

Ingroup Cooperation and the Social Exchange Heuristic

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In the sociological tradition, a group is not a mere aggregate of people. According to a sociology dictionary (Mitchell, 1968), "It is necessary to distinguish an aggregate or category of persons possessing some common features . . . from a number of persons between whom there are relationships based on interaction." According to this definition, people who sit in the waiting area of an airport, for example, hardly constitute a group. The fact that the individuals share certain characteristics such as sitting in the same place does not make them a group. What makes a group distinct from a simple aggregation is the existence of actual or imaginary interactions. Founders of social psychology shared this substantive view of the group. More recently, however, social psychologists, especially in the tradition of social cognition, define the group in terms of the members' perceived similarities. In this tradition, occupying the same salient social category is at the core of the group process. Thus, actual interactions occurring within and between groups are generated by the perception of the group members' similarity and homogeneity. Although this cognitive view of the group is not consistent with the traditional sociological view, the effect of social categories per se in the generation of intergroup and intragroup processes has been demonstrated empirically through a series of so-called minimal group experiments (Tajfel, Billig, Bundy, & Flament, 1971). The findings from these experiments support the view of the group shared by the majority of contemporary social psychologists.

Tajfel and his colleagues set up minimal groups consisting of people who shared only a social category. Specifically, they created minimal groups by

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dividing subjects into two groups based on a trivial criterion, such as the tendency to overestimate or underestimate the number of dots displayed on a screen or a preference for Klee's or Kandinsky's paintings. Participants were not allowed to interact or communicate with other participants. Yet, participants allocated more money to an in-group member than to an out-group member when given the option to do so. This finding suggested that categorization alone, no matter how trivial, was sufficient to generate in-group-favoring behavior in allocating rewards.

Based on this finding, Billig and Tajfel (1973) developed the social identity theory, according to which in-group favoritism, often observed in real as well as laboratory groups, is a product of a human motive to maintain a positive self-esteem. Because one's self-identity derives in part from one's social identity (that identity associated with a group or social category to which one belongs), one is motivated to establish positively valued distinctiveness for such a group or category. From this perspective, participants of the minimal group experiment treated in-group members more favorably than out-group members as a means of making their group positively distinct. Social identity theory gradually expanded its scope to include problems pertaining to intergroup relations and generated an impressive body of literature on such relations (for reviews of this literature see Hogg & Abrams, 1988; Messick & Mackie, 1989). At the same time, social-identity theorists claim that social category alone is sufficient to produce in-group favoritism has been subjected to serious criticisms. Evidence against the pure categorization effect on in-group favoritism in the minimal group situation had grown by the 1990s and was based on several grounds. First, some evidence supports the idea that demand characteristics of the experimental situation invoked the generic norm of cooperation among group members, not the motive to maintain a positive social identity (Berkowitz, 1994; Gerard & Hoyt, 1974). Second, other evidence highlights a residue of interdependence that exists among group members in the form of mutual or multilateral fate control (Gaertner & Insko, 2000; Jin and Yamagishi, 1997; Jin, Yamagishi, & Kiyonari, 1996; Karp, Jin, Yamagishi, & Shinotsuka, 1993; Kerr & Stone, 1995; Kiyonari, Tanida, & Yamagishi, 2000; Ng, 1981; Rabbie & Lodewijkx, 1994; Rabbie, Schot, & Visser, 1989; Yamagishi, Jin, & Kiyonari, 1999; Yamagishi & Kiyonari, 2000).

The evidence presented by the studies cited above suggests that the minimal group situation is less minimal than was originally thought. It is true that no behavioral control (Thibaut & Kelley, 1959) exists in the minimal group. One cannot affect another member's behavior in the minimal group. One allocates rewards between an in-group member and an out-group member, and the choice of allocation has no utilitarian consequence to the allocator. Tajfel and his colleagues interpreted the lack of this behavioral control as indication that there was no interdependence of interest. However, this lack of behavioral control does not mean that members of a

minimal group have no control over other members. In fact, rewards that participants receive in minimal group experiments depend on other participants' actions. As they allocate money, others, at the same time, allocate money to them. The studies cited above have repeatedly demonstrated the critical importance of this implicit interdependence of interests in the form of mutual (or multilateral) fate control (Thibaut & Kelley, 1959) in the minimal group situation. Rabbie et al. (1989), for example, demonstrated this by letting out-group members determine rewards for the participant while the participant allocated rewards to an in-group and an out-group member. Thus the allocator's own rewards depended on the allocation choice made by out-group members. In this condition, out-group rather than in-group favoritism emerged. Karp et al. (1993) removed the mutuality from the fate control by paying the participant a fixed amount. Participants in the experiment thus allocated rewards to an in-group member and an out-group member while their own rewards did not depend on other participants' allocation decisions. In this experiment, no in-group favoritism occurred. Furthermore, Jin et al. (1996), reported (in English) in Yamagishi et al. (1999), showed that only those who expected extra favors from other in-group members exhibited in-group favoritism.

Participants in these minimal group experiments did not give unconditional preferential treatment to in-group members. Rather, they treated other in-group members favorably only when they expected similar favorable treatment in return. In-group favoritism thus has been shown not to be a matter of taste for, or liking of, in-group members per se. If that was the case, participants should have treated in-group members favorably even when they did not expect similar favorable treatment from them. On the basis of this and other experimental evidence, Yamagishi and his colleagues (Karp et al., 1993; Jin et al., 1996; Jin & Yamagishi, 1997; Yamagishi & Kiyonari, 2000; Yamagishi et al., 1999) proposed that in-group favoritism in minimal group experiments is based on the expectation that preferential treatment will be reciprocated by in-group members. Brewer (1999) advances a similar argument, calling the expectation of in-group reciprocity depersonalized trust – trust that is extended to any member of the in-group whether personally related or not but limited to in-group members.

SOCIAL CATEGORIZATION EFFECT IN THE PRISONER'S DILEMMA CONTEXT

The minimal group scheme has been applied in the prisoner's dilemma (PD) context in addition to the original reward allocation context. An implication of the in-group favoritism observed in the original minimal group experiment would be that the level of cooperation is higher with an in-group member than with an out-group member in the PD context.

This prediction of in-group cooperation (i.e., more cooperation with an in-group member than with an out-group member) has been observed repeatedly in the PD experiments that used the minimal group scheme to create the in-group/out-group distinction (Brewer & Kramer, 1986; De Cremer & van Vugt, 1999; Jin & Yamagishi, 1997; Kollock, 1997; Kramer, 1991; Kramer & Brewer, 1984; Kramer & Goldman, 1995; Kramer, Pommerenke, & Newton, 1993; van Vugt & de Cremer, 1999; Wit & Wilke, 1992).

Participants who play a one-shot PD game with an in-group member or an out-group member cooperate more with the former than with the latter. The standard explanation of this in-group cooperation effect in PD experiments is based on social-identity theory: Cooperation toward in-group members is believed to be greater because the player and the partner belong to the same category. This conclusion, however, was challenged seriously by Jin and Yamagishi (1997; reported in English as Experiment 6 by Yamagishi et al., 1999). They manipulated the partner's knowledge about the player's membership independently of the player's knowledge about the partner's membership. Thus, two in-group conditions and two out-group conditions existed. In each of the two in-group conditions, the player who was a member of the Klee group was informed that the partner was also a member of the Klee group. In addition, the player in the in-group/knowledge condition was informed that the partner knew that the two shared membership in the Klee group. In the in-group/no-knowledge condition, however, the player was told that the partner was not informed of the player's group membership. Similar manipulation was used for the two out-group conditions: out-group/knowledge and out-group/no-knowledge. Results of this experiment demonstrated that the mere fact that the player and the partner belonged to the same group was not sufficient to produce in-group cooperation. Unless the player was aware that the partner knew they shared group membership, the partner's group membership had no effect on the level of his or her cooperation. In short, for in-group cooperation in the one-shot PD game to occur, group membership has to be common knowledge, whereby both participants know their memberships and know that both know their memberships. This finding again indicates that expectations of favorable treatment from in-group members are critical for the emergence of in-group favoritism in the minimal group situation.

Yamagishi and his colleagues (Jin & Yamagishi, 1997; Kiyonari et al., 2000; Yamagishi & Kiyonari, 2000; Yamagishi et al., 1999) explain the effect of knowledge commonality on in-group cooperation in their PD experiments in terms of the operation of what they call social-exchange heuristic and group heuristic. The social-exchange heuristic is triggered by the definition of the situation as one involving social exchange, in which each member's welfare depends upon the other member's behavior. The salience

of the group in the minimal group experimental situation triggers the social-exchange heuristic. Once triggered, the heuristic subjectively transforms the perception of the situation from an original PD situation into an Assurance Game (or AG) situation, in which cooperation produces a more desirable outcome than does defection, insofar as the partner cooperates as well.¹ Activation of the social-exchange heuristic causes PD players to expect that their partners are also seeking mutual cooperation rather than hoping to unilaterally exploit their goodwill. The group, from this perspective, plays a role in the production of in-group favoritism or in-group cooperation, not because it provides the source of social identity but because it is perceived as the container of a system of generalized exchanges. Yomagishi and his colleagues view the intuitive understanding of the group as a container of a generalized exchange system. *The group heuristic makes people perceive the group as an arena in which people engage in generalized exchanges.* When a system of generalized exchanges exists, people unilaterally contribute to other members of the system while expecting to be treated in a similar manner by those members of the system. The favors people give to others are a kind of fee to purchase membership to enter the system. They expect to receive favors from others in the system insofar as they are admitted to the system as dues-paying members.

The operation of the social-exchange heuristic may be easier to understand in the context of Pruitt and Kimmel's (1977) goal/expectation theory of cooperation. According to Pruitt and Kimmel, the emergence of cooperation in a PD requires that the player gives up the goal of exploiting the partner and adopts attainment of mutual cooperation as a new goal. The adoption of this new goal, however, is only half of the story. The player who adopts such a goal can be seen as one who has transformed the original PD into an AG, such that he or she prefers mutual cooperation to unilateral exploitation of a cooperative partner. This player who is now subjectively playing an AG instead of a PD would cooperate when he or she expects that the partner would also cooperate. However, he or she would not dare to cooperate when he or she expects that the partner would not cooperate. Hence the second condition for cooperation in a PD is the

¹ Experimental evidence abounds that a substantial proportion of PD players are in fact playing an Assurance Game rather than a PD. In responses to post-experimental questions, participants of PD experiments indicate, on average, that the outcome of mutual cooperation is more desirable than that of unilaterally exploiting the cooperating partner (Hayashi, Ostrom, Walker, & Yamagishi, 1999; Kollock, 1997; Watabe, Terai, Hayashi, & Yamagishi, 1996). Furthermore, the majority of second players (61 percent of American, 75 percent of Japanese, and 73 percent of Korean participants) in sequential PD experiments cooperate when they are informed that the first player has cooperated, whereas the overwhelming majority of them defect when the first player has defected (Cho & Choi, 1999; Hayashi et al., 1999; Watabe et al., 1996).

expectation by the player that the partner would also cooperate. The name, goal/expectation theory, comes from the two conditions – adoption of the new goal (of mutual cooperation) and the expectation that the partner would also cooperate. The social-exchange heuristic provides both these conditions simultaneously.

The argument by Yamagishi and his colleagues summarized above implies that in-group cooperation (a higher level of cooperation with an in-group partner than with an out-group partner) occurs because people play a PD as an AG when the partner is an in-group member and because people expect that their partner is also playing the game as an AG and is willing to reciprocate the player's willingness to cooperate. The salience of the fact that the player and the partner share a same social category triggers the social-exchange heuristic and prompts the player to perceive the situation as one involving a system of generalized exchanges. The commonality of membership knowledge thus plays a critical role in the production of in-group cooperation, since a player expects that the partner will behave in a cooperative manner toward the player if and only if the partner knows that the player is an in-group member. If the partner does not know that the player belongs to the same group (and if the player knows this), the player has no ground to expect that the partner would behave cooperatively toward the player. The critical role of the expectation of the partner's behavior in the production of in-group cooperation was confirmed in the players' responses to the post-experimental questionnaire. In the above experiments, only the players who expected a high level of cooperation from in-group members were shown to practice in-group cooperation, and those who did not expect a higher level of cooperation from in-group than from outgroup members were shown to practice no in-group cooperation. In short, previous findings from PD studies using the minimal group scheme indicate that players cooperate more with an in-group partner than with an out-group partner because they expect that the in-group partner will treat them preferentially. Intrinsic tastes for, or liking of, in-group members were not found to be the cause of in-group cooperation. If intrinsic tastes for, or liking of, in-group members were the cause, players should have cooperated more with an in-group partner than with an out-group partner regardless of the commonality of membership knowledge.

SHARED MEMBERSHIP AS A NECESSARY CONDITION FOR COOPERATION

The series of experimental findings presented above clearly refute the role of shared social category as a sufficient condition for in-group cooperation. Sharing a social category has been shown to have no effect on the level of cooperation unless shared membership is common knowledge. This, however, does not imply that sharing a social category plays no role. We argue,

based on the social exchange heuristic hypothesis advanced by Yamagishi and his colleagues, that sharing a social category is a necessary, though not a sufficient, condition for boosting cooperation in the minimal-group situation. While the experimental findings presented earlier demonstrated that expectation of cooperation from an in-group partner rather than a shared category per se is critical for in-group cooperation in the minimal group situation, we also claim that expectation of cooperation per se is not sufficient for boosting cooperation in the minimal group situation. The social-exchange heuristic hypothesis demands both the goal component and the expectation component of goal/expectation theory (Pruitt & Kimmel, 1977). The shared category triggers the social-exchange heuristic, and, once it is triggered, expectation of the partner's cooperation becomes critical. Without the shared category membership that triggers the heuristic transforming a PD into an AG, expectation of cooperation from the partner should have no effect on the player's level of cooperation. We predict that neither shared membership without expectation of cooperation nor expectation of cooperation without shared membership is sufficient for boosting cooperation. We conducted an experiment to test the following hypothesis, which is derived from the previous discussion.

According to the social-exchange-heuristic account of in-group favoritism, people give favorable treatment to in-group members because the social-exchange heuristic is triggered by the perception of a shared-group category. Sharing a same-group category is thus a necessary condition for in-group favoritism or in-group cooperation to occur in minimal groups. Once triggered, the social-exchange heuristic transforms a PD into an AG. Then, expectation becomes another necessary condition. One cannot expect that the partner will treat her as a member of a same group when the partner does not know that she is in the same group. Thus, enhanced cooperation with in-group members or in-group cooperation is expected to occur when and only when the two necessary conditions – shared-group category and commonality of knowledge of the sharedness of the group category – exist. Either condition by itself will not enhance cooperation toward in-group members.

EXPERIMENT

A total of seventy-three (forty-eight male and twenty-five female) undergraduates from Hokkaido University in Japan participated in groups of about ten participants at a time. They were first divided into two groups, the Klee group and the Kandinsky group, based on their reported preferences for Klee's or Kandinsky's paintings. Then, they played a one-shot PD game four times without feedback, each time with a new partner. The partner's membership (in-group versus unknown) and the information

about the player's membership provided to the partner (in-group versus unknown) were used as within-subject manipulations.

Creation of Minimal Groups

After being informed as to how anonymity is secured, each participant drew from a box an ID card on which a number was written. Participants were asked to identify themselves by the ID number throughout the experiment so that their personal identity would be completely unknown to the experimenter. They were reminded not to show their ID to the other participants or to the experimenter. After the assignment of the ID, participants sat in a classroom facing the front. When all of the participants arrived, they were told that the experiment required two groups of people, and thus they would be divided into two groups based on their picture preferences. The participants then indicated their preferences for one of two pictures projected on a front screen, one painted by Klee and the other by Kandinsky. This task was repeated nine times, each with a new pair of pictures. The sheet reporting the participants' preferences for Klee's or Kandinsky's pictures (participants were not told the painters' names) was then collected and handed to an assistant experimenter who waited outside the classroom.

Partner's Group Identity

In a few minutes, an assistant experimenter knocked on the door and handed a bundle of envelopes to the experimenter. An ID card was clipped on each envelope. The experimenter placed the envelopes side by side on tables in the first row, in such a way that he could not see the ID letters. Then he announced that the experiment was starting and asked the participants to come forward, find the envelope with their own ID attached, and take it. Each envelope contained an instruction booklet. The first page informed the participant that he or she belonged to the Klee group (the people who preferred Klee to Kandinsky) or to the Kandinsky group. The assignment was based on the participant's actual preferences in the picture preference task. Participants were not informed of the other participants' groups. After the assignment to either the Klee or the Kandinsky group, participants were informed that they would conduct several rounds of transactions, each time with a different partner. They were told the following: In each transaction round, it will first be determined from which group their transaction partner² is drawn. In some rounds their partner will be a member of their group, and in other rounds their partner will be a member of the other group. In some rounds the experimenter will inform them from which

² A more neutral term, *aite*, which translates as "the other," was used to refer to the "partner."

group the partner is drawn. In other rounds, the experimenter will not inform them of the group membership of their partner. Similarly, their partner is also instructed about the participant's membership. In some rounds, the partner will not be informed of the membership of the participant. From the participant's viewpoint, the transaction rounds constituted repeated one-shot PD games, not iterated PD games between the same partners with feedback. They did not expect to deal exclusively with members of one group. The outcomes of the games were not disclosed to the participants until they had completed the post-experimental questionnaire.

The Participant's Membership in the Eyes of the Partner

Participants were told in the instructions that the other participants faced the same situation. This means that sometimes the partner would know the participant's membership and other times the partner would not be informed of the participant's membership. The participant's identity in the eyes of the partner was crossed with the partner identity in the eyes of the participant, resulting in the following four cells:

In-Group/In-group Condition: The partner is informed that his or her partner is a member of the same group, and that the partner knows that (i.e., that the partner thinks that the participant is in the same group).

In-Group/Unknown Condition: The participant is informed that the partner is a member of the same group. The participant is also told that the partner is not informed whether the participant is in the same group.

Unknown/In-Group Condition: The participant is not informed whether the partner is in the same group. The participant is, however, informed that his or her partner is told that the participant is in the same group.³

Unknown/Unknown Condition (control condition): The participant is not informed whether the partner is in the same group. The participant is further informed that the partner is not told whether the participant is in the same group.

Each participant experienced all of the four conditions, while the order of the four conditions was randomized for each participant.

Prisoner's Dilemma

After the initial instructions, the nature of transactions – the PD game – was explained, and the participants were asked four questions testing their understanding of the instructions. They were asked to wait until the experimenter came to check their answers. The experimenter checked the

³ Exact instruction is: "We cannot inform you to which group the other person in this transaction belongs. However, the other person is being informed that you belong to the same group."

participants' answers to the questions and gave further explanations when errors were found.

After all of the errors had been corrected and further explanations provided when necessary, the participants were asked to turn to the last page of the instruction booklet. In these instructions, participants were told that they would engage in several rounds of transactions, but the exact number of transactions was not specified. In each transaction, they received two hundred yen (about two dollars) as an endowment. The transaction would take place between two participants. The task of each participant was to decide how much of the two hundred yen (any amount between zero and two hundred) to give to the partner. The experimenter doubled the money provided by the participant. Thus the partner received twice the amount provided by the participant. This situation was symmetrical: The participant also received twice the money provided by the partner.⁴ Although the partner's group identity was revealed to the participant in some transactions, and the participant knew that his or her own group identity might be revealed to the partner, their personal identities were kept anonymous.

Flow of the Transactions

On the last page of the instruction booklet, the participant was informed of the group identity of the partner in the first round of transaction and the knowledge the partner had about the participant's group identity. As the participants finished reading this page, the experimenter asked them to pull the decision sheet from the envelope and write down how much they would give to their partner. The partner's group identity and the knowledge information were indicated again on the decision sheet, together with the participant's own group identity. Participants then placed the completed decision sheet in the envelope with the ID card originally clipped to the envelope. They then filled out a short, post-decisional questionnaire and placed it in the same envelope. The experimenter collected the envelopes and handed them to an assistant experimenter waiting outside the room. This procedure assured the anonymity of the participants' decisions to the experimenter. The experimenter had no access to participants' decisions and did not know their IDs. The assistant experimenter

⁴ This should not be confused with the reward allocation game used in the original-minimal-group experiments in which the allocator had no right to the allocated money. In the current game, each participant earned two hundred yen if neither gave any, four hundred yen if each gave the full amount of two hundred yen to the partner, nothing if one participant gave two hundred yen and the partner gave nothing, and six hundred yen if one participant gave nothing and the partner gave two hundred yen. These figures constitute a PD matrix.

had access to their decisions but could identify them only by their IDs and not by appearance or name.

After a brief waiting period, the assistant knocked on the door again and handed the experimenter another bundle of envelopes. The new sets of envelopes were placed on the front table as before, and the participants came to pick up their envelopes. Then, the participants were asked to open the second envelope and to remove the instructions and the decision sheet for the second transaction. These instructions indicated the group membership of the participant's new partner and the knowledge the partner had about the participant's group membership. Participants wrote the amount they decided to give to the partner on the decision sheet and placed the second set of instructions, the completed decision sheet, and the post-decisional questionnaire back into the same envelope. The experimenter collected the envelopes and handed them to the assistant experimenter waiting outside the room.

After the above process was repeated four times, the experimenter announced that the experiment was over, and asked participants to open the fifth envelope and answer the post-experimental questionnaire while the assistant experimenter was calculating the results of the transactions. After a few minutes, the assistant experimenter knocked on the door and handed the experimenter a bundle of small envelopes. Each envelope contained the payment to the participant whose ID was indicated on one side. The experimenter placed the envelopes side by side on the table. Participants picked up the envelope marked with their ID and left the room. The whole process including the picture preference task and the post-experimental questionnaire took one to one and one half hours.

RESULTS

Manipulation Check

To examine whether the group-identity manipulation had the intended effect, we asked participants in the post-experimental questionnaire to report the degree to which they identified themselves with their own group and with the other group. In one item, participants were asked how strongly they felt that they belonged to the group and in another item they were asked how strongly they felt that they were sharing commonality with members of the group. The strength of participants' identification with the other group (the average of the responses to the two questions, each on a seven-point scale) was subtracted from the strength of his or her identification with his or her own group to produce the in-group identification index. The average identification index score, $m = 1.10$ ($sd = 1.12$), was significantly greater than zero, $t(72) = 8.43$, $p < .0001$. Clearly,

TABLE 12.1. Mean cooperation and mean expectation in each condition

Partner's Identity in the Eyes of the Participant	Participant's Identity in the Eyes of the Partner	Cooperation Level	Expectation of Partner's Cooperation
In-group	In-group	81.2 (61.2)	76.0 (47.4)
In-group	Unknown	51.6 (53.0)	56.0 (43.4)
Unknown	In-group	57.6 (50.6)	75.4 (38.6)
Unknown	Unknown	56.4 (55.8)	53.8 (38.2)

Standard deviation within parentheses.

participants identified with their own group more strongly than with the other group.

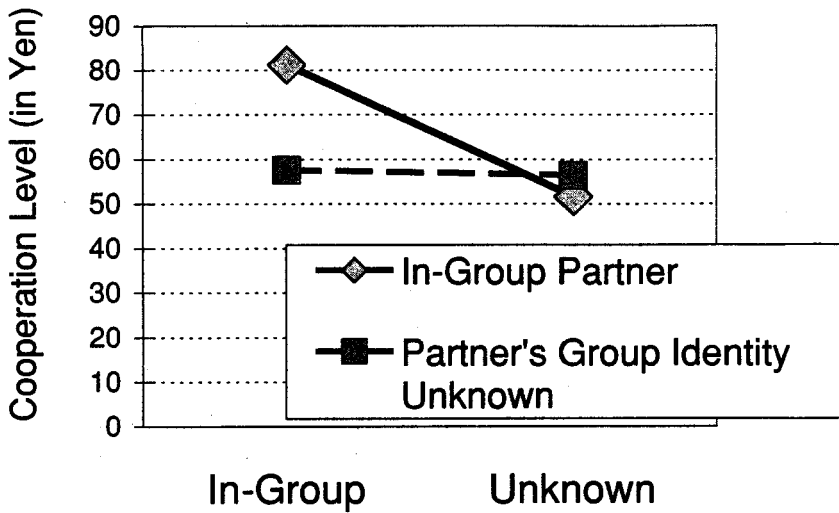
Expectation of the Partner's Cooperation

We manipulated the participant's expectation of the partner's cooperation by manipulating the knowledge the partner had about the participant's group membership. To examine if the knowledge manipulation had the intended effect on the expectation, we asked participants immediately after each decision how much of the endowment of two hundred yen the partner would have contributed. The responses to this question shown in Table 12.1 clearly indicate that the knowledge manipulation produced the intended effect on the participant's expectation of the partner's cooperation.

The partner's group identity did not have any effect on the participant's expectation, $F(1, 72) = .15, ns.$; participants did not expect those who share the same social category to be more cooperative than those who belonged to the other group. On the other hand, the information given to the participant regarding his or her partner's knowledge of the participant's group membership had a strong effect on the expectation, $F(1, 72) = 25.73, p < .0001$. This strong main effect of the partner's knowledge indicates that participants had a "generic norm of cooperation among group members" (Berkowitz, 1994; Gerard & Hoyt, 1974; Tajfel et al., 1971) or depersonalized trust toward group members (Brewer, 1999). Participants expected that people would treat in-group members more favorably than out-group members. The partner's group by knowledge interaction effect was not significant, $F(1, 72) = .05, ns$. The manipulation thus clearly succeeded in altering the participant's expectation of the partner's cooperation.

Cooperation Level

The average cooperation level (i.e., the amount given to the partner out of the endowment of two hundred yen) in each condition is shown in



Partner's Knowledge of the Participant's Membership

FIGURE 12.1. Average cooperation levels.

Table 12.1 and Figure 12.1. The figure clearly shows that the cooperation level is higher in the in-group/in-group condition than in the other three conditions. A repeated measure analysis of variance indicates a significant interaction effect as predicted by the social-exchange-heuristic hypothesis, $F(1, 72) = 12.51, p < .001$. The main effect of the partner's knowledge of the participant's membership was also significant, $F(1, 72) = 16.64, p < .0001$. The main effect of the partner's membership was not significant, $F(1, 72) = 3.92, ns$. We also compared each of the cell means with the mean of the control condition (i.e., unknown/unknown condition) using the Dunnett test. The results of this test indicated that only the mean cooperation level in the in-group/in-group condition was significantly higher than the mean of the control condition. The mean cooperation levels in the other two conditions – in-group/unknown and unknown/in-group conditions – were not significantly different from the mean of the control condition. These results clearly support the hypothesis that both of the two conditions are necessary for in-group cooperation to occur in minimal groups.

DISCUSSION

The message conveyed by the results presented above is clear. Favorable treatment of in-group members in the minimal-group situation, either in the form of in-group favoritism in reward allocation or in-group cooperation in the prisoner's dilemma game, is fundamentally a matter of interdependence. As discussed in the introduction, social-identity theorists overlooked the existence of interdependence of interest in minimal groups.

After all, minimal groups were not so minimal as social-identity theorists believed them to be (Karp et al., 1993). Why does expectation of the partner's cooperation matter at all in a one-shot PD where a player's choice cannot affect the partner's choice? The answer to this question is that many PD players subjectively transform a PD into an Assurance Game. We argue that this transformation is facilitated by the perception of the situation as an intra-group exchange situation. For those who are playing a PD as such, expectation of the partner's choice should have no effect. Such expectation should have an effect only for those who are playing an Assurance Game, not a Prisoner's Dilemma. The second message of the above experimental results is that in-group cooperation is a product of the group heuristic and the social-exchange heuristic. The perception of the situation as a group situation triggers the group heuristic, and makes people expect a system of generalized exchanges. The expectation of generalized exchanges triggers the social-exchange heuristic and makes people behave reciprocally. In this sense, sharing the same social category plays a critical role in the production of in-group cooperation, since it affects the perception of the nature of interdependence.

How the perception of the nature of interdependence was affected by shared membership was revealed in participants' responses to the post-decisional questions. After each decision, participants were asked how strongly they felt that the partner would give more if they gave more to the partner. This sense of interdependency was more strongly felt in the in-group/in-group condition than in the unknown/in-group condition (3.92 vs. 3.19, $t(72) = 2.90, p < .01$). As shown earlier by the significant main effect of the partner's knowledge on the expectation of partner's cooperation, the participant clearly expected a high level of cooperation from a partner of unknown group identity who believed the participant to be an in-group member. However, the result shown above indicates that this expectation does not mean that the participant had the sense of interdependency with the partner. The participant did not feel the sense of interdependency with the partner unless the partner was an in-group member. These findings indicate that people's perception of the nature of interdependence is the key to the emergence of in-group cooperation and in-group favoritism in the minimal group situation.

It is important to note here that the nature of interdependence in a one-shot PD involves generalized, rather than direct exchange. As in the case of reward-allocations in the minimal group experiment, each player cannot affect the other player's behavior since the latter makes a decision without knowing what the former has done. In this sense, the one-shot PD does not involve direct exchanges. Despite the lack of direct contingency, the two players are still mutually dependent for their rewards, and each has a "fate control" (Thibaut & Kelley, 1959) over the other. In generalized exchanges, receiving is not directly contingent upon giving. Yet, whether one receives

a benefit or not depends on other people favoring the system members. A generalized exchange system exists and functions only insofar as people pay dues in the form of giving favors to system members. In other words, a generalized exchange system is characterized by mutual or multilateral fate control and the lack of behavioral control.⁵

From this perspective, the group as a social category is a vacant container or vessel in itself, an empty vessel to pour generalized exchanges into. The group as a social category plays important roles in social and group life only as a container of the generalized exchange system (or as an indicator of the generalized exchange system). What matters is what is inside the vessel, not the vessel itself. Researchers who see the vessel and not what is inside it attribute the effect of social categorization to the vessel itself, not to what is inside it. The results of the current experiments and of experiments by Rabbie and his colleagues and by Yamagishi and his colleagues demonstrate that when people see nothing in the vessel (category), it does not play any role in social and group life. Social categories, when they are somehow made salient, automatically invoke the implicit expectation of a system of generalized exchanges and thus produce the seemingly pure categorization effect.

Finally, we would like to discuss three issues concerning implications of the present study. The first issue concerns the generalizability of the findings from minimal groups to more realistic groups. The results of the current experiment may hold only for the minimal group situation and may not be generalizable to more realistic groups. However, the lack of this kind of generalizability does not compromise the significance of this research. After all, the original minimal-group experiment had a strong impact since it demonstrated the existence of in-group favoritism even in the minimal-group situation. The significance of the current research lies in its success in demonstrating that expectation of generalized reciprocity, not category-based social identity per se, is responsible for in-group favoritism even in the minimal group situation. Whether or not nontrivial, realistic social categories produce in-group favoritism is not an issue here.

The second issue concerns the distinction between in-group evaluation or in-group boasting (Yamagishi et al., 1999), on the one hand, and in-group favoritism, on the other. The former does not involve any tangible rewards while the latter does. We should be reminded that the original minimal group experiment had a strong impact on social psychologists since it

⁵ This characterization of the PD as generalized, not direct, exchange does not apply to iterated games. When the game is repeated, strategic actions such as the use of the tit-for-tat strategy are possible and the two players acquire the ability to affect the other's behavior. Thus, iterated PD games involve direct exchanges whereas one-shot PD games involve generalized exchanges.

involved allocation of tangible rewards, implying that mere categorization produces discriminative behavior. However, in-group evaluation or boasting, e.g., feeling good about the victory of one's national Olympic team, is a long way from in-group favoritism as behavior, i.e., acting in a discriminatory manner toward people in other nations. The most important question awaiting investigation by social psychologists is: How long is the distance between the feelings of group-related pride and intergroup behavior. Simply equating in-group favoritism with in-group evaluation provides no help in this endeavor. The current research suggests that the distance between the two is fairly substantial and what lies on the way is bounded generalized reciprocity and the social-exchange heuristic.

The last issue is the conceptual relationship between the idea of the social category as a container of generalized exchanges, on the one hand, and the conception of group entitativity (Campbell, 1958) on the other. Gaertner and Schopler (1998) argue that groups are perceived as an entity (assume group entitativity) to the degree that group members are interconnected, rather than to the degree that group members are similar to each other.⁶ If we adopt this dynamic-entity perspective rather than the category perspective to seeing in-group entitativity, as do Gaertner and Schopler (1998), the notion of group entitativity is indeed very close to our notion of the group as a container of generalized exchanges. Both claim that the group is closely related to substantial interaction processes within it, and that identification with the group plays significant roles in social and group life, because of the implicitly assumed interaction processes in it. Based on our experimental findings, we argue that the core of the implicitly assumed interaction processes is generalized reciprocity.

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⁶ Similarly, Hamilton, Sherman, and Lickel (1998) argue that groups are perceived as more "groupy" when the structural relations among their members are clearly evident.

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