A TEST OF SOCIAL IDENTITY THEORY:
INTERGROUP DISCRIMINATION AND SELF-ESTEEM
IN THE MINIMAL GROUP PARADIGM

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B.A. (Psychology), Laval University, 1981

A. THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in
THE FACULTY OF GRADUATE STUDIES
(Psychology)

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA
June 1983
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Date June, 30 1983
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Abstract 

To study categorization effects in an experimental context the minimal group paradigm has been designed by Henri Tajfel. Subjects are categorized into two groups on an ad hoc, trivial criterion and asked to allocate points to two anonymous persons. The reliable finding in this minimal situation consists of intergroup discrimination; i.e. ingroup favoritism plus maximum intergroup differentiation. Social Identity Theory attempts to explain such intergroup discrimination in the 'real world' as well as in the context of the minimal group paradigm. The theory postulates a basic need for positive self-esteem and a process of social identification. In situations of social categorization, social identity (i.e. the group membership) can mediate self-esteem. Relative positive group distinctiveness in favor of the ingroup is sought through competitive social comparison and can be achieved by intergroup discrimination. It consequently leads to higher self-esteem. 

This research was aimed at verifying experimentally whether or not self-esteem was indeed involved in intergroup discrimination, and at which of several possible levels: social categorization, cognitive differentiation of the ingroup and the outgroup, or the actual competitive discrimination against the outgroup. Eight conditions concurrently run and randomly
assigned among 135 undergraduates manipulated: (a) social categorization, (b) intergroup discrimination via a point allocation task, and (c); the moment at which self-esteem was assessed; all within the minimal group paradigm. Four conditions determined a 2x2 factorial design and four others added specific supplementary controls. The dependent measures included Rosenberg's Self-Esteem scale, the Twenty Statements test, nine semantic differential scales, Sherwood's Self-Concept Inventory, and a single global rating of self-esteem. Overall the hypothesis was supported. Intergroup discrimination contributed to self-esteem as predicted by Social Identity Theory. A significant interaction effect was found using a two-way MANOVA on the 2x2 design. Specifically, categorized and discriminative subjects were equivalent to baseline subjects on self-esteem and they were higher than those who were either categorized and did not do the point allocation task, or were not categorized but did the task. The supplementary conditions confirmed that for categorized subjects, intergroup discrimination benefitted self-esteem. The results suggested that threat was perceived for those who were facing an unresolved social comparison situation which lowered their self-esteem.
Vérification de la Théorie d'Identité Sociale
dans le Paradigme du Groupe Minimal:
Discrimination Intergroupe et Estime-de-Soi

Résumé

Le paradigme du groupe minimal a été développé par Henri Tajfel pour étudier dans un contexte expérimental les effets de la catégorisation sociale. Des sujets, divisés selon un critère arbitraire en deux groupes, doivent compléter une tâche d'allocation de points entre d'autres participants. De façon constante de la discrimination intergroupe est observée dans cette situation de catégorisation sociale minimale où aucun gain personnel tangible n'est possible. Cette discrimination se manifeste par la recherche simultanée d'un profit absolu pour le groupe d'appartenance et d'une différentiation maximale des deux groupes.

La théorie d'identité sociale tente d'expliquer cette discrimination intergroupe, tant dans la "réalité" que dans le cadre du paradigme du groupe minimal. La théorie se base sur un processus d'identification sociale et sur le besoin d'estime-de-soi; et propose que l'appartenance à un groupe peut être médiatrice d'estime-de-soi. Dans une situation de catégorisation sociale un processus de comparaison s'établit selon lequel les individus tentent d'obtenir pour leur groupe une position relative de supériorité. Cette comparaison favorable entre leur groupe et l'autre groupe contribue à leur estime-de-soi personnel.
La présente recherche vise à établir si l'estime-de-soi est effectivement impliqué dans la discrimination intergroupe, et à quel stade précis: catégorisation, différenciation cognitive entre les groupes, ou discrimination évaluative compétitive. Lors de l'unique session expérimentale 135 étudiants sous-gradués sont répartis au hasard parmi huit conditions. Sont manipulées la catégorisation en groupes, la possibilité de discrimination, et le moment auquel l'estime-de-soi est mesuré. Quatre des conditions constituent un schéme factoriel 2x2, catégorisation par discrimination, alors que quatre autres conditions servent de contrôles spécifiques supplémentaires. Cinq mesures d'estime-de-soi sont utilisées.

L'hypothèse principale est vérifiée. La discrimination intergroupe affecte l'estime-de-soi. En effet, l'interaction catégorisation par discrimination est significative dans l'analyse du plan factoriel. Les sujets catégorisés et discriminants montrent un niveau d'estime-de-soi égal à celui du groupe contrôle et plus élevé que celui des autres conditions. Les conditions supplémentaires démontrent également que pour les sujets catégorisés la discrimination en faveur de son propre groupe est nécessaire au maintien de l'estime-de-soi, la simple différenciation cognitive ne suffit pas. Quant aux sujets mis en situation de comparaison sociale irresolue, ils montrent une baisse d'estime-de-soi, ce qui suggère la perception d'une menace. Somme toute, l'estime-de-soi semble affectée par la discrimination intergroupe, tel que prédit par la théorie d'identité sociale.
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Acknowledgements

I wish to express my gratitude to all those who contributed to this thesis, especially to the members of my committee Dr. Peter Suedfeld and Dr. Delroy Paulhus, and particularly to my supervisor, Dr. Philip Smith for his work. I highly appreciate his competence, diligence and good will. I specifically would like to thank Cherry Bowhay, Mike Boyes and Candy Taylor for their help in data collection, and would also like to express my affection to all the people of the Psychology Annex and to acknowledge their inestimable moral support. I am certainly grateful to the Social Sciences Research Council of Canada and to the University of British Columbia for their financial support.

De plus, je remercie le Fonds F.C.A.C. du Quebec pour son soutien financier. Je suis également tres reconnaissante a ma famille pour son support affectif. Finalement, mes derniers et plus grands hommages vont a Claude Dumas a qui je desire dedier cette these.
A Test of Social Identity Theory: 
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Historically, Social Identity Theory emerged from Tajfel's (1959, 1981) work on the effects of categorization on physical perception. These observations were then transferred to the area of social perception, and the interest focused on groups and their inter-relations. The so-called minimal group experimental paradigm was consequently developed with the aim of understanding the basic processes involved in intergroup relations. Its intriguing results have sustained a great deal of empirical and theoretical work since. Out of this field of research, a major theory of group psychology has been elaborated by H. Tajfel (1978, 1981) and J.C. Turner (1975, 1981); Social Identity Theory.

This thesis will first survey the emergence of the minimal group paradigm and of Social Identity Theory, and review relevant evidence gathered over the past decade. Theoretical issues will then be discussed, and finally some specific predictions basic to Social Identity Theory will be made. These hypotheses will then be experimentally tested.

Tajfel (1959) examined the effects of categorization on
the perception of physical stimuli. Consistent peripheral covariates such as irrelevant categorizations, influence evaluations made on a focal dimension (Tajfel, 1959). For example, if a series of lines that vary in length by a constant amount is divided in the middle into two groups of consecutive lines irrelevantly labelled A and B respectively, the difference between the two lines on each side of the category boundary will be overestimated (Tajfel & Wilkes, 1963). The superimposition of a dichotomous correlated classification on a series of stimuli increases perceived similarity within categories and perceived differences between categories (Doise, 1978; Tajfel, 1978).

The effects of categorization, which appears to have a significant influence on physical perception, have also been explored in the domain of social perception. Studies that have examined the relations between natural social categories such as English and Welsh, Blacks and Whites, males and females, Catholics and Protestants, French Canadians and English Canadians, have confirmed the general tendency to overestimate intragroup homogeneity and intergroup difference (Brewer, 1979; Doise, 1978; Tajfel, 1978). Discrimination and stereotyping seem very prevalent in intergroup relations (Austin & Worchell, 1979; Billig, 1976). Interrelations between natural or "real world" groups are of course interesting and necessary to study. Nevertheless it is very difficult to study basic social psychological processes in naturalistic group contexts, since they are confounded with historical, political and economic
factors that exceed the scope of social psychology. Furthermore, their analysis involves the problems inherent to correlational and cross-cultural studies. In order to study categorization effects and intergroup relations in an experimental context that would allow a systematic examination of the basic processes involved in intergroup relations, Tajfel designed what is now known as the minimal group paradigm (Billig & Tajfel, 1973; Tajfel, Flament, Billig & Bundy, 1971; Turner, 1978). The results of the experiments using this procedure were of crucial importance to the emergence of Social Identity Theory. Consequently, a description of the minimal group procedure and a review of the empirical evidence it has yielded will be considered in the following sections.

The Minimal Group Paradigm

**Typical procedure.** Typically, the minimal group paradigm consists of leading a pool of subjects to believe that they are divided into two mutually exclusive categories. The division into these two groups is actually made at random, though subjects are told that it is based on such things as one's preference for one of two modern painters, or performance at estimating the number of dots on a screen, or other apparently ad hoc and trivial criteria. Subjects' group memberships are confidential, and anonymity is preserved by the use of individual code numbers instead of names. No interaction of any kind is allowed among subjects.

The defining characteristic of the minimal group paradigm is the minimal social categorization. However, experiments
using this procedure have tended to employ similar forms of a dependent measure to demonstrate the effects of the minimal categorization. Typically, subjects are asked, under the cover of a decision-making task, to distribute points between other participants in the study. They do this by using a series of matrices that simultaneously allocate points to two different persons identified on each matrix by their code number and group membership. Typically subjects are told that they will receive the sum of the points allocated to them personally by other participants at the end of the experiment. The matrices are designed to reflect a variety of allocation strategies pursued by the subjects (see examples in Appendix A). The organization of the points in the different matrices allows one to assess five types of allocation strategies: fairness (F), when points are distributed evenly between the members of the two groups; maximum joint profit (MJP), or maximizing the total number of points alloted to the two groups taken together; maximum ingroup profit (MIP), when the absolute number of points given to one's own group is maximized irrespective of the number of points it implies for the outgroup; maximum differentiation (MD), when the difference between the two groups is maximized, and finally; ingroup favouritism (FAV) which combines MIP and MD, thus corresponding to choices that maximize the difference between the two groups and ensure that the ingroup gets more than the outgroup (Billig & Tajfel, 1973; Tajfel et al., 1971; Turner, 1978; Turner, Brown & Tajfel, 1979). Besides the allocation task, evaluative ratings of
others have sometimes also been elicited from the subjects (e.g., Brewer & Silver, 1978).

The basic elements of the minimal group paradigm are the following: (a) no face-to-face interaction among subjects; (b) anonymity; (c) no instrumental or rational link between the criteria for categorization and the response measure, and; (d) no direct utilitarian value of the subjects' responses to themselves as individuals (Brewer, 1979; Tajfel et al., 1971; Turner, 1978).

The typical result of the allocation task consists of a reliable competitive ingroup favoritism, characterized by maximum ingroup profit plus maximum differentiation (Brewer, 1979; Doise, 1978; Tajfel, 1978, 1981; Turner, 1978, 1983). Pro-ingroup evaluative biases are also reliably found in trait ratings and liking preferences (Brewer, 1979).

Procedural variations. Several variations on the basic minimal group paradigm are found in the literature. They confirm the robustness of the findings that minimal categorization can be sufficient to cause intergroup discrimination, as expressed by ingroup favoritism, or by higher evaluation of the ingroup.

One of the variations concerns the criterion for categorization. Groups are often based on trivial criteria such as painting preferences (Billig & Tajfel, 1973; Brewer & Silver, 1978; St-Claire & Turner, 1982), dot estimation (Gerard & Hoyt, 1974; Howard & Rothbart, 1980), or photograph choices
(Brown & Turner, 1979). Even completely random categorization proves to be capable of inducing intergroup discrimination (Billig & Tajfel, 1973; Brewer & Silver, 1979; Locksley, Ortiz & Hepburn, 1980). The simple toss of a coin, or drawing of a slip of paper are enough to produce ingroup biases, even in the absence of any other similarity factor to strengthen group membership. Categorization, as long as it is explicitly recognized by the individual, and does not conflict with subjectively stronger criteria, can lead to intergroup differentiation (Tajfel, 1978).

Usually decisions are made by the subject about two anonymous others; a member of the ingroup and a member of the outgroup. In these cases ingroup favoritism is reliably found. Brown and Turner (1979) and Turner and Spriggs (1982) have also tested conditions in which subjects allocate points between themselves and another individual, half the time from the ingroup and half from the outgroup. In these conditions however, ingroup favoritism is overridden by self-favoritism (Turner, 1975, 1978).

Some experiments have tested the necessity of an explicit similarity factor, by crossing it in a factorial design with random categorization. Subjects were told whether or not: (a) they were divided into groups, and (b) they shared similar aesthetic preferences (Billig & Tajfel, 1973; Brewer & Silver, 1978), or attitudes and beliefs (Allan & Wilder, 1975) with others. Ingroup similarity was found to enhance intergroup discrimination above and beyond the effects of categorization
alone, but was not sufficient to induce discrimination by itself; categorization was the necessary precondition (Billig & Tajfel, 1973; Brewer, 1979; Brewer & Silver, 1978; Tajfel, 1978).

Other variations of the minimal group paradigm have concerned the instructions. In some experiments oral and written instructions have been manipulated to induce explicit competition or explicit cooperation between the groups (Brewer & Silver, 1978; Doise, Cspeli, Dann, Larsen & Ostell, 1972; Turner & Spriggs, 1982; Wilder, 1978). The unanimous conclusion about the role of explicit competitive instructions is that ingroup favoritism can be enhanced by competition, i.e. discrimination will be even greater than in other conditions; but explicit competition is not necessary to obtain the discrimination effect (Brewer, 1979; Brewer & Silver, 1978; Doise et al., 1972; Turner & Spriggs, 1982; Wilder, 1978).

The allocation task sometimes concerns money (Billig & Tajfel, 1973; Hewstone, Finchman & Jaspars, 1981) and sometimes simply points (Brewer & Silver, 1978; Turner, 1978). It may consist of distributing rewards (Brewer & Silver, 1978; Tajfel & Billig, 1974) or penalties (Hewstone et al., 1981; Tajfel et al., 1971). Both money and point distributions are effective in showing ingroup favoritism (Turner, 1975, 1978); but the tendency is weaker when penalties are used (Hewstone et al., 1981).

Two major types of matrices have been used. Predominant in the literature are Tajfel's (1970) matrices, made of thirteen
columns of two rows (see Appendix A). The numbers are displayed in such a way that two allocation strategies conflict in the same matrix. The "pull", or relative influence of one strategy on another can be computed from a subject's answers to two or more presentations of each matrix, with the rows designating ingroup and outgroup rewards alternating from presentation to presentation (Aschenbrenner & Schaefer, 1980; Branthwaite, Doyle & Lightbown, 1979; Brown, Tajfel & Turner, 1980; Turner, 1978, 1980, 1983). Brewer's (1979) matrices on the other hand are easier to code but they have not been as widely used. They consist of four pairs of two-celled matrices (see Appendix A). For each pair, a strategy, either fairness, ingroup profit, intergroup differentiation or joint profit, is determined according to the combination of answers to the two matrices. The frequency of each strategy is used as the measure. Only one experiment (Brewer & Silver, 1978) has directly compared Tajfel's and Brewer's matrices. Similar results were obtained on the two forms (Brewer, 1979; Brewer & Silver, 1978).

Other adaptations of the procedure have used as dependent measures ratings of liking and personality attributes, and results have confirmed biases in favor of the ingroup, even on ratings of physical traits (Doise et al., 1972; Gerard & Hoyt, 1974; Howard & Rothbart, 1980; Park & Rothbart, 1982). Locksley et al. (1980) obtained independent measures of behavior towards the ingroup and the outgroup by having subjects allocate chips from two equal sized piles. Dion (1973) used cooperative versus competitive decisions in prisoner dilemma games as his
dependent variable. These means of responding too yielded results consistent with those described above.

Across all these variations the overall picture shows that mere categorization into a minimal ingroup and outgroup can be sufficient to provoke intergroup differentiation and competitive discrimination (Brewer, 1979; Tajfel, 1978; Tajfel & Turner, 1979). Factors such as similarity and competition enhance ingroup favoritism, but mere categorization into groups constitutes the minimal necessary condition. Moreover, the phenomena of intergroup behavior in the minimal group paradigm are quite robust to design variations.

The striking facts. The most striking finding of this research is that one finds reliable competitive intergroup discrimination in situations of ad hoc, trivial, and even random categorization. Subjects do not know the individual identity of members of their group, do not interact with others, and do not gain any tangible benefit from the task. Still, they adopt a strategy of competitive ingroup favoritism. They make choices not only to maximize ingroup profit, but simultaneously to optimize intergroup differentiation, and they do so even at the cost of absolute gain for the ingroup. No other strategy, such as maximum joint profit or fairness, is as influential. Subjects also consistently express more favorable evaluations for these ingroup members they do not know, and with whom they share only a temporary trivial categorization. Mere perception by subjects that they belong to two different groups can be sufficient to cause intergroup discrimination.
that does not seem to serve any instrumental purpose. As Turner (1978) puts it, "the most striking feature of minimal group discrimination is, in a sense, that it happens at all" (p.140). It is this very phenomenon that stands in need of explanation by a psychological theory of group relations.

Theoretical Interpretations

There have been many attempts to explain 'real world' social discrimination (Austin & Worochel, 1979; Doise, 1978; Tajfel, 1978). These attempts have dealt primarily with complex situations from which the role of historical, economic and political factors cannot be isolated, such as in sexism, racism or antisemitism. What the evidence from the minimal group paradigm adds now to the picture is that there appear to be basic processes underlying intergroup behaviors that can be shown even in very minimal situations where intergroup discrimination would, at first, seem unjustified. What is needed is a theory of intergroup relations that can explain the findings in minimal contexts, and can be applied to less-than-minimal group discrimination as well.

Several explanations of intergroup discrimination are prevalent in the literature and relevant to this discussion. Theories that are based solely on individual processes such as Freudian and neo-Freudian psychoanalytic theories, will not be discussed here, since they rely unrealistically on metaphysical constructs (e.g. Le Bon's "group mind") to explain group behavior, or are overly reductionist (Billig, 1976). The
several remaining explanations will be discussed below under the labels of functionalism, common fate bonding, the generic norm hypothesis, the demand characteristics hypothesis, categorical differentiation, and finally Social Identity Theory.

**Functionalism.**  Functionalism explains group psychology with respect to the interdependence implied by concrete need satisfaction and goal achievement. The functionalist interpretation is best represented by Sherif. His work on intergroup competition and superordinate goals applies to situations of realistic group conflict, where individuals of a group are explicitly interdependent for their own self-interests (Sherif, 1966, 1979). His theory describes conflicts overt objective and material interests. Competition is institutionalized and legitimized in these situations in that a winner and a loser are explicitly expected. In such circumstances ingroup-outgroup differentiation and discrimination become instrumental for winning, and make common sense (Tajfel & Turner, 1979). Minimal group evidence, however, shows that neither institutionalized nor explicit conflicts are necessary, nor are tangible gains required to create intergroup competition and discrimination. The functionalist approach does not explain intergroup discrimination in these circumstances. Under conditions of trivial and transient categorization, ingroup favoritism is non-instrumental and appears gratuitious (Tajfel & Turner, 1979).

**Common fate bonding.**  Common fate bonding refers to the
perception of groupness from experiencing or expecting similar outcomes to those of others (Shaw, 1981). The common fate explanation does not apply to the minimal group paradigm because subjects are usually told that at the end of the matrix task they will be credited with all the points that have been allocated to them personally by all others in the experiment (Billig & Tajfel, 1973; Tajfel & Billig, 1974; Tajfel et al., 1971). There is no explicit competitive structure, nor within-group dependency that would imply a shared fate for the ingroup members, distinctive from that of the outgroup members (Brewer, 1979; Turner, 1975).

The generic norm hypothesis. Another type of explanation that has been applied to the minimal group results is the hypothesis of a generic norm prescribing discrimination against an outgroup (Tajfel, 1970; Tajfel & Billig, 1974). This generic norm was hypothesized to activate the tendency to behave differentially towards the outgroup, even under conditions where such behavior was of no utilitarian value, and the categorization of very little meaning (Tajfel et al., 1971). Normative values to favor one's own group were thought to be carried over into the experimental setting (Billig & Tajfel, 1973). Several problems contributed to the defeat of this hypothesis. First, a norm is defined as a social prescription determining which conduct is appropriate, desirable or expected in a given situation (Tajfel, 1981; Turner, 1980). In the minimal group paradigm a generic norm of fairness would be more plausible than one of ingroup favoritism (Branthwaite et al.,
1979). Fairness seems to be more socially desirable (St-Claire & Turner, 1982; Turner, 1980). Moreover, St-Claire and Turner (1982) found that observer subjects did not expect categorized participants of a minimal group experiment to discriminate against the outgroup. Allan and Wilder's (1975) subjects reported fairness, not favoritism, as their preferred strategy on a postexperimental questionnaire. Furthermore, the actual results of ingroup favoritism in the minimal group experiments appear counter-intuitive to many, and have generated resistance from other social psychologists (Turner, 1980, 1983). This can be taken as evidence against the generic norm hypothesis, as can some cross-cultural evidence which suggests that ingroup favoritism is not universal (Wetherell, 1982). Moreover, from a theoretical point of view normative explanations tend towards circularity since they are verified by the presence of the very behaviors they are trying to explain. They have low predictability, opposite norms can be predicted in the same context; the identification of the prevalent norm is determined a posteriori. Finally, a normative hypothesis is at best descriptive, it does not specify the psychological processes involved, nor explain why a norm of discrimination and not of cooperation would be expected.

The demand characteristics hypothesis.

Another explanation of the minimal group results that is more directly related to the minimal group paradigm per se invokes the role of demand characteristics in accounting for ingroup favoritism. Critics have argued that the experimental setting "demanded"
competition (Aschenbrenner & Schaefer, 1980; Gerard & Hoyt, 1974). Two experiments explicitly addressed this possible artifact. Tajfel and Billig (1974) tested the hypothesis that the uncertainty and insecurity inherent to the experimental context could be responsible for ingroup favoritism. Half the subjects were made familiar with the experimental setting by completing a preference task and an individual questionnaire prior to the actual session. Contrary to the anxiety hypothesis, familiar subjects showed even more ingroup favoritism than those exposed to the setting only once. St-Claire and Turner (1982) manipulated subject roles. A first group of subjects did the standard minimal group experiment, and a second group did it under explicit instructions to discriminate. A third group of subjects, exposed to the same setting and manipulations, had to predict what they thought others would do in this situation. The demand characteristics hypothesis would be supported if the Prediction group anticipated as much ingroup favoritism as the Control subjects actually committed. Moreover, the hypothesis implies that explicit demand cues will increase ingroup favoritism. On the contrary, the results revealed less ingroup favoritism and more fairness predicted by the Prediction group than actually obtained by the control subjects, who discriminated just as much as subjects under explicit instructions to discriminate. St-Claire and Turner (1982) conclude that the demand characteristics hypothesis is not supported. Furthermore, postexperimental inquiries have never revealed any evidence of
compliance to an experimenter effect (Brown, Tajfel & Turner, 1980). Groupness cues are logically necessary to operationalize social categorization, and Turner (1978) recognizes that there is an almost automatic implicit competition elicited, but he rightly points out that this is the very phenomenon of interest. Why, in a situation where no explicit requirements for competition are expressed, does one constantly find discrimination?

Categorical differentiation. Another explanation for the results of the minimal group paradigm is Doise's (1978) model of categorical differentiation. According to Doise, intergroup discrimination can be explained solely on the basis of principles of categorization and category differentiation discovered earlier by Tajfel (1959). Category differentiation is based on intraclass perceptual convergence that accentuates similarities within categories, and interclass divergence that enhances differences between categories (Deschamps & Doise, 1978; Doise, Deschamps & Meyer, 1978; Doise et al., 1972; Doise & Sinclair, 1973). Social categorization induces individuals to perceive people in terms of groups. It leads, according to Doise, to representational, evaluative, and ultimately behavioral differentiations between the groups. Categorization not only enables individuals to organize their subjective experience; it also constitutes a process by which social interactions are structured (Doise, 1978). Tajfel (1978, 1981) also acknowledges that categorization influences cognitions, but Doise (1978) sees it as the only process necessary to
consider, whereas Tajfel does not. According to this cognitive interpretation, ingroup favoritism is the inherent consequence of category differentiation. No other mechanism intervenes. A question arises then about the direction of the differential evaluation between the ingroup and the outgroup. In the purely cognitive interpretation, one cannot predict the direction of the ingroup-outgroup bias, only the fact of differentiation. Cognitions alone do not suffice to explain the evaluative valence of intergroup relations. Something else must interact with cognitive processes of categorization, some motivational process. An alternative to Doise's model, one which addresses the question of valence, is proposed in the form of Social Identity Theory, which is described below.

Social Identity Theory

Social Identity Theory emerged primarily in response to the intriguing results of the minimal group paradigm, although it has evolved to the point now where it has very much wider application. The theory 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 opinions and abilities. Festinger hypothesizes that these evaluations are achieved by means of comparison with others, to the extent that objective, non-social bases for evaluation are not available. Tajfel (1972, 1974) and Turner (1975) argue that the distinction between social and non-social means of comparison is misleading, and that all forms of self-evaluation are in
fact social, even though some standards of comparison may appear "objective" due to high levels of social consensus. They argue that not only individual opinions and abilities, but group memberships too, are evaluatively important, as these provide people with orientation and definition in society. Thus they extend the social comparison idea to embrace intergroup as well as interpersonal evaluations. Festinger theorizes a need for positive social comparison for ability self-evaluation. Tajfel and Turner argue that this is so in the case of intergroup comparison as well. In summary,

"...membership of a particular group in regard to its function of social identification is related to a positive evaluation of its attributes in comparison with other groups" (Turner, 1975, p.8)

and,

"A social group will, therefore, be capable of preserving its contribution to those aspects of an individual's social identity which are positively valued by him only if it manages to keep its positively valued distinctiveness from other groups" (Tajfel, 1972 quoted in Turner, 1975, p.8)

Social Identity Theory makes two basic assumptions. One is that the self-concept comprises an individual identity and a social identity (Brown & Turner, 1981). The former consists of the idiosyncracies of the individual, personal traits and attributes, while the latter is related to group memberships. Social identity refers to one's knowledge of belonging to certain social groups. It is constituted by the set of different groups (e.g. race, sex, language, profession, etc.) of which one is a member. This social self is multifaceted and
the context determines which dimension of it is salient (Turner, 1975, 1982). The second assumption states that there is a basic drive for positive self-evaluation, that is maintenance or enhancement of self-esteem. Individuals strive for a positive self-image (Tajfel, 1978, 1981; Turner, 1975, 1978, 1982).

Thus the theory introduces the notions of social comparison and social competition to account for social discrimination. Turner (1975) refers to social competition to signify that people are striving for a relative positive distinctiveness of their group by comparison with a specific outgroup. By 'competition' he means that both groups cannot simultaneously achieve a relative positive status on the same specific dimension, and by 'social' that this competition is to be distinguished from Sherif's (1966, 1979) type of realistic conflict of interests.

To the perceptual cognitive effects of categorization and group identification are now added the consequences of social comparison with their implications for self-esteem. People use their social identity, i.e. their group memberships, as a source of positive self-esteem. Individuals not only define themselves but also evaluate themselves in terms of their group memberships (Turner, 1982). Positive evaluation is thus achieved through the process of social comparison. Positive social identity, or positive social distinctiveness, is based on favorable comparisons with a relevant outgroup on some valued dimension (Tajfel & Turner, 1979). In situations of
categorization where individuals are defined by their group memberships, people engage in intergroup discrimination in order to obtain by social comparison a relative positive status for their group, and consequently positive personal self-evaluation. Requirements that are to be fulfilled for this principle to apply are: (a) acceptance of the group membership by the individual, i.e. one considers oneself to be socially defined by the category; (b) the outgroup being explicitly defined and relevant, and (c) possibilities of social comparison (Tajfel & Turner, 1979; Turner, 1982). Tajfel (1978) describes a sequence according to which a process starting with social categorization induces social identification, then social comparison which in turn leads to social differentiation by means of social competition (Tajfel, 1978, 1981; Tajfel & Turner, 1979).

These requirements are met in the minimal group procedure, where subjects are anonymous except for their group membership, and can express themselves only through ingroup-outgroup decisions. On these they attempt to achieve for their ingroup a positive group status by engaging in competitive social comparison via the reward allocation task. Their category membership is the way they are socially defined in the situation. Self-esteem is thus derived from the positive status of their group obtained via ingroup favoritism on the matrices. From the above description, Social Identity Theory seems to offer a novel and interesting interpretation of intergroup discrimination in that it combines cognitive and motivational
processes in linking social categorization, social identity and social comparison to social differentiation.

Social Identity Theory is supported by a convergence of empirical evidence. Since Ferguson and Kelly's (1964) study in which two groups working independently in sight of each other but free from any competitive instructions showed evaluative ingroup bias; much evidence, as already reviewed, has been obtained illustrating the relation between social categorization and ingroup favoritism. Rabbie and Wilkens (1971) for example reported a manipulation check, in which groups in a supposedly non-competitive experimental condition equalled groups competing for material gain on a measure of perceived competition. This result poses a problem for a functional interpretation but is consistent with Turner's social competition notion.

Besides this, the theory has been developed in a number of interesting directions. For example, it considers alternatives to social discrimination (Tajfel, 1981; Tajfel & Turner, 1979). In situations where the ingroup cannot achieve a positive status on the available dimensions, Tajfel (1978) suggests that members may attempt individual mobility to access the superior group, create new dimensions on which to achieve favorable comparisons, redefine the outgroup, or change the evaluative significance of the dimension of comparison. They may compete harder, deny their inferiority, and sometimes even their group membership. Moreover, if people can achieve positive self-esteem more easily or more directly individually without
referring to their group membership, they will do so and will not be as interested in a positive status for their group.

The theory has also been efficiently applied to "real world" intergroup relations. For example, Giles and Johnson (1981) use Social Identity principles to explain relations between ethnolinguistic groups. Milner (1981) analyses racial prejudice against Blacks within the same framework. The dynamics of minority groups, and relations of status and power have also been studied in these terms (Tajfel, 1978; Tajfel & Turner, 1979; Turner & Brown, 1978). Tajfel (1978, 1981) has been concerned with the implication of the theory for understanding stereotyping and prejudice, and Billig (1976) sees implications for anthropology, history and politics. Turner (1982) has used the framework to explore group formation processes in more depth.

Social Identity Theory provides a novel and more comprehensive explanation for intergroup discrimination than any of the other approaches discussed earlier. Self-esteem plays a central role in the theory and consequently deserves to be explicitly discussed.

The role of self-esteem. Social Identity Theory assumes a basic drive for positive self-evaluation. There is some support for such an assumption. At a theoretical level, much has been written about a drive for self-esteem. Epstein (1973) and Wells and Marwell (1976) cite many self-concept theoreticians who have postulated a basic need to enhance self-esteem, from James to Rogers, and G.W. Allport to Hilgard.

At the empirical level some studies have related individual self-esteem to group identification and group status (Zander, Stotland & Wolfe, 1960). The more cohesive the group is perceived to be and the more the individual identifies with it, the more self-esteem is affected positively by successes and negatively by group failures. There is also compatible experimental evidence for some specific aspects of the importance of self-evaluation in Social Identity Theory. Turner (1975, 1978) demonstrated that social categorization did not lead to significant intergroup discrimination when subjects could act directly for themselves. When allocating points or money between themselves and another person, subjects showed less ingroup favoritism than when they were making decisions
about two others, one being an ingroup member and one a member of the outgroup. This supports the hypothesis that individuals will not refer to their group membership if they can contribute to their self-evaluation directly as individuals. Turner and Spriggs (1982) replicated this result. Locksley et al. (1980) found reduction of ingroup favoritism on trait ratings and chip allocations when subjects received positive evaluations from the outgroup and negative ones from the ingroup. These data support the idea that people will not engage in as much social competition if they can achieve positive self-evaluation through other means.

Specific biases on evaluative dimensions also testify to the need for positive evaluation (Linville & Jones, 1980; Park & Rothbart, 1982). More favorable than unfavorable behaviors were expected from the ingroup, and more negative behaviors from the outgroup than from the ingroup were remembered in a recognition task (Howard & Rothbart, 1980). Also consistent with the model, Turner (1978) observed more ingroup biases on attributes of high than low importance to the subjects, and on dimensions on which the outgroup was relevant and comparable.

This evidence while generally supportive, is circumstantial, and bears only indirectly on the hypothesis that discrimination in the minimal group paradigm contributes to personal self-evaluation. Only two studies have addressed this hypothesis directly. Oakes and Turner (1980) measured post-experimental self-esteem under two conditions. Subjects were first categorized on painting preferences, and then were
assigned either to an experimental condition in which subjects completed the usual matrix booklet, or to a control condition, in which subjects 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 ingroup favoritism on the matrices, expressed greater self-esteem than control subjects on the Twenty Statements Test and semantic differential items, although a significant difference was not obtained on Rosenberg's (1965) Self-Esteem scale. 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, the criticism can be made that the experimental tasks in the two conditions were not of equal psychological significance. One was a decision-making task, while the other simply consisted of waiting. It could be suggested that the importance of the experimental task influences self-esteem, independently of the opportunity to discriminate. It is therefore essential to compare conditions where the tasks are of comparable psychological significance. Moreover, the setting of the experimental condition makes group membership much more salient, again independently of any actual discrimination response. Consequently, in this study the evidence is not clear on which aspects of the experimental condition caused the difference in self-esteem: the significance of the task, the confrontation of the ingroup and the outgroup, the salience of
the membership, or the discrimination per se.

Turner and Spriggs (1982) conducted another minimal group experiment with self-esteem as one of the dependent variables. Two independent variables were manipulated. One concerned the instructions given to the subjects. They were instructed either to be 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 ingroup and outgroup members, while in the Individual condition, they were not explicitly categorized into groups, and they allocated points between themselves and another person, half the time who shared the same painting preference and for the other half of the matrices, who did not. Self-esteem measures were the same as those used by Oakes and Turner (1980). On the matrices all conditions showed some ingroup favoritism but they differed significantly according to the two expected main effects, giving greater favoritism in the Competition conditions and in the Group conditions. A factor analysis of self-esteem measures revealed a single factor as in the Oakes and Turner experiment. Two-way ANOVAs on each self-esteem scale revealed a main effect for competition versus cooperation, due to the tendency towards higher self-esteem on Rosenberg's inventory, the semantic differential scales and the common factor, under the competitive instructions. On the Twenty Statements test, self-esteem scores were statistically higher under Individual conditions (Self vs. Other matrices) than Group conditions (Other vs. Other matrices). No
interactions were significant. In this experiment the relation between competition and ingroup favoritism seems to have mirrored the pattern between competition and self-esteem. Competitive instructions caused an increase in ingroup favoritism and an increase in self-esteem, suggesting a relation between ingroup favoritism and self-esteem. One cannot conclude, though, that it is the amount of discrimination that indeed caused the change of self-esteem; the relation is indirect and correlational in nature. Moreover, since all the groups were in situations of discrimination and showed ingroup favoritism to some extent, one cannot judge whether intergroup discrimination was a necessary condition for a change in self-esteem. Furthermore, in the explicitly categorized condition, the task consisted of allocating points between two others, one ingrouper and one outgrouper, while in the non-categorized condition subjects distributed points between themselves and somebody else. In the latter condition direct self-interest and the possibility of self-favoritism were introduced. Subjects could act directly on their self-evaluation. Consequently the comparison between the Group condition and the Individual condition could not answer the question about the impact of intergroup discrimination on self-esteem; there was no group-wise control condition where discrimination was impossible. Besides, the eventual impact of categorization per se could not be assessed because the non-categorized subjects had a different type of matrix from the categorized ones, confounding two variables.
These two experiments by Oakes and Turner (1980) and Turner and Spriggs (1982) have attempted to answer part of the question about the role of self-esteem in intergroup discrimination. The evidence they give is not, however, sufficient to verify Social Identity Theory. Because of their methodological weaknesses, no conclusive statement can be made about the effect of discrimination on self-esteem. There is need for further investigation.

The Proposed Research

The aim of the proposed research is to extend the contributions of Oakes and Turner (1980) and Turner and Spriggs (1982) in verifying that self-esteem is involved in intergroup discrimination, and to attempt to determine at which of several possible stages in the procedure, as will be described below. Essentially, Social Identity theory predicts an increase in self-esteem after a successful competitive social comparison. Positive evaluative differentiation, i.e. discrimination, is a prerequisite of success in this respect. It is however conceivable that a change in self-esteem may also be produced by other factors in the design. For example, categorization, in the minimal group paradigm, may in itself elicit some positive self-evaluation in that it socially defines individuals (in an admittedly minimal way) in a context where the ambiguity of the experimental situation may elicit a search for personal meaning. Neither of the experiments described above included a non-categorization control condition to compare the effects of
categorization against. Moreover, purely cognitive differentiation of the ingroup and outgroup i.e. the simple confrontation of the two, independently of any actual discrimination, may contribute to self-esteem because it makes salient social identity, or belonging. This prediction is consistent with a cognitivist position like Doise's. After the impact of categorization and cognitive differentiation, the actual discriminative act would bring in the comparative evaluative component that leads to the positive status of the group.

In summary, Social Identity Theory expects intergroup discrimination to be the factor most responsible for the change in self-esteem, but one may also suspect that social categorization and simple cognitive differentiation will contribute to self-esteem as well.

The following research will test if indeed discrimination enhances self-esteem, and will also provide means to assess the role of the other factors mentioned above. Conditions will manipulate independently categorization, simple cognitive differentiation between the ingroup and the outgroup, and discrimination.

The proposed research will study intergroup discrimination within the minimal group paradigm, because the goal at this stage is to clarify the basics of the theory. Completely random categorization will be used, as opposed to trivial criteria, to minimize any sort of similarity perception. Similarity may lead subjects to make ingroup favoritism not because of their
membership per se, but to defend attributes they may infer sharing with their group.

Many factors, of course, are left to further investigation. At this point, the interest is not in the role of individual variables, personality characteristics, or related traits. The issue of motivation or of intention, whether discrimination is made "in order to" enhance self-esteem as Turner (1982) suggests, is not addressed either. This research focuses on the effect of categorization and discrimination on self-esteem.

To actually test the impact of intergroup discrimination on self-esteem in the minimal group paradigm, the experiment will comprise eight conditions. The independent variables will consist of manipulating: (a) categorization (versus non-categorization); (b) intergroup discrimination via different types of matrix task, and; (c) the moment at which self-esteem, the dependent variable, is assessed.

Since there is no consensus about terminology whether to refer to self-esteem, self-evaluation, self-regard or else (Wells & Marwell, 1976; Wylie, 1961, 1974); the term self-esteem will be used to name a state self-evaluation reflecting the degree of self-liking (Robinson & Shaver, 1973).

We will also use this opportunity directly to compare Tajfel's and Brewer's matrices.
Method

Subjects

One hundred thirty-five (135) undergraduates from an Introductory Psychology class at U.B.C. agreed to participate in this experiment during their class period. The 90 males and 45 females were seated at individual desks separated from each other by about a half meter in a large auditorium.

Procedure

All the conditions in this experiment were run concurrently. After a brief introduction subjects were asked to sign the Consent Form (Appendix B). Then, following oral instructions about the overall procedure and the specific tasks to be performed (Appendix C) three teams 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 be given 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 performed a group categorization at the same time. In these cases the slip led subjects to believe that the class was divided into two groups, Blue and Red, on a random basis, and that they had be assigned by chance to Group Red (Appendix B).
Secrecy of the slip of paper was stressed. Subjects had to read the slip, write the information (code number and, if any, group membership) down 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 using 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, they were also provided from the beginning of the session with a filler task, a whole sheet of anagrams (Appendix B). 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 gathering their comments, hypotheses, perceptions and suspicions (Appendix D).

Finally the subjects were debriefed about the whole procedure, the different conditions, the hypotheses, and were given a brief summary of Social Identity theory.
Conditions

Subjects were randomly assigned to one of eight conditions according to the randomized order of the booklets in the experimenters' boxes.

The conditions varied on three parameters: (a) categorization into groups versus no categorization; (b) type of allocation task, and; (c) the order of the point allocation and self-esteem tasks. Categorization was manipulated on two levels. Some subjects (three quarters of them) were categorized (C) on a supposedly random basis by the drawing of a slip of paper, as members of Group Red (as opposed to Group Blue). This type of putative random categorization was shown to be effective in producing ingroup-outgroup discrimination on the matrices in a pilot study. The other quarter of the subjects were not categorized (NC) into groups at all. Their slip of paper only indicated a personal code number.

The second factor of the experiment, the type of point allocation task, was manipulated by the use of different types of matrices in the booklets. The objective was to make intergroup discrimination through ingroup favoritism possible only for certain conditions and not for others, while at the same time maintaining some equivalence between the tasks. Subjects who had been categorized into groups allocated points on each matrix of their booklet to either: (a) one anonymous member of their ingroup, Red, and one of the outgroup, Blue (Mtx In-Out), (b) two anonymous members of the ingroup (Mtx In-In), or (c) two anonymous members of the outgroup (Mtx Out-
Out). These three conditions all employed normal versions of the matrices, as they have been used in previous research. A further two conditions were created in which categorized subjects allocated points between an ingroup and an outgroup member, but on matrices that had been altered in such a way as to make it impossible to choose anything other than competitive ingroup favoritism (Mtx Forced Discrimination), or to enable only fairness (Mtx Forced Fairness). Non-categorized subjects filled in matrices about two other anonymous persons identified only by code numbers, without referring to any group membership (Mtx). These different types of matrices allowed the experimenter to manipulate the opportunity for a subject to express intergroup discrimination.

The last independent variable concerned the moment at which self-esteem was assessed. In some conditions self-esteem was measured immediately after the categorization manipulation, before the point allocation task; in others it was evaluated after the point distribution task. These two alternatives were manipulated by the order of presentation of the matrix part of the booklet. In the situation where self-esteem was assessed just after the categorization, part I of the booklet contained the self-esteem questionnaire and the matrices were presented in part II in order to preserve similarity in time involvement as compared with the conditions where the matrices were performed first.

As to the dependent variables of this experiment, they consisted of measures of transient self-esteem, also referred
to as state self-esteem (as opposed to trait self-esteem).

The organization of all these parameters yielded a design with eight randomly assigned conditions of the form:

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Booklet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part I</td>
</tr>
<tr>
<td>1) NC</td>
<td>Self-Esteem</td>
</tr>
<tr>
<td>2) NC</td>
<td>Mtx</td>
</tr>
<tr>
<td>3) C</td>
<td>Self-Esteem</td>
</tr>
<tr>
<td>4) C</td>
<td>Mtx In-Out</td>
</tr>
<tr>
<td>5) C</td>
<td>Mtx In-In</td>
</tr>
<tr>
<td>6) C</td>
<td>Mtx Out-Out</td>
</tr>
<tr>
<td>7) C</td>
<td>Mtx Forced Fairness</td>
</tr>
<tr>
<td>8) C</td>
<td>Mtx Forced Dscrmtn</td>
</tr>
</tbody>
</table>

The core of the design consisted of the first four conditions which formed, with respect to the dependent variable self-esteem, a 2x2 design: categorization or non-categorization by matrix task or non-matrix task. To this block the four remaining conditions were affixed as supplementary controls.

The corner-stone of the design was condition 4 which was to be compared on self-esteem with conditions where subjects were categorized but could not express any ingroup favoritism on the matrices because they were not confronted with both the ingroup and the outgroup simultaneously (conditions 5, 6), or
because they were forced to be fair (condition 7). In condition 3 self-esteem was assessed prior to any possible discrimination, no explicit comparison or decision having been made yet. This permitted the simulation of a pre-post measure of self-esteem with respect to discrimination, without encountering repeated measure artifacts such as pretest sensitivity. Moreover the latter condition (3) in conjunction with condition 1, the baseline, permitted the evaluation 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, if perceived freedom in discriminating against an outgroup was a determinant of a change in self-esteem.

Materials

The categorization manipulation was carried out by the use of two types of slips of paper. One indicated only a code number, while the other type also assigned a group membership, Red, to the subject (Appendix B).

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, if any, their group membership (Appendix B).

The matrix part consisted of a page of instructions
(Appendix B) followed by 16 pages of matrices. Eight matrices of Tajfel's 13 column format alternated with eight of Brewer's 2-column type (Appendix A). 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 in color to the group labels, blue or red. Tajfel's matrices were of four different types as shown in Appendix A. Each type was presented twice, switching around the group on the top and bottom rows. Conditions 7 and 8 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 ingroup were necessarily equal to those given to the outgroup. In the Forced Discrimination condition the numbers were combined such that more points were always given to the ingroup (Appendix E).

For each matrix, subjects had to circle a column corresponding to the number of points they allocated to the two persons identified on the page. They also had to write these numbers down on the lines provided.

The self-esteem part consisted of a set of measures for which the instructions stressed the need to answer as they felt at that very moment. The questionnaire included a half-length version of the Twenty Statement Test (Jones, Sengenig & 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 comprising
Julian, Bishop & Fiedler's (1966) nine items and Sherwood's Self-Concept Inventory 13 items (Robinson & Shaver, 1973). Finally there was a single 7-point rating scale addressing directly the level of self-esteem (Hamilton, 1971). The self-esteem questionnaire (Appendix F) constituted part I of the booklet for condition 1 and 3 and part II for all the other conditions.

Finally, the last page of the booklet asked for age and sex.

The consent form, anagram sheet and postexperimental questionnaire are reproduced in the Appendices B and D.

**Hypotheses**

The main objective of this experiment was to determine whether engaging in competitive social comparison and discriminating against an outgroup causes an increase in self-esteem. This presupposed categorization into an ingroup and an outgroup, as well as an opportunity to differentiate between these two groups.

The eight experimental conditions were designed to address this question. Four of them manipulated categorization and the matrix task in a 2x2 design. These were conditions 1 to 4. The principal hypothesis about self-esteem predicted a categorization by matrix interaction effect, with both being
necessary to increase self-esteem. Subjects who were categorized and who discriminated would show higher self-esteem. There was also a secondary set of hypotheses. A small main effect for categorization was expected, in that categorization would add to the subjects' social definition. A small matrix main effect was also hypothesized in the direction of post-matrix self-esteem measures being higher than those taken prior to the matrix task due to the feeling of having completed a significant experimental task. Thus, the main prediction was that condition 4 would be the highest; moreover conditions 2 and 3 would be higher than condition 1.

Four other conditions, 5 to 8, were added as supplementary comparisons to serve as specific controls for the impact of discrimination once categorization had been established. Conditions 5, 6, and 7 offered different means of preventing intergroup differentiation, while presenting the subjects with tasks of comparable length and structure as in condition 4. In condition 8 subjects were forced to discriminate in favor of their own group. The major prediction was that of all conditions where subjects were categorized into groups (conditions 3 to 8), self-esteem would be highest in those where intergroup discrimination occurred (conditions 4 and 8). Further predictions were that conditions 5 and 6 would not differ on self-esteem, and both would be lower than condition 4; and condition 7 (Forced Fairness) would be lower on self-esteem than condition 8 (Forced Discrimination). Concerning the Forced Discrimination condition, it was suspected that the
latter might be lower on self-esteem than the free discrimination condition (condition 4) as a consequence of perceived limited freedom. Regarding the impact on self-esteem of having completed a significant task, conditions 5, 6, 7 should be higher than condition 3.

In summary, for the categorization conditions, the predictions were: (a) conditions 4, 8 > 3, 5, 6, 7; (b) conditions 5 = 6; (c) conditions 4 > 5, 6; (d) conditions 8 > 7; (e) conditions 4 > 8; (f) conditions 5, 6, 7 > 3.

Results

Coding

Five indices were used to measure self-esteem: the shortened Twenty Statement Test (TST), the extended Rosenberg's Self-Esteem Scale (RSBRG), Julian et al. semantic differential scales (JLNSD), Sherwood's Self-Concept Inventory items (SHRWD), and a single global rating scale (SNGL).

For TST two independent judges scored the responses as reflecting positive (+1), negative (-1) or neutral (0) attributions. They agreed on 1108 out of the 1245 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.

For conditions 2, 3, and 4, the choices on the matrices were coded since they would be used for manipulation checks on
the effectiveness of categorization on discrimination, and for the comparative analysis of Tajfel's and Brewer's matrices. Five strategies, previously discussed, were analysed: Fairness (F), Maximum Joint Profit (MJP), Maximum Ingroup Profit (MIP), Maximum Differentiation (MD), and a combination of the last two, Ingroup Favoritism (FAV).

For Tajfel's matrices data were entered as to the position of the chosen cell from 1 to 13, 1 being at the extreme left. Pull scores of a strategy on another were computed based on the two presentations of each matrix. Six pulls, congruent with Tajfel's and Turner's usage, were derived: the pull of FAV on F, of FAV on MJP, of MD on MJP + MIP, and their reciprocals, F on FAV, MJP on FAV and finally MJP+MIP on MD (Brown, Tajfel & Turner, 1980; Turner, 1978, 1980, 1983). Finally, one of the matrix types permitted the calculation of an absolute FAV score, independent of the pull of another strategy. The computation details are given in Appendix G. Brewer's matrices were scored according to her coding system (Appendix A). Frequencies for each strategy, FAV, F, MIP, MJP, were entered for each subject.

It must be noted that the matrix scores described above represent intergroup strategies. The coding system then, is valid only to the extent that an ingroup is opposed to an outgroup. Nevertheless, the same computations can be applied to matrices in condition 2 on which the Ingroup/Outgroup distinction does not hold, yielding what will be called "pseudo" strategy scores. This procedure, which is current in
the literature (Billig & Tajfel, 1973; Brewer & Silver, 1978, Turner, 1980), is essential in order to show that the pull scores in condition 4 are not just artifacts of the scoring procedure.

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 if indeed categorized subjects discriminated.

Table I displays group means on each strategy index; the first four indices represent Brewer's system, the last seven Tajfel's matrices. In addition to conditions 2 and 4, data from condition 3 are also given; these will be used in conjunction with those of condition 4 in a later section.

Insert Table I around here

For some conditions, constraints on the setting insured that subjects did discriminate, or did not. For others, though, subjects were left to their own will, and a verification was required to establish whether they did engage in ingroup favoritism. This was particularly important for condition 4, the pivot of the study.

In order to test if the categorized subjects of condition 4 engaged in discrimination, a one-sample Hotelling's T Square was performed on the strategy indices. This procedure yielded
Table I

Group means on Matrix Scores for Conditions 2, 3, and 4

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Condition 2&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Condition 3</th>
<th>Condition 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewer's frequency</td>
<td>NC-Mtx-SE</td>
<td>C-SE-Mtx I/O</td>
<td>C-Mtx I/O-SE</td>
</tr>
<tr>
<td>FAV</td>
<td>0.58</td>
<td>0.88</td>
<td>1.83</td>
</tr>
<tr>
<td>F</td>
<td>1.11</td>
<td>1.53</td>
<td>0.67</td>
</tr>
<tr>
<td>MIP</td>
<td>1.26</td>
<td>0.82</td>
<td>0.89</td>
</tr>
<tr>
<td>MJP</td>
<td>1.00</td>
<td>0.77</td>
<td>0.61</td>
</tr>
<tr>
<td>Tajfel's pull scores</td>
<td>NC-Mtx-SE</td>
<td>C-SE-Mtx I/O</td>
<td>C-Mtx I/O-SE</td>
</tr>
<tr>
<td>FAV</td>
<td>1.74</td>
<td>1.00</td>
<td>1.33</td>
</tr>
<tr>
<td>FAV on F</td>
<td>-1.58</td>
<td>3.00</td>
<td>1.22</td>
</tr>
<tr>
<td>FAV on MJP</td>
<td>-0.74</td>
<td>1.59</td>
<td>3.17</td>
</tr>
<tr>
<td>MD on MJP+MIP</td>
<td>0.47</td>
<td>0.00</td>
<td>2.17</td>
</tr>
<tr>
<td>F on FAV</td>
<td>2.00</td>
<td>5.35</td>
<td>2.44</td>
</tr>
<tr>
<td>MJP on FAV</td>
<td>1.16</td>
<td>1.47</td>
<td>1.39</td>
</tr>
<tr>
<td>MJP+MIP on MD</td>
<td>-1.00</td>
<td>0.94</td>
<td>-2.06</td>
</tr>
</tbody>
</table>

Note.  a:"pseudo" strategy scores
experiment-wise .95 confidence intervals that established whether or not Tajfel's pull scores were statistically equivalent to zero, and whether Brewer's strategy frequencies differed from 1, the chance level. The pull of FAV on MJP was positive and statistically different from zero, it did not cross 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 frequency of FAV was different from 1, the chance expectation (C.I.=\( (1.29, 2.38) \)). The results also supported the null hypotheses that the frequency of F, MIP, 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 to condition 2 on self-esteem, it was particularly important to verify that these two conditions differed on discrimination indices. Moreover, the replication of the role of categorization in discrimination was of interest here. A multivariate two-sample Hotelling's T Square was run on the seven Tajfel indices and three of Brewer's (Brewer's indices entail linear dependency, as the frequency of three strategies determine the frequency of the fourth). Conditions 2 and 4 differed significantly (Wilks lambda=\( .541, \ F(10,26)=2.30, \ p=.05 \)); Heck value(1,4,12)=.459, \( p<.05 \). Namely, categorized subjects showed more FAV (\( t(35)=4.18, \ p<.001 \)), FAV on MJP (\( t(35)=2.77, \ p<.01 \)) and FAV on F (\( t(35)=1.80, \ p=.08 \)).
Results on Self-Esteem

Correlations among the five measures of self-esteem are displayed in Table II. All were significant beyond the .001 level. RSBRG correlated about .60 with JLNSD, SHRWD and SNGL; SNGL correlated around .55 with JLNSD and SHRWD. JLNSD and SHRWD showed the highest correlation with .75. The lowest correlations were found between TST and the other measures. A Classical Common Factor Analysis extracted one eigen value greater than 1 (3.14) which explained 62.8% of the total variance. The factor matrix is shown in Table III. This factor loaded highly on all self-esteem measures except TST (RSBRG .756, JLNSD .834, SHRWD .838, SNGL .714, TST .498).

Insert Tables II and III around here

The group means on each of the five self-esteem measures are displayed in Table IV. The first set of analyses concerns the 2x2 core design block, while later analyses will include the supplementary control conditions.

Insert Table IV around here

A two-way MANOVA was performed on the five measures of self-esteem: TST, RSBRG, JLNSD, SHRWD and SNGL. The first factor, categorization, had two levels: Categorized (C) and Non-categorized (NC). The second factor, matrix order, had two levels as well: Matrix task prior to the self-esteem assesment
Table II

Correlations among Self-Esteem Measures

<table>
<thead>
<tr>
<th></th>
<th>TST</th>
<th>RSBRG</th>
<th>JLNSD</th>
<th>SHRWD</th>
<th>SNGL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TST</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSBRG</td>
<td>.344</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JLNSD</td>
<td>.398</td>
<td>.612</td>
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<tr>
<td>SHRWD</td>
<td>.457</td>
<td>.605</td>
<td>.748</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SNGL</td>
<td>.364</td>
<td>.620</td>
<td>.572</td>
<td>.546</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. N= 135
All correlations are significant at the .001 level
Table III
Common Factor Analysis on Self-Esteem Measures

<table>
<thead>
<tr>
<th>Scale</th>
<th>Factor I</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>TST</td>
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<tr>
<td>RSBRG</td>
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<td>.572</td>
</tr>
<tr>
<td>JLNSD</td>
<td>.834</td>
<td>.696</td>
</tr>
<tr>
<td>SHRWD</td>
<td>.838</td>
<td>.703</td>
</tr>
<tr>
<td>SNGL</td>
<td>.714</td>
<td>.510</td>
</tr>
</tbody>
</table>

Note. N= 135

The initial factor extraction yielded only one root greater than 1, equal to 3.14, explaining 62.8% of the variance.
Table IV

Group Means on Self-Esteem Measures

<table>
<thead>
<tr>
<th>Condition</th>
<th>n</th>
<th>TST</th>
<th>RSBRG</th>
<th>JLNSD</th>
<th>SHRWD</th>
<th>SNGL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (NC-SE-Mtx)</td>
<td>19</td>
<td>0.140</td>
<td>5.895</td>
<td>5.444</td>
<td>5.583</td>
<td>5.316</td>
</tr>
<tr>
<td>2 (NC-Mtx-SE)</td>
<td>19</td>
<td>-0.353</td>
<td>5.356</td>
<td>4.912</td>
<td>5.419</td>
<td>5.444</td>
</tr>
<tr>
<td>3 (C-SE-Mtx: I/O)</td>
<td>17</td>
<td>0.007</td>
<td>5.418</td>
<td>5.039</td>
<td>5.602</td>
<td>5.353</td>
</tr>
<tr>
<td>4 (C-Mtx I/O-SE)</td>
<td>18</td>
<td>0.122</td>
<td>5.822</td>
<td>5.475</td>
<td>5.457</td>
<td>5.611</td>
</tr>
<tr>
<td>5 (C-Mtx I/I-SE)</td>
<td>13</td>
<td>-0.162</td>
<td>5.346</td>
<td>4.915</td>
<td>5.201</td>
<td>5.333</td>
</tr>
<tr>
<td>6 (C-Mtx O/O-SE)</td>
<td>16</td>
<td>-0.031</td>
<td>5.862</td>
<td>4.806</td>
<td>5.370</td>
<td>5.563</td>
</tr>
<tr>
<td>7 (C-Mtx F -SE)</td>
<td>17</td>
<td>-0.135</td>
<td>5.341</td>
<td>4.974</td>
<td>5.089</td>
<td>5.118</td>
</tr>
<tr>
<td>8 (C-Mtx D -SE)</td>
<td>16</td>
<td>-0.040</td>
<td>5.850</td>
<td>5.278</td>
<td>5.446</td>
<td>5.563</td>
</tr>
</tbody>
</table>
(M) and No matrix prior to the measures (NM). The four cells of this 2x2 design were represented by conditions 1 (NC-NM), 2 (NC-M), 3 (C-NM) and 4 (C-M).

The two-way MANOVA showed no main effects; neither a categorization effect (p=.725), nor a matrix task effect (p=.317). The interaction effect, though, was highly significant according to both the Likelihood Ratio criterion and the Greatest Characteristic Root approach (Wilks lambda = .700, F(5,63) = 5.39, p<.0001; Heck value(1,1.5,30.5) = .300, p<.01). Since the multivariate technique demonstrated that the interaction was significant within the constraints of an experiment-wise type I error rate of .05 across the five measures, two-way univariate tests (ANOVA) were performed to see on which scales there were differences. Two-way interactions were significant on TST (F(1,67)=6.41, p=.014), RSBRG (F(1,67)=4.97, p=.029), and on JLNSD (F(1,67)=5.40, p=.023). These interactions are plotted in Figures 1, 2 and 3.

For the three measures on which the interaction effect was significant, post-hoc pairwise comparisons were done using a Simple Effect Analysis to find which cells differed. T tests were carried out at .01 type I error rate using Mean Square Within as the best estimator of the error variance. These post-hoc contrasts showed that condition 2 (NC-M) was lower than condition 1 (NC-NM) and 4 (C-M), these latter two not
Figure 1. Categorization by matrix interaction effect on TST

Note. Conditions sharing the same subscript are not statistically different.
Figure 2. Categorization by matrix interaction effect on RSBRG

Note. Conditions sharing the same subscript are not statistically different.
Figure 3. Categorization by matrix interaction effect on JLNSD

Note. Conditions sharing the same subscript are not statistically different.
being statistically different; and that condition 3 (C-NM) was also lower than 1 and 4, except on TST. Conditions 2 and 3 were equal, except on TST. Conditions 1 (NC-NM) and 4 (C-M) were not statistically different on any scale. Letter subscripts indicate these results on Figure 1, 2, 3.

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.

The next set of analyses includes the supplementary conditions 5 to 8, and focuses on some specific comparisons. First, a one-way MANOVA on the five self-esteem measures across all eight conditions was significant (Wilks lambda=.661, F(35,507)=1.50, p=.035; Heck value(5,.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, though. Multiple comparisons on each variable would offer no statistical power since there exist 140 possible contrasts, pairwise only. An experiment-wise type I error rate of .05 would imply contrasts each at the .0004 level, which is beyond reasonable hope. In this context where a multivariate treatment of the data was not easily manageable it appeared more appropriate to apply univariate techniques on a global summarizing index of self-esteem. In order to reduce the dimensionality of the self-esteem data a Principal Component Analysis was applied to the five dependent measures of self-esteem. The first principal
component is the best linear combination of variables that maximizes variance and gives the most reliable consistent index. In contrast to Common Factor Analysis which describes the structure of the variance in the data, Principal Component Analysis reproduces exactly the original scores. Therefore it is a more appropriate index for comparison purposes. The result from Principal Component Analysis are shown in Table V. Only one principal component with an eigen value 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 TST which was somewhat lower (RSBRG .82, JLNSD .86, SHWRD .86, SNGL .79, and TST .61). For each subject a principal component score (PC) was computed using these weights in linear combination. Univariate analyses between experimental conditions could then be carried out on this new index.

Since only some specific comparisons were of interest to the hypotheses, univariate a priori Bonferroni tests were executed on the global index of self-esteem, the first principal component (PC). This powerful technique preserved a .05 experiment-wise type I error rate over the six contrasts that were meaningful in this context. Consistent with the hypotheses, some contrasts were submitted to one-tailed tests. Table VI displays the group means on PC. Table VII lists the contrasts and their respective results.
Table V

Principal Component Analysis on Self-Esteem Measures

<table>
<thead>
<tr>
<th>Scale</th>
<th>1st P.C.</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>TST</td>
<td>.609</td>
<td>.371</td>
</tr>
<tr>
<td>RSBRG</td>
<td>.816</td>
<td>.665</td>
</tr>
<tr>
<td>JLNSD</td>
<td>.859</td>
<td>.738</td>
</tr>
<tr>
<td>SHRWD</td>
<td>.862</td>
<td>.744</td>
</tr>
<tr>
<td>SNGL</td>
<td>.789</td>
<td>.623</td>
</tr>
</tbody>
</table>

Note.  N= 135

The only eigen value greater than 1, was equal to 3.14, and explained 62.8% of the variance.
For conditions in which subjects had been categorized, subjects who could discriminate (conditions 4 and 8) were higher on PC 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 post self-esteem to those who distributed points to two outgroup members (condition 6), both conditions being prevented from engaging in intergroup discrimination. These two latter non-discriminating conditions (5 and 6) were significantly lower on PC than those who had ingroup versus outgroup matrices and could discriminate (condition 4). The Forced Discrimination condition (8) was higher than the Forced Fairness one (7), but not different from the free discrimination condition (4). Finally, whether or not one performed the experimental matrix task did not influence self-esteem for those who could not engage in intergroup discrimination; conditions 5, 6, 7 were equal to 3.

In summary, we verified that, given categorization, discriminative conditions were higher on PC than non-discriminative ones (conditions 4, 8 > 3, 5, 6, 7; 4 > 5, 6; 8 > 7; 4 = 8; 5 = 6; 5, 6, 7 = 3).

Moreover, since the hypothesis was that discrimination led to higher self-esteem, an exploratory internal analysis of condition 4 was attempted. The aim was to see if there was a relationship between the extent of discrimination and the level
<table>
<thead>
<tr>
<th>Conditions</th>
<th>P.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (NC-SE-Mtx)</td>
<td>0.285</td>
</tr>
<tr>
<td>2 (NC-Mtx-SE)</td>
<td>-0.225</td>
</tr>
<tr>
<td>3 (C-SE-Mtx I/O)</td>
<td>-0.028</td>
</tr>
<tr>
<td>4 (C-Mtx I/O-SE)</td>
<td>0.303</td>
</tr>
<tr>
<td>5 (C-Mtx I/I-SE)</td>
<td>-0.275</td>
</tr>
<tr>
<td>6 (C-Mtx O/O-SE)</td>
<td>0.002</td>
</tr>
<tr>
<td>7 (C-Mtx F-SE)</td>
<td>-0.334</td>
</tr>
<tr>
<td>8 (C-Mtx D-SE)</td>
<td>0.174</td>
</tr>
</tbody>
</table>
Table VII
A Priori Bonferroni T Tests
on the First Principal Component (P.C.)

<table>
<thead>
<tr>
<th>Hypothesis about conditions</th>
<th>Actual value</th>
<th>Critical of the contrast difference</th>
<th>Statistical decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4,8 &gt; 3,5,6,7$</td>
<td>1.589</td>
<td>1.143</td>
<td>$4,8 &gt; 3,5,6,7$</td>
</tr>
<tr>
<td>$5 = 6$</td>
<td>0.277</td>
<td>0.922(^a)</td>
<td>$5 = 6$</td>
</tr>
<tr>
<td>$4 &gt; 5,6$</td>
<td>0.879</td>
<td>0.807</td>
<td>$4 &gt; 5,6$</td>
</tr>
<tr>
<td>$8 &gt; 7$</td>
<td>0.507</td>
<td>0.460</td>
<td>$8 &gt; 7$</td>
</tr>
<tr>
<td>$4 &gt; 8$</td>
<td>0.130</td>
<td>0.461</td>
<td>$4 = 8$</td>
</tr>
<tr>
<td>$5,6,7 &gt; 3$</td>
<td>-0.521</td>
<td>0.680</td>
<td>$5,6,7 &gt; 3$</td>
</tr>
</tbody>
</table>

Note. Experiment-wise type I error rate of .05, contrast-wise error rate smaller than .01

One-tailed tests, unless otherwise specified

\(^a\) Two-tailed test
of self-esteem. Correlations between the first principal component of the self-esteem measures and the matrix indices were computed, within condition 4; and a regression analysis was performed to predict P.C. from the strategy indices. The small number of cases limited attainment of statistical significance for the correlations. The multiple regression analysis brought out the significant elements involved in the relationship between self-esteem and discrimination while taking care of the inter-correlations among the strategies. A multiple regression coefficient of .726 (p=.004) was achieved from a stepwise regression analysis which used as the two best predictors the pull of MIP+MJP on MD (beta=.618) and the pull of FAV on MJP (beta=.566).

Insert Table VIII around here

Comparison of Brewer's and Tajfel's Matrices

The study offered a good opportunity to compare Brewer's strategy indices from the 2-cell matrices and Tajfel's pull scores from the 13-cell matrices. For this analysis only conditions 3 and 4 were considered as they were the only ones to oppose the ingroup against the outgroup, all other conditions yielding only "pseudo" strategy indices. Consequently condition 3 and 4 matrix responses were pooled, for a total N of 35.
<table>
<thead>
<tr>
<th>Strategy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewer's</td>
<td></td>
</tr>
<tr>
<td>FAV</td>
<td>.15</td>
</tr>
<tr>
<td>F</td>
<td>-.13</td>
</tr>
<tr>
<td>MIP</td>
<td>-.18</td>
</tr>
<tr>
<td>MJP</td>
<td>.13</td>
</tr>
<tr>
<td>Tajfel's</td>
<td></td>
</tr>
<tr>
<td>FAV</td>
<td>.38*</td>
</tr>
<tr>
<td>FAV on F</td>
<td>.36*</td>
</tr>
<tr>
<td>FAV on MJP</td>
<td>.41**</td>
</tr>
<tr>
<td>MD on MJP+MIP</td>
<td>.25</td>
</tr>
<tr>
<td>F on FAV</td>
<td>.13</td>
</tr>
<tr>
<td>MJP on FAV</td>
<td>-.06</td>
</tr>
<tr>
<td>MJP+MIP on MD</td>
<td>.48**</td>
</tr>
</tbody>
</table>

Note. N= 18

* p < .10    ** p < .05
To ascertain that the indices were reflecting intergroup discrimination, a one-sample Hotelling's T Square was performed. It confirmed that these subjects had been discriminating. The .95 simultaneous confidence interval of the pull of FAV on F was from .364 to 3.804 (t(33)=2.47, p<.02) and of FAV on MJP was from .964 to 3.836 (t(33)=3.40, p<.005), both significant. Under the stringent type I error control of the multivariate technique, the confidence interval obtained for Brewer's FAV lay between 0.971 and 1.772. This result would have attained significance if the interval had not included 1, the chance expectation.

Table IX shows the Pearson correlations among all strategy indices. Quadrant II displays Brewer's inter-strategy correlations, and Quadrant IV the correlations among Tajfel's different pulls. Quadrant III gives the between-set correlations.

Brewer's FAV index correlated significantly with all Tajfel's indices of discrimination: with the pull of FAV (r=.35), the pull of FAV on F (r=.36), of FAV on MJP (r=.40) and of MD on MJP+MIP (r=.36). Similarly Brewer's F correlated significantly with Tajfel's measure of fairness, F on FAV (r=.51). MIP correlated positively with the pull of FAV (r=.28) but negatively with the pull of F on FAV (r=-.42). Brewer's MJP did not correlate significantly with MJP pulls.
Table IX
Correlations between Matrix Indices

<table>
<thead>
<tr>
<th>Brewer's frequencies</th>
<th>Tajfel's pull scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAV</td>
<td>FAV</td>
</tr>
<tr>
<td>F</td>
<td>F/FAV</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP</td>
<td>FAV/MJP</td>
</tr>
<tr>
<td>MJP+MIP</td>
<td>MD/MJP+MIP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brewer's</th>
<th>Tajfel's</th>
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<tr>
<td>FAV</td>
<td>FAV</td>
</tr>
<tr>
<td>F</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
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<td>MJP</td>
<td>FAV/F</td>
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<table>
<thead>
<tr>
<th>Brewer's</th>
<th>Tajfel's</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>FAV</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP</td>
<td>FAV/MJP</td>
</tr>
<tr>
<td>MJP+MIP</td>
<td>MD/MJP+MIP</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Brewer's</th>
<th>Tajfel's</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>FAV</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP</td>
<td>FAV/F</td>
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<tr>
<td>MJP+MIP</td>
<td>MD/MJP+MIP</td>
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<table>
<thead>
<tr>
<th>Brewer's</th>
<th>Tajfel's</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>FAV</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP</td>
<td>FAV/MJP</td>
</tr>
<tr>
<td>MJP+MIP</td>
<td>MD/MJP+MIP</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Brewer's</th>
<th>Tajfel's</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>FAV</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP+MIP</td>
<td>MD/MJP+MIP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brewer's</th>
<th>Tajfel's</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>FAV</td>
</tr>
<tr>
<td>MIP</td>
<td>FAV/F</td>
</tr>
<tr>
<td>MJP</td>
<td>FAV/MJP</td>
</tr>
<tr>
<td>MJP+MIP</td>
<td>MD/MJP+MIP</td>
</tr>
</tbody>
</table>

Note. N=35
* p<.05, ** p<.01, *** p<.005
Both matrix systems seemed internally consistent. Within Brewer's system F correlated negatively with FAV ($r=-.47$), MIP ($r=-.46$) and MJP ($r=-.38$). MJP correlated negatively with FAV too ($r=-.32$), but MIP did not correlate significantly with either of these two. In Tajfel's system, discrimination indices all correlated significantly together (pulls of FAV, FAV on F, FAV on MJP, MD on MJP+MIP). The pull of FAV on MJP correlated negatively with the pull of MJP+MIP on MD ($r=-.29$) and with the pull of F on FAV ($r=-.35$). The latter also related negatively to the pull of MJP+MIP on MD ($r=-.29$).

Because of the linear dependency within Brewer's system a Common Factor Analysis could not be performed on the matrix indices. A component analysis with rotation, though, yielded four factors with eigen values greater than 1, explaining respectively 27.6, 18.8, 11.7 and 10.1 percent of the variance, for a total of 68.2%. The third and fourth factors with their eigen values of 1.29 and 1.11 barely met the inclusion criterion.

---

Table X displays the component structure matrix. The first factor loaded highly on all discrimination indices (FAV .701, pull of FAV .789, FAV on F .656, FAV on MJP .747, MD on MJP+MIP .712). The second factor was highly correlated with fairness: F (.747), F on FAV (.748) and MIP (-.812). Regarding the third and fourth factors, each loaded only on one index, MJP+MIP on
**Table X**

Component Structure on Matrix Indices (Oblique Rotation)

<table>
<thead>
<tr>
<th>Factor</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewer's</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAV</td>
<td>.701</td>
<td>-.109</td>
<td>-.086</td>
<td>.127</td>
<td>.52</td>
</tr>
<tr>
<td>F</td>
<td>-.309</td>
<td>.747</td>
<td>-.024</td>
<td>.423</td>
<td>.75</td>
</tr>
<tr>
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<td>-.812</td>
<td>.064</td>
<td>.186</td>
<td>.86</td>
</tr>
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<td>-.113</td>
<td>.078</td>
<td>-.953</td>
<td>.96</td>
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<td></td>
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<tr>
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<td>.056</td>
<td>.240</td>
<td>-.113</td>
<td>.72</td>
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<td>-.144</td>
<td>-.061</td>
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<tr>
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<td>-.120</td>
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<tr>
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<td>-.133</td>
<td>.242</td>
<td>.273</td>
<td>.67</td>
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<tr>
<td>F on FAV</td>
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<td>.748</td>
<td>.161</td>
<td>.202</td>
<td>.66</td>
</tr>
<tr>
<td>MJP on FAV</td>
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<td>-.543</td>
<td>-.143</td>
<td>-.051</td>
<td>.30</td>
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<tr>
<td>MJP+MIP on MD</td>
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<td>.109</td>
<td>.908</td>
<td>-.077</td>
<td>.84</td>
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</tbody>
</table>

Eigen Value 3.04 2.07 1.29 1.11
% of variance 27.6 18.8 11.7 10.1

Note. N= 35
MD for one, and MJP for the other.

Postexperimental Questionnaire

The postexperimental questionnaire was exploratory in nature, it 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 the hypothesis that self-esteem was related to intergroup discrimination.

Discussion and Conclusions

This research aimed at testing the role of self-esteem in intergroup relations as postulated by Social Identity Theory. According to the theory, individuals gain in terms of self-evaluation from the positive distinctivness of their group on some evaluative dimension. Consequently, discrimination against an outgroup contributes to self-esteem. In this
experiment the hypothesis translated into the main predictions of a categorization by matrix task interaction effect, in the 2x2 design, with the expectation that the condition of categorization and discrimination would result in the highest self-esteem. Considering the supplementary conditions, the discriminative groups (4 and 8) were expected to be higher than the ones prevented from intergroup discrimination (conditions 3, 5, 6, 7). Additional hypotheses predicted small categorization and matrix task main effects in the factorial design, and for the supplementary conditions a cognitive differentiation effect, and some other specific differences which will be discussed later.

The general conclusion to emerge from the results is that the major predictions regarding self-esteem were verified. The two-way interaction, categorization by matrix, was significant, and among the supplementary control conditions the discriminative groups were significantly higher on self-esteem than the non-discriminative ones. However, no main effects in the 2x2 design were significant. Condition 4 (categorized and discriminative) was statistically equivalent to the baseline, condition 1. No effects on self-esteem of simple cognitive differentiation were evidenced.

These brief statements need to be discussed in more detail. Firstly, manipulation checks revealed that categorized subjects did indeed discriminate if given the opportunity to do so. Condition 4 resulted in significant ingroup favoritism, as predicted and necessary to the self-esteem hypothesis. Central
to the desired comparisons, conditions 4 (C-M) and 2 (NC-M) were significantly different on the matrix indices, the former showing more ingroup favoritism, the latter more fairness. This result replicates Billig and Tajfel's (1973) experiment and the general findings of the minimal group literature. Mere categorization into an ingroup and an outgroup can be sufficient to create ingroup biases and discrimination.

The effectiveness of the independent variable having been confirmed, the self-esteem results can be discussed. The 2x2 design, manipulating categorization and order of presentation of the matrix task, yielded a highly significant interaction, but no main effects. Care should be taken when interpreting the two-way design. At the theoretical level the two factors were not orthogonal to one another, although their operationalizations were. The matrix task factor had different implications for conditions 2 and 4. For the categorized condition (4) the point allocation task enabled intergroup discrimination, whereas such a strategy was not definable for non-categorized subjects (condition 2). Moreover conditions 1 and 2 did not differ in terms of discrimination per se but rather with respect to the psychological significance of the point distribution task. The significant interaction pattern was repeated on three of the five self-esteem measures: TST, RSBRG and JLNSD. Condition 4 (C-M) was equivalent to condition 1, the baseline (NC-NM). Both were higher than 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. Since condition 3 was lower than condition 1, and condition 4 equal to condition 1, a plausible interpretation is that ingroup favoritism reduced a threat to self-esteem. Under this interpretation, categorization initiated a need for positive group-wise social comparison that was not experienced by the subjects in condition 1. Since this comparison was as yet unresolved in condition 3 when self-esteem was measured, prior to the matrix task, it was perceived as threatening. Consequently lower self-esteem was observed at that point. Subjects in condition 2 were involved in an individual-wise comparison task in which they could not contribute to their own position. Perhaps they suspected that other participants were making decisions about them, and they consequently too perceived a threatening, unresolved situation; as a result their self-esteem decreased.

As shown by the statistical results on the main effects, categorization in itself was not enough to raise self-esteem; nor was the matrix task if people could not act in favor of their relative position in the comparison. On the contrary, these two conditions appeared to be threatening compared to condition 1. Ingroup favoritism, though, restored self-esteem for categorized subjects. Maybe 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 condition 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 ingroup 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 in favor of the ingroup raised self-esteem compared to non-discrimination. Conditions 4 and 8 were higher on self-esteem than 3, 5, 6 and 7. Forced and free discrimination resulted in equivalent self-esteem levels. In non-discriminative conditions, it did not matter whether self-esteem was assessed after the categorization (condition 3), if a task had been making the group membership salient (conditions 4 and 5), or if the task had been opposing simultaneously the ingroup and the outgroup (condition 7). These four conditions did not differ statistically. These results are highly consistent with Social Identity Theory; given categorization, discrimination in favor of one's own group is necessary for positive self-esteem. Categorization in itself was not sufficient, nor was cognitive differentiation of the ingroup and the outgroup if not paired with an evaluative differentiation as well.

The regression analysis also added support to the hypothesis that intergroup discrimination was the crucial variable. Within condition 4 in which categorized subjects had a chance to discriminate, self-esteem was significantly predicted by the amount of ingroup favoritism. Given the small
number of cases in this specific condition this is weak evidence, but nevertheless consistent.

Overall, Social Identity Theory was supported. Positive self-evaluation could be achieved by means of positive group distinctiveness. In this situation where subjects could not derive personal self-esteem directly, they could use their group membership to establish a favorable comparison via intergroup discrimination. The results are consistent with Oakes and Turner (1980) and Turner and Spriggs's (1982) findings in that categorized and discriminative subjects showed higher self-esteem, while making a stronger case methodologically and statistically. The experimental conditions provided a better psychological equivalence between tasks and covered a range of alternative explanations. Multivariate techniques of analysis assured a conservative statistical treatment. Oakes and Turner (1980) obtained significantly higher self-esteem for the discrimination condition on the Twenty Statements Test and Julian's semantic differentials, and on their common factor score. In their experiment, Rosenberg's scale did not reach significance, but it is worth noting that they computed Rosenberg's scale score as the number of positive items endorsed rather than the actual rating, from 1 to 4, attributed to each sentence by the subject. The Group conditions in Turner and Spriggs (1982) experiment can be compared to this study. Competition, which implied more ingroup favoritism than cooperation, yielded higher self-esteem on Rosenberg's test and Julian's semantic differential scales, as
well as on their common factor score. These results are consistent with the present ones, which were significant for TST, RSBRG and JLNSD, and for the self-esteem index derived from a principal component analysis.

As may be recalled from the introduction, Zander et al. (1960) had found analogous results in a different context. Success had more impact on individual self-esteem if people identified with a highly united group that if they considered themselves only as an ununified collection of persons.

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 criterion. Categorization was determined simply by drawing a slip of paper leading to the most trivial and temporary group membership. Yet they engaged in intergroup discrimination and moreover, gained self-esteem as a consequence.

A particularly interesting feature of the results concerns the evidence suggesting that categorization alone induces a threat to self-esteem and that intergroup differentiation can relieve it. This finding that intergroup discrimination restored a loss of self-esteem caused by categorization was not predicted by Social Identity Theory. The theory discusses how intergroup discrimination, given categorization, contributes to self-esteem, but it has not yet elaborated on the effect of categorization per se on self-esteem. In this respect Oakes and Turner's (1980) experiment addressed only one aspect of the
question since it considered only conditions with categorization. Turner and Spriggs (1982) had non-categorized conditions but this variable was confounded with the Self versus Other matrix type. Our design, however, permitted the observation that categorization alone has a detrimental effect on self-esteem. This adds to our model of the relation between intergroup discrimination and self-esteem in a novel manner that has not previously been investigated.

Significant results were obtained on three scales: RSBRG, JLNSD, and TST. Rosenberg's measure of self-esteem has been widely validated (Rosenberg, 1965) and highly recommended (McCarthy & Hoge, 1982; Robinson & Shaver, 1973; Wylie, 1974). The semantic differentials are, according to Colman and Olver (1978) and Julian et al. (1966), the best way to evaluate state self-esteem. The Twenty Statements Test seems also to be a good measure of spontaneous self-evaluation (Kuhn & McPartland, 1954; McGuire & Padawer-Singer, 1976). No significant results were found on Sherwood's Self-Concept Inventory, which offered an appealing face validity but no evidence of psychometric quality (Robinson & Shaver, 1973). As to the single global rating (SNGL), the unique scale may have made it too succinct a measure to be sensitive enough. The correlations between the five different measures were consistent with Hamilton's (1971), and they yielded a unique common factor as in Oakes and Turner (1980), and Turner and Spriggs (1982).

Besides the main focus of this research, some secondary issues are worth discussing. Brewer's and Tajfel's matrices
were analysed and compared, using the data from condition 3 and 4 pooled together. Correlations within each system showed that both were internally coherent. Brewer's different strategy indices correlated negatively among themselves. All Tajfel's indices of ingroup favoritism correlated positively with each other. Obverse pulls (e.g. the pull of FAV on MJP and the pull of MJP on FAV) were uncorrelated. Critics have argued that computations of opposite pulls entail linear dependency (Aschenbrenner & Schaeffer, 1980; Branthwaite et al., 1979). Turner (1980, 1983) has defended, on the contrary, that they were independent indices. These results support Turner's position. Furthermore, the two systems seem consistent with one another, even though they are based on quite different scoring methods. Between battery correlations showed that Tajfel's indices of ingroup favoritism correlated positively with Brewer's measure of ingroup favoritism (FAV). Both fairness measures also correlated positively. Brewer's absolute ingroup profit (MIP) correlated negatively with Tajfel's pull of fairness on favoritism. None of Tajfel's pull scores correlated significantly with Brewer's joint profit index. The one slight inconsistency between the two systems lies in the fact that Brewer's MIP correlated negatively with Tajfel's pure pull of FAV. The factor analysis executed on all the indices combined together showed that Brewer's and Tajfel's ingroup favoritism measures loaded on the same factor with similar weight and represented the main component. Fairness constituted the second most important factor loading equally on Brewer's F and
Tajfel's pull of F on FAV, and negatively on Brewer's absolute ingroup profit, MIP. The two matrix systems seemed basically to agree on their description of subjects' strategies. Tajfel's pull scores offer a more complex picture in that they qualify the relative strength of different strategies. His format displays more obviously the possible strategies whereas Brewer's two-cell forced choices seem more likely to leave the subjects unaware that their strategies can be decoded. No research has yet examined whether subjects' awareness of the strategy they are using is influential. A problem with Brewer's system is that because it deals with frequencies of occurrence it conveys an inherent linear dependency. Frequencies of three strategies necessarily determine the frequency of the fourth. Consequently some multivariate techniques cannot be applied on the whole set of variables. The important point to conclude on is that both systems are compatible.

Thus, in summary, this experiment supported Social Identity Theory. It demonstrated that, given social categorization, intergroup discrimination could contribute to self-esteem. The results also suggested that categorization alone could induce threat to self-esteem.

Questions about external validity may be raised. Turner (1979) has a very interesting discussion on the matter. He agrees that laboratory experiments can certainly be artificial events that do not resemble the real world, but he considers them extremely valuable as a technique for theoretical research. "Experimental social psychology generalizes to the
real world through extending its theories, not its empirical data" (Turner, 1979, p.30). For Turner ecological importance, the degree to which a social psychological law has some practical purpose, is the key concept. Consequently, he stresses the distinctions that should be made between ecological importance and mundane realism (the extent to which the experimental simulation resembles a real world setting), and ecological representativeness (the empirical generalizability of population and environment samples). The present experiment may only have satisfied the demands of ecological importance. Furthermore, this experiment must be considered in the particular context of testing some specific hypotheses from a theory. The aim was not to justify the validity, generalizability or applicability of the theory, but to experimentally verify some of its predictions. Regarding internal validity, the design, the fact that all conditions were run simultaneously, exposing subjects to the very same procedure insured the integrity of the findings. Needless to say, this experiment is not perfect and does not in itself constitute a proof, but knowledge and science emerge out of the accumulation of evidence.

This demonstration could have been stronger. It would have benefited from a ninth condition, in which the matrices would be manipulated to create a Forced Loss situation. Subjects would have filled in matrices for which only outgroup favoritism was possible, the ingroup always getting less than the outgroup. Self-esteem should have been lower for this group
than for the Forced Discrimination condition in which the ingroup was favored.

Furthermore, the experiment unfortunately still leaves some doubt about the role of cognitive ambiguity. The discriminative conditions may have "made more sense" to the subjects than the non-discriminative conditions. This state of affairs may have consequently affected self-esteem. Future research using different paradigms will elucidate this point. One must note however that even if this was the case, it would not refute the Social Identity Theory hypothesis, but merely lead to the subsequent question: Why does discrimination "make more sense" than fairness under minimal group conditions?

More research is needed to investigate the role of self-esteem in intergroup relations. Future attempts should confront individual- versus group-mediated self-esteem. Turner's (1978, 1981) self versus other matrices could be used to compare the impact on self-esteem of ingroup favoritism and of direct self-favoritism. Locksley et al.'s (1980) experiment, in which subjects received personal feedback from the outgroup could be duplicated with the addition of self-esteem measures. Distribution of penalties rather than rewards could be explored in relation to self-esteem; the effect of similarity manipulations should be investigated as well. At the theoretical level, the impact of categorization alone and the role of threat to self-esteem should be elaborated on (Smith, 1983). Moreover, other variables will eventually have to be included in the theory, such as the role of culture and of
socialization in the ways self-esteem can be enhanced. Personality factors such as chronic levels of self-esteem may also be of interest. Some evidence already suggests differential patterns of social behavior between individuals of high and low self-esteem (Colman & Olver, 1968; Jones, 1973), although this has not yet been investigated in the context of social groups. Finally, the implications of a motivational hypothesis will have to be analyzed in terms of causality relationships and intentions: Is intergroup discrimination made in order to enhance self-esteem, as Turner (1982) suggests? No research has directly addressed this question of intentionality yet.

This experiment confirms that intergroup discrimination can contribute to individual self-esteem. Doing so, it supports Social Identity Theory, which offers an explanation for intergroup discrimination in the minimal group paradigm as well as in the "real world". It proposes that social categorization leads to social identification, then, to social comparison and social differentiation. Individuals define and evaluate themselves in terms of their group memberships. The way one perceives groups and his or her relation with them, determines how she or he will behave towards them and their members. Social discrimination and intergroup relations in general are consequently interpreted with respect to evaluative social comparison processes about social identities that influence individual self-esteem.
References


Appendix A

Tajfel's and Brewer's Matrices
Matrices

Tajfel's

These numbers are rewards for:

Member 31 of Group In

\[
\begin{pmatrix}
19 & 18 & 17 & 16 & 15 & 14 & 13 & 12 & 11 & 10 & 9 & 8 & 7 \\
1 & 3 & 5 & 7 & 9 & 11 & 13 & 15 & 17 & 19 & 21 & 23 & 25
\end{pmatrix}
\]

Member 42 of Group Out

The chosen column gives:

to member 31 of Group In: ___
to member 42 of Group Out: ___

Variations

Type 1

\[
\begin{pmatrix}
2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14
\end{pmatrix}
\]

In at top row FAV

Out at top row F, FAV

Type 2

\[
\begin{pmatrix}
7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 \\
25 & 23 & 21 & 19 & 17 & 15 & 13 & 11 & 9 & 7 & 5 & 3 & 1
\end{pmatrix}
\]

In at top row MJP

Out at top row MJP, FAV

Type 3

\[
\begin{pmatrix}
1 & 3 & 5 & 7 & 9 & 11 & 13 & 15 & 17 & 19 & 21 & 23 & 25 \\
7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19
\end{pmatrix}
\]

In at top row

Out at top row MJP, FAV

Type 4

\[
\begin{pmatrix}
13 & 12 & 11 & 10 & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13
\end{pmatrix}
\]

In at top row FAV

Out at top row FAV
Brewer's

These numbers are rewards for:

Member 31 of Group In 7 8
Member 42 of Group Out 9 4

The chosen column gives:

to member 31 of Group In : ___
to member 42 of Group Out: ___

Variations

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<td>4</td>
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<td>a</td>
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choices (a,a)=F (a,b)=MJP (b,a)=FAV (b,b)=MIP

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<td>b</td>
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choices (a,a)=MJP (a,b)=F (b,a)=MIP (b,b)=FAV

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choices (a,a)=F (a,b)=FAV (b,a)=MJP (b,b)=MIP

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</table>

choices (a,a)=FAV (a,b)=F (b,a)=MIP (b,b)=MJP
Appendix B

Consent Form, Slip of Paper, Anagram Sheet,
Title Page and Instructions for the Matrix Task
Consent Form

This research is concerned with decision-making. You will be asked to answer a few questions and to make decisions about other people anonymously. A complete description of the aims of this research will be given at the end of the session.

Your participation in this study is completely voluntary. You are free to withdraw from the experiment at any time. No personal identification of any kind will ever be required as we want to preserve complete anonymity. Access to your answers will be strictly limited to the main investigators, and no other use of the data will be made except for the aim of this research. Strict confidentiality is ensured.

I have read and understood the above, and I agree to participate in this experiment of my own free will.

(signed) ______________________

Thank you.
Slip of Paper

For Non-categorized Subjects

Your personal code number is: 16
Write your personal code number on the second page of your booklet please, and at the back of the anagram sheet. Make sure nobody sees it.
Fold up this slip of paper and put it in the envelope provided please.

For Categorized Subjects

For this study you will be divided into 2 groups, RED and BLUE:
This slip of paper you drew determines that you are in:
Group RED [X] Group BLUE [ ]
and your personal code number is: 16
(people in Group RED have 2-digit personal code numbers; people in Group Blue have 3-digit personal code numbers.)
Write your group membership and personal code number on the second page of your booklet please and at the back of the anagram sheet. Make sure nobody else sees them.
Fold up this slip of paper and put it in the envelope provided, please.
Anagrams

EBATL: _______________________________
FGIT: ______________________________
TRPAEC: ____________________________
EOTSVE: ____________________________
AODIR: ______________________________
NIWRT: ______________________________
GSRD: ______________________________
POTRS: ______________________________
NDCAE: ______________________________
IMSUC: ______________________________
LUOCD: ______________________________
CPNELI: ______________________________
LSOHC: ______________________________
NYACD: ______________________________
YSOT: ______________________________
LNIA: ______________________________
IRNA: ______________________________
EAMG: ______________________________
NLPTS: ______________________________
Title Page of the Booklet

For Non-categorized Subjects

Study on Decision Making

Your personal code number is: _______

This questionnaire is made up of two parts. You will be making different sorts of decisions.

- Do the pages in the order they come; do not go back and forth
- Read the instructions for each part carefully
- Do not talk; if you have any question raise your hand

For Categorized Subjects

Study on Decision Making

You belong to Group: _______

and your personal code number is: _______

This questionnaire is made up of two parts. You will be making different sorts of decisions.

- Do the pages in the order they come; do not go back and forth
- Read the instructions for each part carefully
- Do not talk; if you have any question raise your hand
Instructions for the Matrix Part

For Non-categorized Subjects

Part I (II)

This part is a point allocation task. You must decide how many points to allocate between two other participants.

On each page you will find an array of numbers which represent points. They will be displayed by pairs in columns. Each number of a pair represents the number of points you give to the person identified at the beginning of the line by their code number. You have to choose one, and only one, column per page. Sometimes you will choose among 13 columns, sometimes between only 2. You also have to write down the numbers of the column you chose. For example:

These numbers are rewards for:

Person *: 1 2 3 4 5 6 7 8 9 10 11 12 13
Person @: 14 15 16 17 18 19 20 21 22 23 24 25 26

The chosen column gives:

Person *: ________
Person @: ________

Like in this example you circle one column, and write down its details. It may seem a bit strange to do this, but remember that in everyday life people have often to make decisions with only minimal information. This task is an experimental analogue.

Note:-There are no right or wrong answers. We are interested in your spontaneous decisions.

-It is completely anonymous.

-Do all the pages, in the order they come (do not go back and forth)

-Choose one column per page, for each page.

-Write down the numbers of the chosen column beside the persons identified.
For Categorized Subjects

Part I (II)

This part is a point allocation task. You must decide how many points to allocate between two other participants, one from each group RED and BLUE.

On each page you will find an array of numbers which represent points. They will be displayed by pairs in columns. Each number of a pair represents the number of points you give to the person identified at the beginning of the row by their group membership and code number. You have to choose one, and only one, column per page. Sometimes you will choose among 13 columns, sometimes between only 2. You also have to write down the numbers of the column you chose. For example:

These numbers are rewards for:

member 100 of Group *: 1 2 3 4 5 6 7 8 9 10 11 12 13
member 101 of Group @: 14 15 16 17 18 19 20 21 22 23 24 25 26

The chosen column gives:

to member 100 of Group *: ___
to member 101 of Group @: ___

Like in this example you circle one column, and write down its details. It may seem a bit strange to do this, but remember that in everyday life people have often to make decisions with only minimal information. This task is an experimental analogue.

Note:
- There are no right or wrong answers. We are interested in your spontaneous decisions.
- It is completely anonymous.
- Do all the pages in the order they come. (do not go back and forth)
- Choose one column per page, for each page.
- Write down the numbers of the chosen column beside the person identified.
Appendix C

Oral Instructions
Oral Instructions

From now on please do not talk to each other and do not communicate in any way. Listen carefully to these instructions and explanations. This is a study on decision making. You will be asked to make all sorts of decisions throughout the session. But before starting, we will ask you to read and sign a consent form which we will be passed around. This is a formality the university requests. Please sign it and put it face down on your desk. We will collect them later. At the same time we will pass a sheet with anagrams and an envelope which will be used later on. So read the consent form which says: (...). Sign the consent form and put it face down on your desk.

A sheet with anagrams has also been passed to you. Anagrams are words with the letters all mixed up. The task is to reconstruct the word. While waiting during this session we would like you to try to do these anagrams. In fact it is just a favor we are asking you; it is to establish a baseline for another study. Try them whenever you have spare time, when we are passing material around, or at the end when you will be finished.

To guarantee your complete anonymity you will use a personal code number rather than your name throughout the session. It is very important that you keep your own code number secret. Do not tell it to anybody and make sure nobody sees it. You will draw your personal code number from a bag in a minute. Make sure to
take only one slip of paper. Read it, write the information down on the second page of the booklet you will be given in a few minutes, and at the back of the anagram sheet. Then, fold up the slip of paper so that other people cannot see it and put it in the envelope you were given a minute ago.

For the first two parts of this session we will use booklets like this one. Each booklet contains 2 sections. One is a questionnaire. Answer all questions spontaneously and genuinely. Follow the instructions carefully. The other section of the booklet is a point allocation task. You will have to make decisions about distributing points between different people. On each page you will find an array of numbers like this (...) with two people identified at the beginning of each row by their code number. You will have to choose one and only one column of numbers that represents the number of points you wish to give to the two different persons identified at the beginning of the row. You circle the column you choose and write down the numbers of the column chosen beside the persons identified. You cannot choose one number from the top row and one number from another column on the bottom row. You have to choose only one column. Sometimes you will choose among 13 columns, sometimes between only 2, depending on the page. You will always be deciding about people other than yourself. But at the end you will be told the total number of points that had been awarded to you personally by other people. This task may seem a little bit
unusual at first but do it anyway. You will get used to it rapidly.

Do not spend too much time on each page. Answer spontaneously and fairly quickly. You should be done in about 15 or 20 minutes. If you have any question raise your hand, do not talk. You should be able to answer everything easily with the instructions provided in the booklet. It is important to note that:
(a) it is confidential and anonymous, (b) there are no right or wrong answers, and, (c) we are interested in your spontaneous decisions. Answer everything on every page. Do the pages in the order they come, do not go back and forth. Read the instructions carefully. After part I in the booklet go straight on to part II.

When you finish, close your booklet, put it face down on your desk and wait for the other phase of the study. You may try the anagrams during that time.

Now we will pass the booklets, and will go around with a bag from which you will draw your slip of paper with personal information written on it. Make sure to take only one slip of paper. You can start on the anagrams, but as soon as you get your booklet start on it.

(...) 

O.K. Thank you very much. This is the end of the experimental part. We will pass a sheet to get your comments. Be genuine, it is anonymous. When you finish answering this sheet fold it and place it inside your booklet. After, we will discuss
the study.

Make sure to give us back all the material: consent form, anagram sheet, envelope and the booklet. Thank you.
Appendix D

Postexperimental Questionnaire
Postexperimental Questionnaire

What do you think this experiment is about? 

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

What do you think the hypothesis of this experiment is? 

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

What do you think you had to do? 

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Comments: 

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Thanks.
Appendix E
Forced Discrimination and Forced Fairness
Modified Matrices
### Forced Discrimination Matrices

#### Tajfel's format

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Forced Fairness Matrices

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Appendix F

Self-Esteem Questionnaire
Self-Esteem Questionnaire

Part I (II)

Now we want you to answer the following questions SPONTANEOUSLY according to how you feel right now.

Twenty Statement Test (TST)

A) There are ten blank lines below. Please write down on each line 10 adjectives that describe the way you feel about yourself right now. Write only one word per line. Just give 10 different answers as they occur to you. Do not worry about logics or importance. Answer as it was only to yourself, not to somebody else.

I am: 1) __________________________
2) __________________________
3) __________________________
4) __________________________
5) __________________________
6) __________________________
7) __________________________
8) __________________________
9) __________________________
10) __________________________
Rosenberg's Self-Esteem Scale (RSBRG)

B) Answer the following 10 questions according to how much you agree with the statement at this moment. Write in front of each statement the number, from 1 to 7, that corresponds to your level of agreement.

1...2...3...4...5...6...7

strongly do not strongly

disagree know agree

___ I feel that I am a person of worth, at least on an equal basis with others.

___ I feel that I have a number of good qualities.

___ All in all I am inclined to feel that I am a failure.

___ I am able to do things as well as most people.

___ I feel I do not have much to be proud of.

___ I take a positive attitude towards myself.

___ On the whole I am satisfied with myself.

___ I wish I could have more respect for myself.

___ I certainly feel useless at times.

___ At times I think I am no good at all.

Julian et al.'s semantic differential scales (JLNSD)

C) Now circle on each line the number at which you situate yourself right now on each of these attributes.

1) pleasant                        unpleasant

1 2 3 4 5 6 7
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Sherwood's Self-Concept Inventory (SHRWD)

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14) not likeable
1 2 3 4 5 6 7
likeable

15) cooperative
1 2 3 4 5 6 7
competitive

16) leader
1 2 3 4 5 6 7
follower

17) immoral
1 2 3 4 5 6 7
moral

18) frustrated
1 2 3 4 5 6 7
satisfied

19) intelligent
1 2 3 4 5 6 7
unintelligent

20) anxious
1 2 3 4 5 6 7
calm

21) useful
1 2 3 4 5 6 7
useless

22) self-confident
1 2 3 4 5 6 7
lack of self-c.

Hamilton's single global rating (SNGL)

D) Finally, circle on this scale from 1 to 7 your overall level of self-opinion or self-esteem, that is how high or low you presently judge your total picture of yourself?

low
1 2 3 4 5 6 7

high
Appendix G

Tajfel's pull score computations
**Tajfel's pull score computations**

Each type of Tajfel's matrices was presented twice, once with the ingroup on the top row and the outgroup on the bottom row (In/Out), once with the order inverted (Out/In). For each presentation the position of the chosen column was scored from 1 to 13, 1 being at the extreme left. Pull scores were obtained by the following operations on the subjects' choices (chc).

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- Pull of FAV on F = chc(Out/In) - chc(In/Out)
- Pull of F on FAV = chc(Out/In) + chc(In/Out) - 14

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- Pull of FAV on MJP = chc(In/Out) - chc(Out/In)
- Pull of MJP on FAV = 14 - chc(In/Out) - chc(Out/In)

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- Pull of MD on MJP+MIP = chc(In/Out) - chc(Out/In)
- Pull of MJP+MIP on MD = chc(Out/In) + chc(In/Out) - 14

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</tbody>
</table>

- Pull of FAV = chc(Out/In) - chc(In/Out)