and Social Psychology
1985, Vol. 49, No. 3, 660-670

0022-3514/85/$00.75

Intergroup Discrimination and Self-Esteem in the Minimal Group Paradigm

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This experiment was designed to test the hypothesis that intergroup discrimination in the minimal group paradigm is related to self-esteem. According to Social Identity Theory, intergroup discrimination is a strategy for achieving self-esteem via social competition aimed at increasing the positive distinctiveness of one's own group. However, other elements of the procedure, such as categorization into groups, or the opportunity to engage in a meaningful experimental task irrespective of its value for social competition, might also affect self-esteem. One hundred thirty-five undergraduates were randomly assigned to eight concurrent experimental conditions. A two-way multivariate analysis of variance on the core design produced a significant interaction effect, whereby categorized subjects who had the opportunity to discriminate between groups and noncategorized subjects who did not discriminate showed higher self-esteem than did both categorized subjects who could not engage in discrimination and noncategorized subjects who could discriminate. These results support social identity theory and also suggest that social categorization by itself may constitute a threat to self-esteem that can be resolved via social competition. Results from the supplementary conditions support the conclusion that it is intergroup discrimination, and not merely the completion of an experimental task, that redeems self-esteem.

More than 20 experiments in which researchers used variants of the minimal group experimental procedure (MGP) support the hyothesis that under certain conditions, merely being categorized into an experimental group is sufficient to induce favoritism to the in-group and discrimination against an out-group (e.g., Billig & Tajfel, 1973; Brewer, 1979; Brown, Tajfel, & Turner, 1980; Locksley, Ortiz, & Hepburn, 1980; Tajfel, 1970; Turner, 1978, 1980, 1983).

In these experiments, which have been extensively described elsewhere (Brewer, 1979; Tajfel, Flament, Billig, & Bundy, 1971; Turner, 1978, 1983), subjects are divided into groups on trivial or ad hoc bases, and then make decisions about rewards for anonymous in-group and out-group members. Reliably, they discriminate competitively in favor of their own group, striving not only for their own group's gain, but also for advantage relative to the other group even when this entails the sacrifice of absolute gain for one's own group.

The significance of competitive discrimination in the MGP is not only that it draws attention to the ease with which hitherto nonexistent criteria, which are in any case transient and usually trivial in the experiments, can become psychologically prominent as the focal point of social discrimination. Less striking, but in some ways more significant, is the fact that these criteria become the focal point of directed and reliable discrimination, taking the form of competitive in-group favoritism, in a context that is devoid of all the variables that are normally thought to determine group cohesion and intergroup antipathy.

The most satisfactory explanation of these findings to date is Tajfel and Turner's Social Identity Theory (SIT; Turner, 1982). This is based in part on an extension of Festinger's (1954) theory of social comparison, which postulates a human need to evaluate one's own

This research was completed in partial fulfillment of the masters degree by the first author, who acknowledges support received from the Social Science Research Council of Canada, from the FCAC research fund of Quebec, and from the University of British Columbia.

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opinions and abilities. Tajfel (1978) argued that not only individual opinions and abilities but group memberships as well are evaluatively important because they provide people with orientation and definition in society. He thus extended the social comparison idea to embrace intergroup as well as interpersonal evaluations. Just as Festinger hypothesized that there is a pressure towards obtaining favorable social comparisons for ability evaluations, Tajfel argued that this is true also in the case of intergroup comparisons.

To account for the fact that discrimination in the MGP systematically favors the in-group, Tajfel (1972, 1974) and Turner (1975; Tajfel & Turner, 1979) argued that social categorization more or less automatically stimulates comparisons between the in-group and out-group and, furthermore, that there is a motivational tendency for people to resolve these comparisons in such a way as to defend, maintain, and possibly enhance their self-esteem. Social categorization in the MGP, they argued, triggers intergroup comparisons that have repercussions for group members' self-evaluations, thereby inducing them to engage in behavior that enhances the relative value of their own group when the opportunity arises. Turner (1975) called this *social competition.*

The need for positive self-esteem, in the sense of a relatively favorable self-evaluation, is afforded a prominent role in SIT as the motive underlying competitive discrimination. In only two experiments have researchers directly addressed the hypothesis that discrimination in the MGP contributes to personal self-evaluation. Oakes and Turner (1980) measured postexperimental self-esteem under two conditions. Subjects were first categorized on painting preferences and then were assigned either to an experimental condition, in which they completed the usual matrix booklet, or to a control condition, in which they read a newspaper article on which they would supposedly be questioned later. At the end of the session, all subjects completed a self-evaluation questionnaire. Experimental subjects, who indeed showed in-group favoritism on the matrices, expressed greater self-esteem than did control subjects. A factor analysis of the self-esteem measures yielded a single factor on which scores differed significantly across conditions. The experiment thus gave encouraging results. However, one can level the criticism that the experimental tasks in the two conditions were not of equal psychological significance: One was a decision-making task, whereas the other simply consisted of waiting. One could argue that the importance of the experimental task influenced self-esteem independently of the opportunity to discriminate. It would therefore be desirable to compare conditions in which the tasks are of comparable psychological significance. Moreover, the setting of the experimental condition made group membership much more salient, again independently of any actual discrimination response. Consequently, it is not clear which aspect of the experimental condition caused the difference in self-esteem: the significance of the task, the emphasis on comparison between in-group and out-group, or the discrimination itself.

Turner and Spriggs (1982) conducted another MGP experiment with self-esteem as one of the dependent variables. Two independent variables were manipulated. One was the instructions given to the subjects: They were instructed to be either cooperative or competitive. The second manipulation concerned the type of matrix. In the group condition, subjects were categorized on painting preferences, and they allocated points between in-group and out-group members, whereas in the individual condition, they were not explicitly categorized into groups, and they allocated points between themselves and another person, half of the time to someone who shared the same painting preference and the other half of the time to someone who did not. The self-esteem measures were the same as those used by Oakes and Turner (1980), namely, the Twenty Statements Test, semantic differential items, and Rosenberg's (1965) Self-Esteem Inventory. Subjects in all conditions showed in-group favoritism, but they differed significantly according to the two expected main effects: More in-group favoritism was shown in the competition conditions than in the cooperation conditions, and more was shown in the group conditions than in the individual conditions. Two-way analyses of variance (ANOVAs) on each self-esteem scale revealed a main effect for competition versus cooperation, which was due to the tendency towards higher self-esteem on Rosenberg's scale, the semantic differential

scales, and the common factor under competitive instructions. Surprisingly, self-esteem scores were higher under individual conditions (self vs. other matrices) than under group conditions (other vs. other matrices). No interactions were significant.

In that experiment the relation between competition and in-group favoritism seems to have mirrored the pattern between competition and self-esteem. Competitive instructions caused an increase in in-group favoritism and an increase in self-esteem, suggesting a relation between in-group favoritism and self-esteem. However, one cannot conclude that it is the amount of discrimination itself that caused the change in self-esteem; the relation between these two variables is correlational, and both could have been due to competitive instructions. Moreover, because subjects in all conditions were in situations of discrimination and showed in-group favoritism to some extent, one cannot judge whether intergroup discrimination was a necessary condition for a change in self-esteem; an appropriate control condition without discrimination was lacking.

Those two experiments partly addressed the hypothesis concerning the role of self-esteem in intergroup discrimination, but neither was conclusive. Our aim is to extend the contributions of Oakes and Turner (1980) and Turner and Spriggs (1982) in investigating the relation between social categorization, intergroup discrimination, and self-esteem, and to attempt to isolate the locus of the relation. Essentially, SIT is predictive of an increase in self-esteem after a successful competitive social comparison. Positive differentiation (i.e., discrimination) is a prerequisite of success in this respect. However, it is also conceivable that a change in self-esteem may be produced by other factors. For example, categorization in the MGP may itself elicit some positive self-evaluation in that it contributes in an admittedly minimal way to an individual's self-definition in a context in which the ambiguity of the experimental situation may elicit a search for meaning. Neither of the experiments just described included a no-categorization control condition against which one could compare the effects of categorization. Furthermore, it is possible that the opportunity for cognitive comparison and differentiation of the in-group and outgroup, independently of any actual discrimination, may contribute to self-esteem because it makes group membership salient. Then, above and beyond the possible impact of categorization and cognitive differentiation, actual intergroup discrimination would of course bring into play the consequential process of social competition, which is the key factor according to SIT.

Method

Design and Hypotheses

Our main objective was to determine whether competitive social comparison and discrimination againt an outgroup cause an increase in self-esteem. This presupposes a social categorization manipulation, as well as an opportunity to differentiate between groups. Eight experimental conditions were designed, as displayed in Table 1.

The conditions varied on three parameters: (a) categorization into groups versus no categorization, (b) type of point-allocation task, and (c) the order of the point-allocation and self-esteem tasks. The core of the design consisted of the first four conditions, which formed, with respect to the dependent variable self-esteem, a 2×2 design: Categorization Versus Noncategorization $\times$ Matrix Task Versus No Matrix Task. To this block the four remaining conditions were affixed as supplementary controls.

The cornerstone of the design was Condition 4, which was to be compared on self-esteem with conditions in which subjects were categorized but could not express any in-group favoritism on the matrices because they were not confronted with both the ingroup and the outgroup simultaneously (Conditions 5 and 6) or because they were forced to be fair (Condition 7). In Condition 3 self-esteem was assessed before any possible discrimination, no explicit comparison or decision having yet been made. This permitted us to simulate a pre–postmeasure of self-esteem with respect to discrimination, without encountering repeated measure artifacts such as pretest sensitivity. Moreover, Condition 3 in conjunction with Condition 1, the baseline, permitted the evalution of the impact of categorization alone on self-esteem. Condition 2 served as a control for the effect of the matrix task. Condition 8 provided an analogue to Condition 7 with respect to its forced character, and tested, when opposed to Condition 4, whether perceived freedom in discriminating against an out-group was a determinant of a change in self-esteem.

Concerning the 2×2 design, in our principal hypothesis we predicted a Categorization $\times$ Matrix interaction effect: Subjects who were categorized and who discriminated would show the highest self-esteem. As for the supplementary control conditions, the major prediction was that of all categorization conditions (3 through 8), self-esteem would be highest in those in which intergroup discrimination occurred (4 and 8). Further predictions were that Conditions 5 and 6 would not differ for each other on self-esteem, and both would be lower than Condition 4; moreover, Condition 8 (forced discrimination) would be higher on self-esteem than Condition 7 (forced fairness). A comparison between Conditions 4 and 8 would help to reveal whether the constraints of a task in which in-group favoritism was imposed would interfere with the expected sal-

Table 1
Summary of the Experimental Design

Categorization	Booklet	
	Part 1	Part 2
1. NC	Self-esteem	Other–other matrices
2. NC	Other–other matrices	Self-esteem
3. C	Self-esteem	In-group/out-group matrices
4. C	In-group/out-group matrices	Self-esteem
5. C	In-group/in-group matrices	Self-esteem
6. C	Out-group/out-group matrices	Self-esteem
7. C	Forced fairness matrices	Self-esteem
8. C	Forced discrimination matrices	Self-esteem

Note. NC = no categorization; C = categorization.

utary effects of that strategy. Finally, we predicted that if completing a significant experimental task is in itself beneficial for self-esteem, then Conditions 5, 6, and 7 should be higher than Condition 3.

In summary, for the categorization conditions, our predictions for self-esteem were as follows: (a) It would be greater in Conditions 4 and 8 than in 3, 5, 6, and 7; (b) it would be the same in Conditions 5 and 6; (c) it would be greater in Condition 4 than in 5 and 6; (d) it would be greater in Condition 8 than in 7; (e) it would be greater in Condition 5 than in 8; (f) it would be greater in Conditions 5, 6, and 7 than in 3.

Subjects

One hundred thirty-five undergraduates from an introductory psychology class at the University of British Columbia agreed to participate in this experiment during their class period. The 90 male and 45 female subjects were seated at individual desks separated from each other by about 0.5 m in a large auditorium.

Procedure

All the conditions in this experiment were run concurrently and subjects were randomly assigned to conditions. After a brief introduction, subjects were asked to sign a consent form. Then, following oral instructions about the overall procedure and the specific tasks to be performed, three teams each of two experimental assistants went around the classroom allowing each subject to draw a slip of paper from a bag and to take an experimental booklet. Subjects had been told that they would obtain an anonymous confidential personal code number by drawing a slip of paper. They would use this code number throughout the experimental session instead of their name, in order to protect their anonymity. In fact, all subjects drew "personal" code number 16. Moreover, three quarters of the slips of paper enabled us to perform a group categorization at the same time: According to these slips, the class was divided into two groups, Blue and Red, on a random basis, and that the subjects who received these slips had been assigned by chance to Group Red. Secrecy of the slip of paper was stressed. Subjects had to read the slip, write down the information (code number and, if any, group membership) on the second page of their experimental booklet, fold up the slip of paper, and put it in an envelope already provided. The subjects then started work on their booklet, which contained two parts. One part was a point-allocation task involving matrices of rewards for two unknown persons identified by their code numbers and, in some conditions, by their group memberships. The other part of the booklet consisted of a self-esteem questionnaire. These two parts appeared in reversed order, depending on the condition. To prevent subjects from talking to one another, we also provided them from the beginning of the session with a filler task, a whole sheet of anagrams. They were instructed to solve these in their spare time, under the cover of establishing norms for somebody else's study. When everybody had finished answering their booklet, the experiment was declared over. Subjects were then asked to complete a postexperimental questionnaire with which we gathered their comments, hypotheses, perceptions, and suspicions. Finally, the subjects were debriefed about the whole procedure, the different conditions, and the hypotheses, and were given a brief summary of SIT.

Materials

As described earlier, we performed the categorization manipulation by using two types of slips of paper, which were drawn by the subjects; one type indicated only a code number and the other type also assigned a group membership, Red, to the subject. The core of the manipulations was accomplished through the booklets, whose composition changed according to the conditions. The booklets were made of 27 half-pages stapled together. The first page was left blank in order to cover the second page on which subjects had to write their code number and, in categorization conditions, their group membership. The matrix part consisted of a page of instructions followed by 16 pages of matrices. Eight matrices of Tajfel's (1970) 13-choice format alternated with eight of Brewer's (1979) two-choice type (for a full description of the matrices and their psychometric properties, see Brewer, 1979; Brown et al., 1980; Turner, 1978, 1983; examples are given in Table 2). For each of these matrices two unknown persons were identified at the beginning of the rows by some randomly chosen code numbers and, for Conditions 3 through 8, by group memberships. This information was handwritten in ink corresponding to the color to the group labels, blue or red. For each matrix, subjects had to circle a column corresponding to the number of points they wished to allocate to the two persons identified on the page, and also to affirm this choice by copying the numbers in blank spaces provided on the page.

In Conditions 7 and 8 we used modified versions of the original matrices. For the forced fairness condition, the arrays of numbers were constructed in such a way that the points allocated to the in-group were necessarily equal to

Table 2
Examples of Tajfel's 13-Choice and Brewer's 2-Choice Point-Allocation Matrices

	Tajfel's												
These numbers are rewards for													
Member 31 of Group Red:	19	18	17	16	15	14	13	12	11	10	9	8	7
Member 42 of Group Blue:	1	3	5	7	9	11	13	15	17	19	21	23	25
The chosen column gives													
to Member 31 of Group Red: _____													
to Member 42 of Group Blue: _____													
	Brewer's												
These numbers are rewards for													
Member 31 of Group Red:	7	8											
Member 42 of Group Blue:	9	4											
The chosen column gives													
to Member 31 of Group Red: _____													
to Member 42 of Group Blue: _____													

Note. Subjects are instructed to circle one column of numbers that represents their preferred allocation of points to the in-group and out-group members. They then copy these numbers in the appropriate spaces below the matrix. This enables the experimenter to check to see that subjects are explicitly aware of how the points will be distributed.

those given to the out-group. In the forced discrimination condition, the numbers were combined such that more points were always given to the in-group.

The self-esteem part consisted of a set of measures for which the instructions stressed the need for subjects to answer as they felt at that very moment ("State self-esteem"). The questionnaire included a half-length version of the Twenty Statement Test (Jones, Sensening, & Haley, 1974; Kuhn & McPartland, 1954; McGuire & Padawer-Singer, 1976), Rosenberg's (1965) 10-item Self-Esteem Scale extended to a 7-point Likert scale, 22 semantic differential scales consisting of Julian, Bishop, and Fiedler's (1966) nine items, and Sherwood's 13-item Self-Concept Inventory (Robinson & Shaver, 1973). Finally, there was a single 7-point rating scale with which we directly addressed the level of self-esteem (Hamilton, 1971).

The self-esteem questionnaire constituted Part 1 of the booklet for Conditions 1 and 3, and Part 2 for all other conditions. On the penultimate page of the booklet we asked for age and sex. On the final page, subjects were to write down what they thought the experiment was about.

Results

Manipulation Checks

The matrix task served to operationalize the independent variable, intergroup discrimination. The encoding of the matrix choices allowed a manipulation check to see whether categorized subjects indeed discriminated.

In some conditions, constraints on the setting ensured that subjects did or did not discriminate. For others, though, subjects were left to their own will, and a verification was required to establish whether they did engage in in-group favoritism. This was particularly important for Condition 4, the pivot of the experiment. Five strategies, described by Turner (1978, 1983) and Brewer and Silver (1978), were analyzed: fairness (F), maximum joint profit (MJP), maximum in-group profit (MIP), maximum differentiation (MD), and a combination of the last two, in-group favoritism (FAV).

To test whether the categorized subjects of Condition 4 engaged in discrimination, we performed a one-sample Hotelling's T^2 on the strategy indexes. This procedure yielded experimentwise .95 confidence intervals that established whether Tajfel's (1970) pull scores were statistically equivalent to zero, and whether Brewer's (1979) strategy frequencies differed from 1, the chance level. The results show conclusively that subjects in Condition 4 engaged in intergroup discrimination. The pull of FAV on MJP was positive and statistically different from zero, C.I. = (1.4, 4.9); $t(17) = 3.82$, $p < .01$; the pull of MJP + MIP on MD was negative and significant, C.I. = (−3.6, −0.5); $t(17) = -2.85$, $p < .02$. The fre-

quency of FAV was different from 1, the chance expectation, C.I. = (1.29, 2.38). The results also supported the null hypotheses that the frequencies of F, MIP, and MJP were not different from 1, the chance level, and that the pull of F on FAV and of MJP on FAV were not different from zero.

Furthermore, because Condition 4 was to be compared with Condition 2 on self-esteem, it was particularly important to verify that these two conditions differed on discrimination indexes. Moreover, the replication of the role of categorization in discrimination was of interest here. A multivariate two-sample Hotelling's T^2 was run on the seven Tajfel indexes and three of Brewer's (Brewer's indexes entail linear dependency, as the frequency of three strategies determine the frequency of the fourth). Conditions 2 and 4 differed significantly (Wilks's lambda = .541), $F(10, 26) = 2.30$, $p < .05$; Heck value (1, 4, 12) = .459, $p < .05$. Namely, categorized subjects showed (a) more FAV, $t(35) = 4.18$, $p < .001$, (b) more FAV on MJP, $t(35) = 2.77$, $p < .01$, and (c) more FAV on F, $t(35) = 1.80$, $p < .08$. These results confirm that subjects in Condition 4 indeed engaged in intergroup discrimination, a prerequisite for an adequate test of our hypotheses.

Results on Self-Esteem

Five indices were obtained for self-esteem: the shortened Twenty Statement Test, the extended Rosenberg's (1965) Self-Esteem Scale, Julian et al.'s (1966) semantic differential scales, Sherwood's (Robinson & Shaver, 1973) Self-Concept Inventory items, and a single global rating scale.

For the Twenty Statement Test, two independent judges scored the responses as reflecting positive (1), negative (−1) or neutral (0) attributions. They agreed on 1,108 out of the 1,245 decisions, an agreement rate of 89%. For the other four measures, the subjects' responses were coded from 1 to 7, 7 being the positive anchor, and the average score on each measure was calculated for each subject.

Correlations among the five measures of self-esteem were all very highly significant ($p < .001$). They ranged from .55 to .75 except for those between the Twenty Statement Test and the other measures, which were lower, ranging from .34 to .46. In a common factor analysis we extracted one eigenvalue (3.14) greater than 1 that explained 62.8% of the total variance. The factor weights were .84 for the Sherwood inventory, .84 for the Julian et al. scales, .76 for the Rosenberg scale, .71 for the global scale, and .50 for the Twenty Statement Test.

The group means on each of the five self-esteem measures and on the first principal component are displayed in Table 3. The first set of analyses concerns the 2 × 2 core design block, whereas later analyses include the supplementary control conditions. A two-way multivariate analysis of variance (MANOVA) was performed on the five measures of self-esteem. The first factor, categorization, had two levels: categorized (C) and noncategorized (NC). The second factor, order of the matrices in the booklet, also had two levels: matrix task before the self-esteem assessment (M) and no matrix before the measures (NM). The four cells of this 2 × 2 design were represented by Conditions 1 (NC–NM), 2 (NC–M), 3 (C–NM), and 4 (C–M).

The two-way MANOVA showed neither a categorization effect ($p > .7$) nor a matrix task effect ($p > .3$). The interaction effect, however, was highly significant according to both the likelihood ratio criterion and the greatest characteristic root approach (Wilks's lambda = .700), $F(5, 63) = 5.39$, $p < .0001$; Heck value (1, 1.5, 30.5) = .300, $p < .01$. Because with the multivariate technique we demonstrated that the interaction was significant within the constraints of an experimentwise Type I error rate of .05 across the five measures, we performed two-way univariate tests (ANOVAs) to discover on which scales there were significant interactions. Two-way interactions were significant on the Twenty Statement Test, $F(1, 67) = 6.41$, $p < .02$; on the Rosenberg scale, $F(1, 67) = 4.97$, $p < .03$; and on the Julian et al. scales, $F(1, 67) = 5.40$, $p < .03$. For these three measures, post hoc comparisons were made via simple effect analysis. We carried out t tests at .01 Type I error rate, using mean square within as the best estimate of the error variance. These post hoc contrasts showed that Condition 2 (NC–M) was lower on self-esteem than Conditions 1 (NC–NM)

Table 3
Group Means on Self-Esteem Measures and the First Principal Component

	Condition	*n*	T	R	J	S	G	PC
1	(NC, SE, Mtx)	19	0.140	5.895	5.444	5.583	5.316	.285
2	(NC, Mtx, SE)	19	−0.353	5.356	4.912	5.419	5.444	−.225
3	(C, SE, I/O)	17	0.007	5.418	5.039	5.602	5.353	−.028
4	(C, I/O, SE)	18	0.122	5.822	5.475	5.457	5.611	.303
5	(C, I/I, SE)	13	−0.162	5.346	4.915	5.201	5.333	−.275
6	(C, O/O, SE)	16	−0.031	5.862	4.806	5.370	5.563	.002
7	(C–F, SE)	17	−0.135	5.341	4.974	5.089	5.118	−.334
8	(C–D, SE)	16	−0.040	5.850	5.278	5.446	5.563	.174

Note. T = Twenty Statement Test, R = Rosenberg Self-Esteem Scale, J = Julian et al. semantic differential scales, S = Sherwood's Self-Concept Inventory items, G = global rating scale, PC = principal component score; NC = noncategorized, SE = self-esteem, Mtx = matrix, C = categorized, I/O = in-group/out-group, I/I = in-group/in-group, O/O = out-group/out-group, C–F = forced fairness condition, C–D = forced discrimination condition.

and 4 (C–M), the latter two not being statistically different, and that Condition 3 (C–NM) was also lower than 1 and 4, except on the Twenty Statement Test, on which they were not different. Conditions 2 and 3 were equal on self-esteem, except on the Twenty Statement Test, on which 2 was significantly lower than 3. Conditions 1 (NC–NM) and 4 (C–M) were not statistically different on any scale. In summary, the two-way MANOVA showed that the interaction between categorization and the matrix task was significant, even with a highly controlled alpha rate, with Conditions 1 and 4 being highest (refer to the values in Table 3).

In the next set of analyses we included the supplementary Conditions 5 to 8 and focused on some specific comparisons. A one-way MANOVA on the five self-esteem measures across all eight conditions was significant (Wilks's lambda = .661), $F(35, 507) = 1.50$, $p < .04$; Heck value (5, 0.5, 59) = .216, $p < .01$, yielding a clear, global, statistically conservative statement that the conditions differed significantly.

The problem posed by trying to describe these differences in more detail is not a trivial one. Multiple comparisons on each variable would offer no statistical power because there exist 140 possible pairwise contrasts alone. In this context it appeared more appropriate to apply univariate techniques on a global summary index of the five self-esteem indexes, taken here as the first principal component. To reduce the dimensionality of the self-esteem data, we applied a principal component analysis to the five dependent measures of self-esteem. Only one principal component with an eigenvalue greater than 1 was extracted, and it explained 62.8% of the variance. All the variables loaded about equally on this first principal component except for the Twenty Statement Test, which was somewhat lower. The weights were .61 for that, .82 for the Rosenberg scale, .86 for the Julian et al. scales, .86 for the Sherwood inventory, and .79 for the global scale. For each subject, we computed a principal component score, using these weights in linear combination. We then performed univariate analyses between experimental conditions on this new index.

Because only some specific comparisons were of interest in regard to the hypotheses, univariate a priori Bonferroni tests were executed on the first principal component. This powerful technique preserved a .05 experimentwise Type I error rate over the six contrasts that were relevant to the hypotheses. In Table 4 we list the contrasts and their respective results. For conditions in which subjects had been categorized, subjects who could discriminate (Conditions 4 and 8) had higher principal component scores than those who could not (Conditions 3, 5, 6, 7). Categorized subjects filling in the matrices about two members of their own group (Condition 5) were equivalent on self-esteem to those who distributed points to two out-group members (Condition 6); subjects in both conditions were prevented from

Table 4
A Priori Bonferroni T Tests on the First Principal Component

Hypothesis about conditions	Actual value of contrast	Critical difference	Statistical decision
4,8 > 3, 5, 6, 7	1.589	1.143	4, 8 > 3, 5, 6, 7
5 = 6	0.277	0.922[a]	5 = 6
4 > 5, 6	0.879	0.807	4 > 5, 6
8 > 7	0.507	0.460	8 > 7
4 > 8	0.130	0.461	4 = 8
5, 6, 7 > 3	−0.521	0.680	5, 6, 7 = 3

Note. Experimentwise Type I error rate was .05; contrastwise error rate was smaller than .01. The inequalities and equivalences in the first and last columns refer respectively to expected and observed between-condition differences in scores on the first principal component. All tests were one-tailed, unless otherwise specified.
[a] Two-tailed test.

engaging in intergroup discrimination. Subjects in these two nondiscriminating conditions had significantly lower principal component scores than those who had in-group versus outgroup matrices and could discriminate (Condition 4). Subjects in the forced discrimination condition (8) had higher scores than those in the forced fairness condition (7), but their scores were not different from those of subjects in the free discrimination condition (4). Finally, whether one performed the experimental matrix task did not influence self-esteem for those who could not engage in intergroup discrimination: Subjects in Conditions 5, 6, and 7 were equivalent to those in Condition 3.

In summary, we verified that, given categorization, subjects in the discriminative conditions had higher principal component scores than did nondiscriminative subjects (scores in Conditions 4 and 8 were higher than those in 3, 5, 6, and 7; were higher in 4 than in 5 and 6; were higher in 8 than in 7; were equal in 4 and 8, in 5 and 6, and in 5, 6, 7, and 3).

Moreover, because the hypothesis was that discrimination led to higher self-esteem, we conducted an exploratory internal analysis of Condition 4. Our aim was to discover whether there was a relation between the extent of discrimination and the level of self-esteem. Correlations between principal component scores and the matrix indexes were computed within Condition 4, and a regression analysis was performed to predict principal component scores from the strategy indexes. We obtained a multiple regression coefficient of .726 ($p < .005$) from a stepwise regression analysis in which we used as the two best predictors two pulls reflecting in-group gain: MIP + MJP on MD ($\beta = .618$) and the pull of FAV on MJP ($\beta = .566$). A similar regression analysis was performed on the data from Condition 3, in which self-esteem was assessed before the matrix task, and it is of interest to note that no significant relations between principal component scores and the matrix indexes were obtained.

Postexperimental Questionnaire

The postexperimental questionnaire was exploratory in nature, and was aimed at revealing signs of suspiciousness and demand characteristics. One hundred thirty subjects completed the questionnaire. None mentioned suspecting that different conditions were run simultaneously, nor that the drawing of the slip of paper was deceptive. A fair number of them even wrote their code on their answer sheet. No categorized subjects acknowledged any doubt about the existence of the two groups; many referred explicitly to Group Red and Group Blue. Most subjects focused on the self-esteem questionnaire in their comments. They perceived it as a personality trait or strength of character measure, and related it often to the anagram task. None actually stated a hypothesis in which he or she related self-esteem to intergroup discrimination.

Discussion and Conclusions

The results of this experiment support the main predictions of SIT concerning the effects

of discrimination favorable to the in-group on self-esteem, and allow us to rule out alternative hypotheses that are based on the effects of either categorization or having completed a significant experimental task alone. Categorized subjects who discriminated showed higher postexperimental self-esteem than either categorized subjects who did not have the opportunity to discriminate or noncategorized subjects who engaged in a similar experimental task. Further support comes from the finding that the level of self-esteem in the forced discrimination condition was statistically indistinguishable from that in Condition 4 and higher than that in the forced fairness condition and in the other nondiscriminative conditions (5 and 6). Finally, there was suggestive evidence from the internal analysis of Condition 4 that indexes of in-group gain were significantly related to postexperimental self-esteem. This relation was not obtained in Condition 3, in which self-esteem was assessed before the point-allocation task.

In one respect, the form of the interaction between social categorization and the matrix task was quite different from what was expected. The level of self-esteem in Condition 1 (NC–NM) was equivalent to that in Condition 4 (C–M). Both were higher than those in Conditions 2 (NC–M) and 3 (C–NM). This configuration of results suggests that intergroup discrimination did not enhance self-esteem but rather restored and maintained it. Because in Condition 3 self-esteem was lower than in Condition 1, and in Condition 4 it was equal to that in Condition 1, a plausible interpretation is that in-group favoritism reduced a threat to self-esteem. Under this interpretation, categorization initiated a need for positive groupwise social comparison that was not experienced by the subjects in Condition 1. Because this comparison was as yet unresolved in Condition 3 when self-esteem was assessed, before the matrix task, it was perceived as threatening. Consequently, lower self-esteem was observed at that point. The noncategorized subjects in Condition 2 were involved in an individualwise comparison task in which the matrices did not allow them to contribute to their own position. Perhaps they suspected that other participants were making decisions about them, and they too consequently perceived a threatening, unresolved situation; as a result, their self-esteem was lower. As shown by the statistical results on the main effects, categorization in itself was not enough to raise self-esteem; neither was the matrix task if people could not act in favor of their relative position in the comparison. On the contrary, these two conditions (2 and 3) appeared to be threatening, compared with Condition 1. In-group favoritism, though, restored self-esteem for categorized subjects. Perhaps direct self-favoritism would have had the same beneficial impact, but in this experiment it was not an available solution.

An alternative interpretation attributes the decreased self-esteem to cognitive ambiguity. Subjects in Conditions 2 and 3 were confronted with, respectively, a puzzling task or an irrelevant categorization, whereas in Condition 4, subjects could use these two pieces of information together and engage in in-group favoritism. This "cognitive ambiguity" hypothesis, though, is weakened by the results from the supplementary conditions. The additional conditions demonstrated clearly that for categorized subjects, discrimination compared with nondiscrimination in favor of the in-group resulted in higher self-esteem. Subjects in Conditions 4 and 8 had higher self-esteem than those in 3, 5, 6, and 7. Forced and free discrimination resulted in equivalent self-esteem levels. In nondiscriminative conditions, it did not matter (a) whether self-esteem was assessed after the categorization (Condition 3), (b) whether a task had been making the group membership salient (Conditions 4 and 5), or (c) whether the task had simultaneously opposed the in-group and the out-group (Condition 7). These four conditions did not differ statistically. These results are consistent with SIT: Given categorization, discrimination in favor of one's own group results in a relative increase in self-esteem. Categorization in itself was not sufficient, nor was cognitive differentiation of the in-group and the out-group if not paired with a comparative value differentiation as well. This experimental demonstration that intergroup discrimination can affect self-esteem is all the more significant because it was demonstrated in the minimal group paradigm and was based on a random categorization criterion. Group membership

was determined simply on the basis of a slip of paper leading to the most trivial and temporary group membership. Yet subjects engaged in intergroup discrimination and, moreover, gained self-esteem as a consequence.

Apart from this, our main contribution is the discovery that social categorization in the absence of an opportunity for intergroup differentiation may attenuate self-esteem somewhat. This finding does not contradict SIT, which does not make predictions concerning the effects of social categorization alone on self-esteem. Unfortunately, this experiment does not permit one to make a clear decision as to whether the "perceived threat" or the "cognitive ambiguity" interpretation provides a better account of the observations, and future research will address this issue.

Eventual conclusions regarding the motivational role of the need for positive self-esteem in intergroup relations will clearly have to be based on observations made in a wide variety of contexts. In this sense, our research is very much a beginning, and the results must be interpreted cautiously, based as they are on students in an experimental setting. On the other hand, most of the features peculiar to this setting, such as minimal categorization, concurrent experimental conditions, and student subjects, seem intuitively to have militated against obtaining systematic effects on self-esteem. Nevertheless, such effects were observed. Furthermore, the tight operational control afforded here enabled us to disentangle the independent effects of previously confounded variables, and to make a discovery that would have been difficult, even impossible, to observe using groups with previous histories, in naturalistic situations in which the vehicles of differentiation are numerous and readily available.

The results of this experiment and others like it are troubling, because they imply that the conditions under which a sense of well-being is promoted within one's own groups entail a cost to others. Indeed, it is difficult to avoid the conclusion that people engage in ingroup favoritism in order to promote this well-being (by whatever psychological process: reduction of threat or ambiguity, enhancement of group position, etc.), although the issue of intentionality has not been explicitly addressed here or elsewhere. In the final analysis, however, knowledge of the factors that underlie group conflict, though it may be the cause for some pessimism about human nature, is a necessary prerequisite to reducing this conflict. In this sense, SIT offers a very optimistic horizon.

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Received February 27, 1984
Revision received November 5, 1984 ■

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