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Social Decision Heuristics, Role Schemas, and the Consumption of Shared Resources

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Abstract

A series of experiments were performed to investigate the use of social decision heuristics in a multi-person sequential resource sharing task. Past research has suggested that members of small groups sharing a common resource may employ simplified decision rules such as "share equally" to allocate the available resource. Studies 1 and 2 were designed to test the generality of this conclusion and explore its sensitivity to various methodological changes in the experimental situation. The results provided strong support for the prominence of the "share equally" heuristic with approximately 70-75% of the subjects requesting equal shares of the common resource. Study 3 examined some conditions under which an equal division heuristic might be violated. Specifically, we investigated the extent to which arbitrary role assignments within the group may influence subjects' choice behavior. The results of Study 3 indicated that subjects assigned the role of "supervisor" tended to violate the equality rule and take significantly more from the common pool than did subjects assigned the roles of either "leader" or "guide". This role schema effect suggests that future research on decision making in resource dilemmas may need to explore the content of group members' implicit knowledge structures about resource sharing situations and their implications for choice.

Social Decision Heuristics, Role Schemas, and the Consumption of Shared Resources

Whenever a group of individuals share access to a common pool resource, the potential exists for suboptimal collective outcomes as each member seeks to gain maximum benefit from the limited resource (Hardin, 1968). Situations such as the commons dilemma raise the issue of which allocation rules are to be used to guide members' consumption decisions. In the area of distributive justice, a variety of resource allocation rules have been proposed such as equity, equality, or need (Deutsch, 1975; Lerner, 1974; Leventhal, 1976). Much of the empirical research on this topic, however, has been conducted within the context of dyadic or triadic exchange relationships. Relatively little experimental work in social psychology has _directly_ examined the allocation rules used by members of larger groups confronted with resource dilemmas (Messick & Brewer, 1983).

One exception to this general research trend is a recent study by Rutte, Wilke, and Messick (1987). These researchers presented subjects with a sequential decision-making task in which six group members could request money (Dutch guilders) from a common resource pool, one member at a time. Subjects were told that they could request up to 10 guilders each from a common pool that would contain an amount between 5 and 55 guilders ($2.50-$27.50 U.S. dollar equivalent). If the sum of the members' requests from the pool was less than or equal to the actual amount available, then each member could keep the money requested. However, if the sum exceeded the total pool size, then no members would receive any money. No communication among subjects was allowed. Preprogrammed feedback led each subject to believe that he or she was the fifth of six members to withdraw money from the common pool. Half of the subjects were subsequently informed that the pool contained 25 guilders (scarcity condition), while the remaining half were told that their pool contained 35 guilders (abundance condition). All subjects received false feedback indicating that the first four group members had taken a total of 20 guilders. Thus, scarcity condition subjects were left with 5 guilders in the pool and abundance condition subjects had 15 guilders left to divide between themselves and the sixth group member.

This resource dilemma game is amenable to game theoretic analysis to determine optimal strategies for subjects' choice behavior. If the subject assumes that the sixth person is rational like him or herself, then the choice strategy that will maximize individual outcomes is to take all that is left minus one guilder for the last group member. Therefore, game theory would predict that subjects should request 4 guilders in the scarcity condition and 10 guilders (the maximum allowed) in the abundance condition. This strategy would leave the sixth person with either 1 guilder (scarcity condition) or 5 guilders (abundance condition). If the sixth person is also intent on maximizing individual payoffs, then he or she should accept the 1 guilder in preference to 0 guilders in the event that he or she requests an amount greater than the amount left. Likewise, 5 guilders should clearly be accepted in preference to receiving nothing.

Rutte et al. (1987) found, however, that only 14% of their subjects followed this game theoretic strategy. The data showed that subjects tended to either take half of the amount left or to take amounts that were systematically related to the amounts taken by other group members. In attempting to explain their results, Rutte et al. (1987) introduced the notion of a social decision heuristic. They argued that in many resource sharing situations people adopt simple rules of thumb (e.g., "first come, first served", "women and children first", "you cut, I choose", etc.) for allocating a scarce resource to group members. According to Rutte et al. (1987), one prominent rule often invoked is the "share equally" heuristic. When a common, valued resource must be divided, the decision rule that most easily comes to mind is to allocate the resource in equal shares to group members. Rutte et al. (1987) maintain that a social decision heuristic such as "share equally" is appealing because it serves a number of useful functions for the decision maker. First, it provides a clear guide for action or choice, thereby reducing uncertainty. Second, it allows one to generate expectations about what other group members are likely to choose. And finally, the "share equally" rule establishes an unambiguous standard for evaluating the fairness of others' behavior.

While the explanation provided by Rutte et al. (1987) appears to be a compelling description of their subjects' behavior, it must be noted that this interpretation was post-hoc and therefore must be viewed with caution. There is, however, other literature in the area of conflict and decision-making that supports the notion of a "share equally" heuristic. In some sense, the ubiquity of this decision rule in everyday life may be explained in terms of Schelling's (1960) concept of a prominent focal point as a solution to pure coordination games without communication. Thus, equal division may derive some of its appeal because it is well understood, easily applied in most situations, and generally promotes positive social relations among group members (Deutsch, 1975). A variety of past empirical studies from social psychology and economics also document that people use equal division in numerous social decision-making tasks (e.g., Guth, Schmittberger, & Schwarze, 1982; Harris & Joyce, 1980; Hoffman & Spitzer, 1982; Kahneman, Knetsch, & Thaler, 1986; Reis & Gruzen, 1976).

The results of Harris and Joyce's (1980) study are particularly striking. They found that subjects who were asked to allocate payoffs to a group of others (each of whom had made different level of contributions to a group effort) tended to distribute the money equally among group members. In this case, final outcomes among members were equal. However, when subjects were asked to allocate expenses (i.e., room rental fees) incurred by the group to the members, the participants also tended to assign equal shares of the expenses, even though this distribution produced unequal final outcomes (due to differential contributions). In other words, a substantial number of subjects (37-50%) preferred to divide equally whatever it was that was to be allocated, whether it was payoffs or expenses. The inconsistent allocation behavior of Harris and Joyce's (1980) subjects suggests the mindlessness of "scripted" behavior (Langer, Blank, & Chanowitz, 1978) and is reminiscent of the pervasive framing effects reported by Tversky & Kahneman (1981).

Following the theoretical approach of Rutte et al. (1987), Allison and Messick (in press) examined the effects of four independent factors on subjects' use of social decision heuristics. In this experiment, subjects were told that they would be the first group member, in a group of six, to choose how many points to take from a common resource pool. Each resource point was potentially exchangeable for cash at a rate of 50 cents per point. The four independent variables were: (a) payoff magnitude (low vs. high), (b) divisibility of resource (divisible vs. nondivisible), (c) perceived control of last (sixth) group member over group's outcomes (fate control vs. no fate control), and (d) subject's social value orientation (cooperative vs. noncooperative). Allison and Messick (in press) predicted that subjects, in general, would use equal division as a salient anchor point for their decisions, defining the minimum amount that was appropriate to request. They further hypothesized that certain situational or dispositional factors might tempt subjects to take more points than would be prescribed by a simple "share equally" heuristic. Specifically, subjects were expected to take one-sixth of the resource pool points (equal division) when the monetary payoffs were low, the pool was perfectly divisible by six, fate control was present, and the decision makers had cooperative social values. The largest deviations from equality were expected when these conditions were reversed (i.e., large payoffs, nondivisible pool size, no fate control, noncooperative social value orientation).

The results of the Allison and Messick (in press) study nicely confirmed these predictions. The only condition in which subjects appeared to use a "share equally" rule (took 16-17% of total pool) was when the payoffs were low, the resource pool was divisible by six, and fate control was present. When the values of these variables were reversed, subjects took approximately 46% of the common pool for themselves. A three-way interaction between social values, payoff, and divisibility was also observed in which the highest proportion of the common pool (47%) was taken by noncooperators who were confronted with high payoffs and a nondivisible pool. Subjects in the other experimental conditions took, on the average, proportions ranging from 22% to 28% of the total pool. Allison and Messick (in press) also reported that no subjects behaved in accordance with game theoretic principles (i.e., request all but five points from pool in fate control condition; take all points in no fate control condition), a finding consistent with those of Rutte et al. (1987).

Allison and Messick (in press) concluded that subjects' choices could be explained by a simple principle. That is, the magnitude of subjects' deviations from equality is monotonically related to the absolute <u>number</u> of inducements to violate equality. Subjects with zero inducements to deviate from a "share equally" rule took the smallest percentage of the common pool (15%), subjects with one or two inducements took between one-fifth to one-fourth of the resource (24% and 23%, respectively), subjects with three inducements took almost one-third of the points (31%), and subjects requested over half of the resource when all four temptations were present (53%).

Thus, although the effects of the four factors were not strictly additive, it does appear that subject's decisions diverge from equality as the number of factors suggesting competing decision rules increases. Both the Rutte et al. (1987) study and the data of Allison and Messick (in press) suggest that subjects' choices involve resolving the conflict between the demands of applying the "share equally" rule and those implied by other salient cues to permissible behavior in the immediate social environment.

It is important to note here that the social decision heuristic construct developed by Rutte et al. (1987) is distinguishable conceptually from the more familiar notion of a <u>social</u> <u>norm</u>. Social norms may be global in nature, prescribing standards for behavior that are generally acceptable in a given society or culture (Sherif, 1936). Social norms may also be more specific, as in the informal rules for behavior developed and enforced within a specific group (Festinger, Schachter, & Back, 1950). Social decision heuristics, however, are easily applied rules of thumb that an <u>individual</u> may employ to make decisions in group settings. A particular social decision heuristic such as "share equally" may become a group norm if it is widely shared by all or most group members. There is no necessary reason, however, why this must always be true within a given group. Furthermore, conceptualizing equal division as a social norm may weaken its explanatory power due to the vagueness of the "norm" construct and its tautological nature (Darley & Latane, 1970; Piliavin et al., 1981). We prefer to think of the equality rule as a social decision heuristic because this theoretical approach suggests a cognitive process by which various decision rules are invoked and hence is more amenable to empirical testing. That is, people will utilize the "share equally" heuristic to the extent that environmental cues making the rule salient are present and to the extent that competing cues are absent (Allison & Messick, in press).

The purpose of the present research was to investigate further the conditions under which social decision heuristics like "share equally" are used to facilitate decision-making in resource dilemmas. Specifically, we conducted a series of experiments with several goals in mind. First, the research attempted to replicate the previous empirical finding that equal division is a prominent decision heuristic in resource sharing tasks (Study 1). Second, the research explored the generality of this phenomenon and its sensitivity to minor procedural variations (Study 2). Third, the first two experiments also allowed us to assess the utility of Jackson's (1966) Return Potential Model for obtaining quantitative measures of the normative structure of the resource sharing task. Fourth, following the work of Allison and Messick (in press), we designed an experiment (Study 3) to determine the effects of arbitrary role assignments on group members' tendencies to violate the "share equally" rule. Specifically, Study 3 examined the degree to which subjects' decisions are influenced by the activation of cognitive schemas that prescribe equality versus those that may evoke alternative allocation rules.

Study 1

The purpose of the first experiment was to establish baseline conditions for the frequency with which the "share equally" heuristic is used in a multi-person, sequential resource sharing task used in previous research (Allison & Messick, in press; Rutte et al., 1987). Thus, the main objective was to demonstrate that equal division is in fact a commonly used allocation rule in this experimental task. All subjects in these studies were run in six-person groups and were randomly assigned to the first position in the request sequence. By placing subjects in the first position, we can obtain the most accurate assessment of their implicit decision rules since their choices cannot be affected by feedback about other members' choices.

A secondary goal in this study was to test the utility of an alternative methodology for assessing the normative structure of the resource sharing task. Toward this end, we employed Jackson's (1966) Return Potential Model (RPM) to measure subjects' perceptions of the group's normative system. This technique allows one to derive a number of interesting structural characteristics (e.g., ideal behavior, range of tolerable behavior, intensity of feelings, etc.) that describe the type of group norms held implicitly by group members. Jackson's (1966) RPM methodology defines a norm in a given interaction situation in terms of the distribution of potential approval or disapproval by others for various behavioral alternatives of an actor along a particular dimension. This conceptualization of norms is not unique, of course, as March (1954) had proposed a similar theoretical analysis several years earlier. As noted above, the social decision heuristic is conceived as distinct from a group norm, but since both constructs share a strong normative or prescriptive component, it was thought that the RPM measurement technique might provide useful supplementary data for interpreting subjects' choice behavior in the resource sharing task.

Method

Subjects

The subjects were 66 undergraduate students at Texas A & M University who participated in the study to fulfill a course requirement in introductory psychology. Subjects were run in groups of six persons. Confederates were used for those groups in which fewer than six subjects arrived for the experiment.

Apparatus

The experiment was conducted in a computer laboratory using an Apple Macintosh SE as a file server. One Apple Macintosh Plus microcomputer was located at each of the six semi-private work stations. These computers were connected to the file server using MacServe software developed by Infosphere Corp. Subjects responded to questions by clicking a "mouse" located on the desk in each station. The experiment was programmed using HyperCard, a software package developed by Apple Computer Corp. The experimental program displayed all instructions and presented all pretrial and posttrial questions on each subject's computer screen. Each subject was assigned a color name to protect the confidentiality of his or her choices.

Procedure

Upon arrival at the laboratory, each subject was randomly assigned to a computer station. The subjects were instructed to remain seated and that communication with other subjects was not allowed during the experiment. The experimenter told subjects that the experimental task involved requesting points from a common resource pool. It was emphasized that each point was exchangeable for cash at the end of the experimental hour. The subjects were then told that they would be using the network of computers to interact with each other in the group. The experimenter explained the operation of the "mouse" and told subjects that all further instructions would be presented on their computer screens. A personal record sheet and a pencil were provided for each subject to write down the members' requests from the resource pool. All questions about the operation of the computers were answered by the experimenter at this time.

The computer instructions explained that the study was concerned with how people make decisions in groups that share common resources. Examples were provided of situations in universities and private corporations in which general funds are divided among the various colleges or departments. The instructions then proceeded to explain the specific details of the experimental task. Subjects were told that they were members of a six-person group that would have access to a resource pool of 30 points. The subjects were informed that they could each request from 0 to 10 points from the common pool. Each resource point was worth $0.25 in cash which would be paid to the subject at the conclusion of the experimental session. Subjects were given two goals in the experiment: (a) to take as many points as possible from the pool for themselves, and (b) to take care that the total requests of the six group members did not exceed the amount available in the common pool. The instructions stated clearly that if the group members requested a total amount greater than 30 points, then all members of the group would receive nothing.

The procedure for making requests from the resource pool was described to subjects as a sequential procedure, and that each member would be randomly assigned a number between one and six. This number indicated the sequential order in which subjects were allowed to make their point requests. Thus, the member assigned to the first position would choose first, followed by member #2, then member #3, and so on until the last member of the group made his or her request. Each member was told that they would be shown the point request of each member who chose <u>before</u> them in the sequence. The instructions stated that each member would receive a different color name (e.g., red, orange, yellow, etc.) to identify him or her in the experiment to maintain anonymity. Subjects were told that the total amount requested by the group would not be revealed until the end of the experimental hour. At this point, the computer program allowed subjects to review all the previous instruction screens if they had any questions.

Following the instructions, subjects were presented with a brief pretrial questionnaire consisting of 11 items. These questions were designed to assess subjects' understanding of the experimental task, their perceptions of optimal strategies, and their expectations about other members' behavior.

The sequential decision task began immediately following this questionnaire. Subjects received their position and color assignment from the computer. In this study, all subjects were assigned to the <u>first</u> position. The instructions, however, led them to believe that each member would receive a different position assignment. Thus, the decision situation for subjects in this experiment was to choose how many resource points to take from a common pool of 30 points, with the constraint that their request had to be in the range from 0 to 10 points. Subjects then made their point requests by clicking the "mouse" until the desired number appeared on their computer screen. Only whole integer numbers were permitted as responses to this question. Following this decision, subjects were told to wait momentarily while the other members made their choices. Subjects did not receive any feedback about the point requests made by other subjects who were assigned to positions two through six.

At this point, the sequential decision task was completed. Subjects then were presented with additional instructions and a second session was conducted in which subjects received a new position assignment and repeated the sequential decision task. Request data from this second session are not germane to the present study and will not be reported in this paper.

Following the second decision-making session, a post-experimental questionnaire was administered. These questions assessed the fairness of the sequential procedure, the decision rules used by subjects to request points, and the subjects' perceptions of the group's norm regarding how much to request from the common pool. The latter questions were constructed based on Jackson's (1966) Return Potential Model. Using this measurement technique, subjects were asked to rate on a 7-point Likert-type scale, ranging from -3 (highly disapprove) through 0 (indifferent) to +3 (highly approve), the degree of approval or disapproval they would feel toward an hypothetical member "X" if he or she took a specified number of points from the pool. Subjects were told to assume a total resource pool of 30 points shared by a group of six persons, with each member allowed to request between 0 and 10 points. A rating was obtained for requests ranging from 10 points to 0 points. This set of 11 ratings defines a <u>return potential curve</u> for each subject. These ratings were then averaged across subjects to obtain an overall RPM curve for the study (see Figure 1).

Following the postexperimental questionnaire, each subject was escorted to a private room where the experimenter provided a detailed debriefing. Due to the deception regarding the position assignments, all subjects were paid $5.00 for their participation rather than for the actual number of points requested.[1] After receiving cash payments, all subjects were thanked for their participation and excused.

Results and Discussion

<u>Subjects' Understanding of Task</u>

Several pretrial questions indicated that subjects understood the sequential decision task according to the experimental instructions. Of the 66 subjects, 64 (97%) correctly reported the size of the group (6 persons) and the number of points available to the group (30). All 66 subjects understood that no members would receive any points if the sum of the members' requests exceeded 30 points. For purposes of data analysis, the two subjects who incorrectly reported the number of points available to the group were deleted from the sample, leaving a total of 64 participants.

<u>Subjects' Requests</u>

Table 1 presents the frequencies of subjects in each of the 11 possible choice categories (0 to 10 points). In this study, use of the "share equally" rule would be indicated by the percentage of subjects who requested 5 points, or one-sixth of the total common pool. As Table 1 indicates, the results showed that of the 64 subjects in the study, 45 subjects (70%) requested five points. Chi-square analysis found that this distribution of requests was significantly different from that expected by chance, X^2 (10, N = 64) = 295.48, p < .001. When we collapsed adjacent cells and classified subjects into 3 categories (less than 5 points, 5 points, greater than 5 points), chi-square analysis demonstrated that the frequency of subjects using the equality rule was the modal choice (70%), with deviations below (12.5%) and above (17%) this value occurring with nearly equal frequency, X^2 (2, N = 64) = 39.60, p < .001.

Insert Table 1 about here

To check for gender differences, a one-way ANOVA was performed on subjects' requests. The results yielded a significant gender effect, F(1, 62) = 4.46, p < .04. Unexpectedly, male subjects (M = 5.29) requested more resource points, on the average, than did female subjects (M = 4.66). Overall, the mean amount requested in this study was 5.00 points. To determine if there were also gender differences in the frequency of use of the equality rule, a chi-square analysis was performed by classifying subjects according to gender and whether or not subjects used the equality rule (i.e., requested 5 points). This analysis showed that males (71%) used the equality rule as frequently as did females (69%), X^2 (1, N = 64) = .046, n.s. Thus, the gender effect in the ANOVA may be interpreted as a difference in the magnitude of subjects' requests and not as a difference in the number of men or women who endorsed the equality rule.

Post-Questionnaire Data

Self-reported Decision Rule. Subjects were asked to indicate the decision rule that most closely approximated the one that they used to request points. The possible rules presented to subjects were: (1) "Divide equally among group members"; (2) "First come, first serve"; (3) "To each according to his/her needs"; (4) "People should get what they earn or deserve"; (5) "Take everything"; (6) "Other--please specify". Overall, 49 (77%) of the subjects reported using the "divide equally" rule to make their requests. The next most frequently used rule was "first come, first serve" (7 subjects, or 11%). Five subjects (8%) reported using the needs rule, and only 2 subjects (3%) used the equity rule ("people should get what they earn or deserve"). No significant gender differences emerged on the self-reported decision rule, X^2 (4, N = 64) = 6.09, $p < .20$. This pattern of self-reports agrees with the behavioral data presented above.

Structural Characteristics of Group Norm. Jackson's (1966) Return Potential Model (RPM) was used to derive several indices of the normative characteristics of this sequential task situation. Figure 1 displays the overall ratings in the form of a "Return Potential Curve", with the behavior dimension on the abscissa and the subjects' approval/disapproval ratings on the ordinate. Jackson's RPM technique allows for the precise measurement of a set of structural characteristics of the group's normative system, including the point of maximum return (i.e., "ideal behavior"), the range of tolerable behavior (Sherif & Sherif, 1956), the intensity of members' feelings, and the potential return difference.

Insert Figure 1 about here

The point of maximum return is simply the highest point on the RPM curve, indicating the point along the behavior dimension that receives maximum approval from group members. Figure 1 clearly shows that 5 points was considered by subjects to be the ideal behavior in this situation. The range of tolerable behavior represents the length of the line segment on the abscissa marked off where the RPM curve crosses the x-axis (the point of indifference). This characteristic of the group norm specifies the range of behavior that is approved of by group members. Figure 1 reveals that group members generally felt that requests from 1 to 5 points were acceptable (evaluated positively). Beyond 5 points, however, the ratings turned negative, as shown by the sharp discontinuity in the slope of the RPM curve between 5 points and 6 points. Requests greater than 6 points received progressively more negative evaluations.

The level of intensity is an index of how strongly the members feel about the behavior in question. This characteristic is calculated by summing the absolute values of the ordinates on the scale. While the intensity value describes the strength of the group's norm, it does not specify the direction. The RPM data in this study revealed a mean intensity score of 20.03, out of a maximum value of 33.0, suggesting that the act of requesting points was important to group members and evoked relatively strong feelings of approval or disapproval. An intensity value near zero (represented by a relatively flat RPM curve near the indifference point (0) across the behavior dimension) would indicate the absence of a normative system regulating the behavior.

The potential return difference (PRD) measures whether a normative system relies primarily on reward or punishment to control members' behavior. Thus, this index attempts to capture the "atmosphere" within the group. The PRD is the algebraic sum of all ordinate values on the curve, both positive and negative. A strongly positive PRD value suggests a more supportive or tolerant group climate while a highly negative value indicates a more punitive or restrictive environment. The mean PRD value in this study was -0.79, suggesting that the group's atmosphere was governed about equally by punishments and rewards in this resource sharing situation.

Study 2

The results of Study 1 strongly supported the existence of a "share equally" heuristic in this sequential resource dilemma task. In addition, the Return Potential Model data summarized in Figure 1 corroborated this finding in suggesting that equal division had rather strong normative appeal in this interaction situation. Although this pattern of results is suggestive, it is possible that several methodological features of Study 1 may have made the "share equally" rule particularly salient to subjects. First, the common resource pool size was evenly divisible by six. As Allison and Messick (in press) have found, divisibility of the resource does appear to increase the use of equal division as a choice rule. Hence, the experimental test in Study 1 may have been biased toward the use of the equality rule by allowing subjects to simply divide the 30 points evenly among group members, with each person allocated five points.

A second aspect of the methodology in Study 1 that may have encouraged or "primed" the equal division rule concerns the range within which subjects were permitted to request points. Since this range was 0 to 10 points for each subject, it could be argued that subjects simply selected a number halfway between the two extremes as a "reasonable" amount to request. Thus, interpreting the majority choice of 5 points as indicating the application of a "divide equally" heuristic may be incorrect. This choice pattern may have been an artifact of the specific values used to define the width of the range for requests in Study 1.

In order to evaluate these rival hypotheses, a second study was performed in which several changes were made in the experimental methodology. First, the size of the resource pool was varied systematically such that the number of points available to the group was no longer easily divisible by six (e.g., 25 points vs. 35 points). Second, the range of permissible requests was increased (e.g., 0 to 15 points) in order to eliminate the confound between the amount prescribed by equal division and the absolute midpoint of the request range. The overall goal of Study 2 was to assess the generality of the results of Study 1 in an experimental situation free from some of the constraining factors present in Study 1. We expected that the choice patterns observed in Study 1 would be replicated in Study 2.

Method

Subjects

The subjects were 96 undergraduates enrolled in an introductory psychology course at Texas A & M University. Subjects participated in order to fulfill a course requirement. Six subjects were scheduled for each experimental session. When fewer than six subjects arrived for the experiment, confederates were used. Each subject was randomly assigned to one of two experimental conditions. There were 48 subjects per condition.

Apparatus

The Macintosh computer network described in Study 1 was used to conduct this experiment. The computer was programmed such that each of the six microcomputers displayed instructions appropriate to one of the two experimental conditions. The experimental design was replicated three times within each experimental session.

Procedure

The procedure in this study was identical to Study 1 with two exceptions. First, the total number of points available in the common pool was manipulated systematically. Half of the subjects were told that there were 25 points in the common resource pool, whereas the remaining half of the subjects were instructed that there were 35 points available to the group. Second, the range of permissible point requests was increased in this study so that subjects were allowed to request between 0 and 15 points from the resource pool. Each point was worth $ 0.25, as in Study 1. All other instructions were identical to Study 1.

The pretrial and postexperimental questionnaire items were administered exactly as in Study 1. The only difference was that the RPM scales were constructed such that subjects rated an hypothetical member "X" for requests ranging from 15 points to 0 points. Subjects were told to assume a maximum pool size of either 25 points or 35 points, depending on the experimental condition, and a group of six persons sharing the pool.

As in Study 1, subjects received a thorough postexperimental debriefing and were paid the same amount ($ 5.00) for their participation. Subjects were then thanked for their participation and excused.

Results and Discussion

Subjects' Understanding of Task

The responses to the pretrial questions indicated that the majority of subjects understood the experimental task. Of the 96 subjects in the study, 94 (98%) correctly reported the number of group members and the total amount of points in the common pool. Only one subject failed to understand the consequences of requesting more points than available to the group. Thus, for purposes of data analysis, three subjects were excluded, leaving a total of 93 participants.

Subjects' Requests

Equal division of the common pool resulted in different values in the two experimental conditions. In the 25-point condition, one-sixth of this total is approximately 4.17 points. In the 35-point condition, the equality rule would dictate 5.83 points as one-sixth share of the total pool size. Thus, depending on the rounding rule chosen by subjects, application of the equality rule should result in requests of either 4 or 5 points in the 25-point condition and 5 or 6 points in the 35-point condition. Table 2 presents the frequency distribution of requests in each experimental condition. Chi-square analyses performed separately for each condition demonstrated that the observed distributions deviated significantly from that expected by chance, X^2 (15, N = 47) = 206.58, p < .001 (25-point condition), X^2 (15, N = 46) = 153.65, p < .001 (35-point condition).

Insert Table 2 about here

As Table 2 indicates, in the 25-point condition, 35 of the 47 subjects (74%) used an equal division rule, taking 4 or 5 points from the pool. In addition, roughly the same number of subjects (7 or 15%) requested amounts less than 4 points compared to those individuals (5 or 11%) requesting amounts greater than 5 points, X^2 (2, N = 47) = 35.91, p < .001. In the 35-point condition, 31 of the 46 subjects (67%) applied the "share equally" rule, requesting 5 or 6 points. In this condition, the distribution around this modal choice was asymmetrical, with only 2 subjects (4%) taking amounts less than 5 points and 13 subjects

(28%) requesting amounts <u>greater</u> than 6 points, X^2 (2, N = 46) = 27.96, p < .001. Overall, 66 of the 93 subjects (71%) took amounts from the common pool that suggested the application of a "share equally" heuristic.

To test for gender effects, a 2 x 2 (Pool Size x Gender) ANOVA was performed on the subjects' requests, yielding only a main effect for resource pool size, F(1, 89) = 18.26, p < .001. Overall, 25-point condition subjects requested fewer points (M = 4.57) than 35-point condition subjects (M = 6.02). Notice that the mean requests in each condition were very close to the equality rule values of 4.17 and 5.83 in the 25-point and 35-point conditions, respectively. Contrary to Study 1, gender did not affect mean request size in this study. However, among subjects who used the equality rule in the 35-point condition, there was a gender difference in the number of subjects choosing 5 points versus 6 points. Of the 16 subjects who chose the smaller amount (5), 13 were female (81%), whereas only 9 of the 15 subjects (60%) who selected 6 points were female, X^2 (1, N = 31) = 5.23, p < .05. There was a similar gender difference trend in the 25-point condition, but it was not statistically significant.

<u>Post-Questionnaire Data</u>

<u>Self-reported Decision Rule</u> Subjects reported a strong preference for the "divide equally" rule, with 78 of the 93 subjects (84%) endorsing this allocation strategy. Six subjects (6%) chose "first come, first serve" and an equal number (6) reported using the needs rule (6%). Only two subjects (2%) chose the equity rule, and one subject (1%) endorsed the "take

everything" decision rule. Chi-square analyses showed no differences in this overall distribution as a function of pool size or gender.

Structural Characteristics of Group Norm. Figures 2 and 3 display the return potential curves for each experimental condition. The point of maximum return differed slightly in each condition. As expected, the value for this measure was 4 points in the 25-point condition and 5 points in the 35-point condition. The range of tolerable behavior also differed in each experimental condition. Figure 2 shows that, in the 25-point condition, the range of behavior receiving approval was approximately from 1 to 5 points. Figure 3 reveals, however, that in the 35-point condition, the range of acceptable behavior was from 2 to 7 points, suggesting a slightly wider latitude of acceptance. Together, these measures indicate that both the "ideal behavior" and the range of tolerable behavior shifted systematically as a function of pool size, results that are predictable from the application of the "share equally" heuristic. Both Figures 2 and 3 show the sharp drop in positive evaluations given to behavioral choices that violate the equality rule, with the change in slope more pronounced in the 25-point condition.

Insert Figures 2 and 3 about here

The intensity of members' feelings was moderately strong in this study, as reflected in an overall mean value of 28.56 (maximum possible score = 48). A 2 x 2 (Pool Size x Gender)

ANOVA found a marginally significant main effect for pool size, $F(1, 89) = 2.77$, $p < .10$. Twenty-five point condition subjects ($M = 29.96$) had slightly stronger feelings of approval or disapproval than did 35-point condition subjects ($M = 27.13$). These results for the intensity measure suggest that consumption behavior does appear to be regulated by norms in this interaction situation.

The potential return difference (PRD) in this study indicated a more strongly punitive group climate, with a mean value of -8.28. A 2 x 2 (Pool Size x Gender) ANOVA yielded a nonsignificant main effect for pool size, $F(1, 89) = 2.67$, $p < .11$. The PRD index was slightly more negative in the 25-point condition ($M = -10.38$) than in the 35-point condition ($M = -6.13$). This trend, however, is consistent with the somewhat wider range of tolerable behavior and lower intensity scores in the 35-point condition. In general, the mean PRD measure, in contrast to Study 1, suggests that negative sanctions appear to govern the group's regulation of consumption behavior in this experiment.

Study 3

The experimental results of Studies 1 and 2 provide additional empirical support for the pervasiveness of the "share equally" rule in this sequential resource dilemma task. Overall, roughly 70-75% of the subjects took amounts from the common pool that were equal shares of the total amount available. Furthermore, Study 2 demonstrated that these results cannot be explained easily by methodological artifacts such as an evenly divisible pool size or confounds due to the range of requests permitted.

It appears that the "share equally" heuristic is perceived by the majority of subjects as a salient "focal point" (Schelling, 1960) in this resource allocation dilemma.

Given this baseline measure of subjects' responses to this task situation, an interesting question is to identify some conditions under which subjects will deliberately violate the equality rule and use some other rule for making resource use decisions. While equal division appears to be the most common rule elicited by the environmental conditions in Studies 1 and 2, subtle changes in this decision environment may activate different social decision heuristics (Allison & Messick, in press; Hoffman & Spitzer, 1985; Reis & Gruzen, 1976). Study 3 was designed to further explore this possibility.

One possible factor that may influence choice behavior is the group member's conception of his or her role within the group. In Studies 1 and 2, subjects were led to believe that there were no status differences among group members. The assignment of members to positions was described as a purely random process determined by the computer. Thus, there was little basis for inferring differences in member inputs or differential entitlements to the common pool. In such a situation, perhaps it is not surprising to observe the widespread use of the equality rule for sharing the resource.

Recent research in social cognition, however, has demonstrated that role schemata can exert profound effects on subjects' processing of information at encoding, retrieval, and during social inference (Taylor & Crocker, 1981; Fiske & Taylor, 1984). According to Fiske and Taylor (1984), a role schema is a cognitive structure that organizes one's knowledge about those norms and behaviors appropriate to a particular social role (e.g., doctor, lawyer, policeman, etc.). For example, stereotypes represent one type of role schema that structures one's prior knowledge about people who fall into various social categories based on age, race, or gender. Cohen (1981) has found that occupations appear to bias memory in the direction of personal attributes consistent with the elicited role schema. Moreover, Rothbart, Evans, and Fulero (1979) have reported similar recall effects for other social stereotypes. Fiske & Taylor (1984) note that well-developed role schemas may also affect the use of problem-solving heuristics such as representativeness and availability (Kahneman & Tversky, 1973).

As applied to group situations involving social dilemmas, a recent study by Messe (1988) suggests that certain role schemas may create perceptions of rank or privilege among the members of a group. Specifically, Messe (1988) found that subjects perceived the behavior of a group member, described as a "supervisor" of a work crew, who was working less hard than the other "workers" differently than they did other crew members' behavior. When asked to evaluate probable reasons for the supervisor's behavior, subjects most frequently cited explanations such as "beliefs about what supervisors do" and "a belief that supervisors are privileged". These results are intriguing in that they suggest that different role schemas may activate different perceptions of entitlement in a social dilemma setting.

Study 3 was designed to test whether certain role schemas may activate social decision heuristics other than "share equally" in a resource sharing situation. Subjects were presented with a similar sequential resource dilemma task as in Studies 1 and 2. In this experiment, subjects were told that they were either the "supervisor", "leader", or "guide" of the group. This role assignment was done randomly and the arbitrary nature of the process was emphasized to subjects. We also included a second factor, partitionment of the resource, in the design to assess its effects in conjunction with the role schema manipulation. Previous research has found that subjects' choice behavior in resource dilemmas is influenced by the degree to which the shared resource can be partitioned into discrete, discernable units (Allison, Redpath, & Schaerfl, 1990). Allison et al. (1990) reported that violations of the equality rule were most likely when the resource pool was nonpartitioned and the group size was large (i.e., 12 versus 3 persons).

Based on the work of Messe (1988), we predicted that subjects assigned to the role of "supervisor" would perceive a sense of rank or privilege relative to the other group members. This role schema, in turn, was expected to lead "supervisor" subjects to violate the "share equally" rule and take more from the common pool compared to subjects assigned the roles of "leader" or "guide". We also expected to replicate Allison et al.'s (1990) findings that subjects should take more than an equal share when the shared resource is nonpartitioned than when it is partitioned. Finally, based on the theoretical model proposed by Allison & Messick (in press), we predicted that the magnitude of the role schema effect for supervisors might be larger in the nonpartitioned resource condition than in the partitioned condition. The rationale for this interaction prediction is that the number of inducements (2) for violating equality is larger in this cell of the design compared to the other conditions.

Method

Subjects

The subjects were 64 introductory psychology students at the University of Richmond who participated to fulfill a course requirement. Each subject was randomly assigned to one of the six experimental conditions.

Design

The experiment employed a 3 (Role Assignment: Supervisor, Guide, Leader) x 2 (Resource Type: Partitioned, Nonpartitioned) between-subjects factorial design. One half of the subjects shared a partitioned resource (blocks), whereas the other half shared a nonpartitioned resource (sand). Moreover, one third of the subjects were informed that they had been randomly assigned the role of "supervisor" of the group, one third were told that they were the group's "guide", and the remaining third were informed that they were the group's "leader". To ensure that these labels would produce the intended effects, a pretest was performed prior to the study in which 41 undergraduate students were asked to rate the degree to which these three types of group leaders behaved in a socially responsible manner toward the members of their group. The ratings were recorded on a 1 to 7 Likert-type scale, with higher numbers indicating greater social responsibility. The results revealed that a guide was perceived to be more socially responsible ($M = 5.20$) than either a leader ($M = 4.59$) or a supervisor ($M = 4.12$), $F(2, 38) = 7.34$, $p < .05$.

<u>Procedure</u>

Subjects arrived at the laboratory for an experiment entitled, "Social Decision Making". Although subjects were run individually, they were told that the study was an investigation of how people make decisions in groups. It was explained that the task was such that the other group members were not required to be present together at the same time.

Subjects were told that the experiment was concerned with the manner in which groups shared resources. Subjects were informed that they were in a six-person group. The resource that subjects shared was either a partitioned resource (24 blocks) or a nonpartitioned resource (24 pounds of sand). Subjects were told the exact quantity of the resource. The task called for each member of the group to take as much of the resource as he or she wished from a box containing the resource. Subjects could take as much of the resource as they desired.

To provide an incentive for subjects to consume the resource, the experimenter explained that at the end of the semester one experimental group would be chosen at random. Each member of this selected group would receive $1.00 for each block (or pound of sand) that he or she had taken from the common resource pool.[2] Subjects in the nonpartitioned condition were also told that they would be paid for the <u>exact</u> amount of pounds taken (including number of ounces either above or below the pound measurement unit). Thus, subjects could potentially earn $24.00 if they took all of the resource available.

Subjects were then told that a <u>sequential</u> procedure would be used to allocate the shared resource. This procedure required that the group consume the resource one member at a time. To determine which group member would go first, the experimenter would randomly designate one member as group leader (supervisor, or guide, depending on the experimental condition). This designated group leader would be the first member to take as much as he or she wished from the box containing the resource. The five remaining group members would then be randomly assigned numbers from 2 to 6. The member assigned the number "2" would be the next group member to take from the resource pool, with the member assigned the number "3" choosing third in the sequence, and so on until all six members had made their requests.

At this point, each subject was told that he or she had been randomly assigned the role of leader, supervisor, or guide of the group, depending on the experimental condition. As a result of this random selection process, each subject was led to believe that he or she was the first of six group members to withdraw units of sand (or blocks) from the common resource box. Using their hands (blocks condition) or a small shovel (sand condition), subjects then withdrew the amount of resources that they wished to consume for themselves and placed it in a small box provided by the experimenter.

Results and Discussion

<u>Subjects' Understanding of Task</u>

Upon completing the experiment, subjects were given a brief questionnaire that assessed their memory of critical aspects of the experimental instructions. Subjects' responses to this questionnaire revealed that all 64 subjects remembered correctly their role title, the number of members in the group, and the amount of resource units available to the group.

<u>Subjects' Requests</u>

To determine whether the amount of resources taken varied as a function of the experimental treatments, subjects' resource choices were analyzed by a 3 (Role Assignment) x 2 (Resource Type) ANOVA. This analysis found a significant main effect for Role Assignment, $F(2, 58) = 4.95$, $p < .05$. The means associated with this effect are presented in Table 3. Inspection of Table 3 shows that subjects' resource choices were strongly affected by the type of role assignment. Supervisors took significantly more of the shared resource ($M = 6.02$) than did guides ($M = 4.19$) or leaders ($M = 4.17$). Another way to interpret this role assignment effect is to recognize that guides and leaders took an average amount that was consistent with an equal division rule (one-sixth of the total resource pool), whereas supervisors took an average amount (one-fourth of pool size) that was significantly greater than the value implied by an equality rule (4 units). Contrary to predictions, no main effect for partitionment or interaction effect with role assignment was observed.

Insert Table 3 about here

<u>Self-Reports of Decision Rules</u>

After subjects made their choices, they were asked how important it was to divide the resource equally among the group members. Subjects responded by circling a number on a 1 to 7 Likert-type scale, where higher numbers indicated greater importance. The means associated with responses to this questionnaire item are presented in Table 4. A 3 (Role Assignment) x 2 (Resource Type) ANOVA performed on these data revealed a significant main effect for Role Assignment, $F(2, 58) = 5.78$, $p < .01$. Subjects assigned the role of guide ($M = 6.14$) believed that it was more important to divide the resource equally than did subjects in the leader role ($M = 5.45$) or subjects in the supervisor role ($M = 4.54$).

Insert Table 4 about here

General Discussion

We began this research with several objectives. First, we sought to replicate earlier work that suggested that group members sharing a common resource often adopt a "share equally" rule as a social decision heuristic (Allison & Messick, in press; Rutte et al., 1987). The results of Study 1 provided strong empirical support for this idea. Rather than maximizing utility by following a game theoretic strategy, subjects preferred to take an equal share of the common pool, leaving ample resources for others to do the same. Second, we wanted to explore the robustness of this finding and assess its sensitivity to certain methodological changes in the experimental situation. Study 2 nicely confirmed the results of Study 1 and ruled out several alternative explanations for subjects' preferences for equality. Our conclusion from these studies is that subjects appear to use a "share equally" heuristic as a powerful anchor point for their consumption choices in this sequential resource sharing task. Less than one-third of the subjects deviated from this prominent allocation strategy.

A third goal in this research was to assess the usefulness of a methodological technique developed by Jackson (1966) to measure the structural characteristics of a group's normative system in a resource sharing situation. Studies 1 and 2 revealed that the Return Potential Model curves were consistent with the subjects' choice behavior. Dividing the common pool equally was regarded as the most approved behavior in this situation. The shape of the RPM curves (as reflected in the "range of tolerable behavior" and "intensity" indicators) showed that the resource sharing task evoked a rather strong set of evaluative reactions from group members regarding appropriate consumption behavior. Study 2 also demonstrated that the "ideal behavior" point shifted systematically as a function of resource pool size, a result consistent with the application of a "share equally" heuristic. These preliminary data suggest that Jackson's (1966) model may prove to be extremely useful in future research in this area by providing quantitative measures of the normative structure of various resource dilemma situations. When used across a series of studies, this technique could yield valuable comparative data that may generate new hypotheses.

Finally, we designed Study 3 to investigate whether different role schemas can lead group members to violate the equality rule and adopt an alternative social decision heuristic. The results of this experiment provided support for this hypothesis. Subjects assigned the role of "supervisor" violated the "divide equally" rule and took a larger amount from the common pool than did subjects in the role of "leader" or "guide." The hypotheses regarding partitionment of the resource were not supported, however.

The main effect for role assignment is an interesting and potentially important finding. This result demonstrates the potency of cognitive schemas in guiding group members' choice behavior in resource dilemmas. Apparently, "supervisor" subjects felt entitled to take more than an equal share (one-fourth) from the common pool compared to "leaders" or "guides." Since these role assignments were made totally at random, differential inputs based on effort or ability could not be logically inferred. Thus, equity theory (Adams, 1965) cannot adequately account for these data. Our interpretation is that the role schema of "supervisor" activated a cognitive structure that consisted of a set of associations including a sense of rank, privilege, or entitlement (Messe, 1988). This role schema further suggested that the "share equally" rule did not apply in this situation. Instead, a different social decision heuristic appears to have been adopted (e.g., "first come, first served", "supervisors deserve more than others").

In conclusion, the results of these studies underscore the usefulness of an information processing approach to understanding decision behavior in common pool situations. Subjects' choices appear to be better described by simple cognitive heuristics such as "divide equally" rather than by more elaborate and effortful mental processes. It must be acknowledged, of course, that this conclusion, drawn from Studies 1 and 2, may be limited to our particular resource dilemma paradigm. Only future empirical studies using different resource sharing tasks will be able to address this question. The findings of Study 3, however, are intriguing and suggest that we need to further explore the effects of subjects' cognitive schemas or scripts (Abelson, 1976) regarding resource sharing situations. If subtle differences created by giving subjects different arbitrary labels to define themselves can significantly alter subsequent choice behavior, then we may need to recognize the possibility that our subjects may be operating on a different cognitive level than many of our normative decision-making models presuppose. More systematic use of recent process tracing techniques from cognitive psychology such as verbal protocol analysis (Ericsson & Simon, 1980) and information search methods (Payne, 1980) may provide new insights into the content of group members' scripts for how common resources are to be shared.

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Footnotes

[1]This payment procedure was used in order to ensure that subjects were not penalized for cooperative choices that may have been influenced by the deception of assigning all subjects to the first sequential position. The $5.00 payment also represented the highest dollar amount that a subject could earn by requesting the maximum number of points (10) in both decision making sessions.

[2]A lottery was, in fact, conducted later in the term and all subjects of the winning group were paid in cash for the amount of resources taken.

Table 1.

Distribution of Subjects' Point Requests in Study 1

Points Requested	0	1	2	3	4	5	6	7	8	9	10	N
No. of subjects	0	1	3	2	2	45	6	2	3	0	0	64

Note. The mean number of points requested was 5.00.

Table 2.

Distribution of Subjects' Point Requests by Experimental Condition in Study 2

25-point Condition:

	Points Requested															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
N	0	0	1	6	24	11	0	3	1	0	0	0	0	0	0	1

35-point Condition:

	Points Requested															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
N	0	0	0	0	2	16	15	9	2	0	2	0	0	0	0	0

Note. N = 47 in 25-point condition; N = 46 in 35-point condition.

Table 3.

Mean Number of Resource Units Taken as a Function of Role Assignment and Resource Type in Study 3

	Resource Type		
Role Assignment	Partitioned	Nonpartitioned	Mean
Supervisor	5.96	6.10	6.02
Guide	4.08	4.30	4.19
Leader	3.93	4.40	4.17
Mean	4.76	4.93	4.84

Table 4.

Mean Importance Ratings of Dividing Equally as a Function of Role Assignment and Resource Type in Study 3

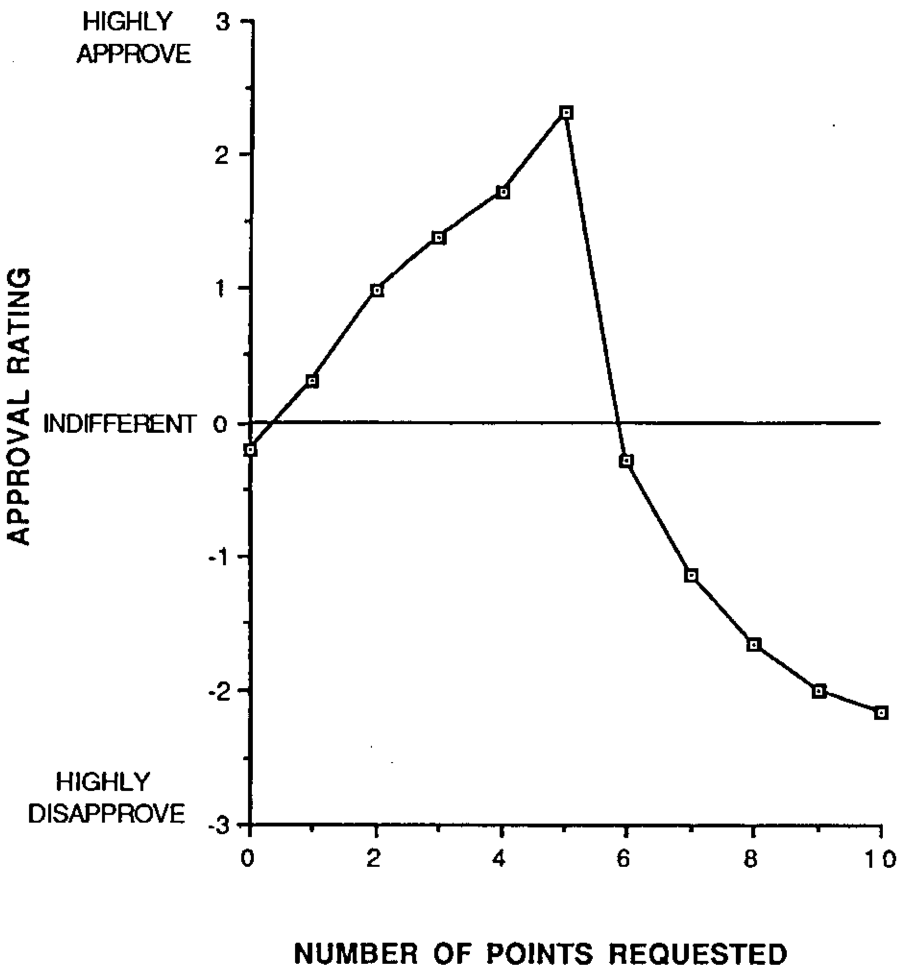
	Resource Type		
Role Assignment	Partitioned	Nonpartitioned	Mean
Supervisor	4.31	4.80	4.52
Guide	6.09	6.20	6.14
Leader	5.30	5.60	5.45
Mean	5.18	5.53	5.34

Figure Captions

<u>Figure 1</u>. Mean approval ratings for consumption behaviors in Study 1.

<u>Figure 2</u>. Mean approval ratings for consumption behaviors in 25-point condition in Study 2.

<u>Figure 3</u>. Mean approval ratings for consumption behaviors in 35-point condition in Study 2.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NUMBER OF POINTS REQUESTED

Figure 1.

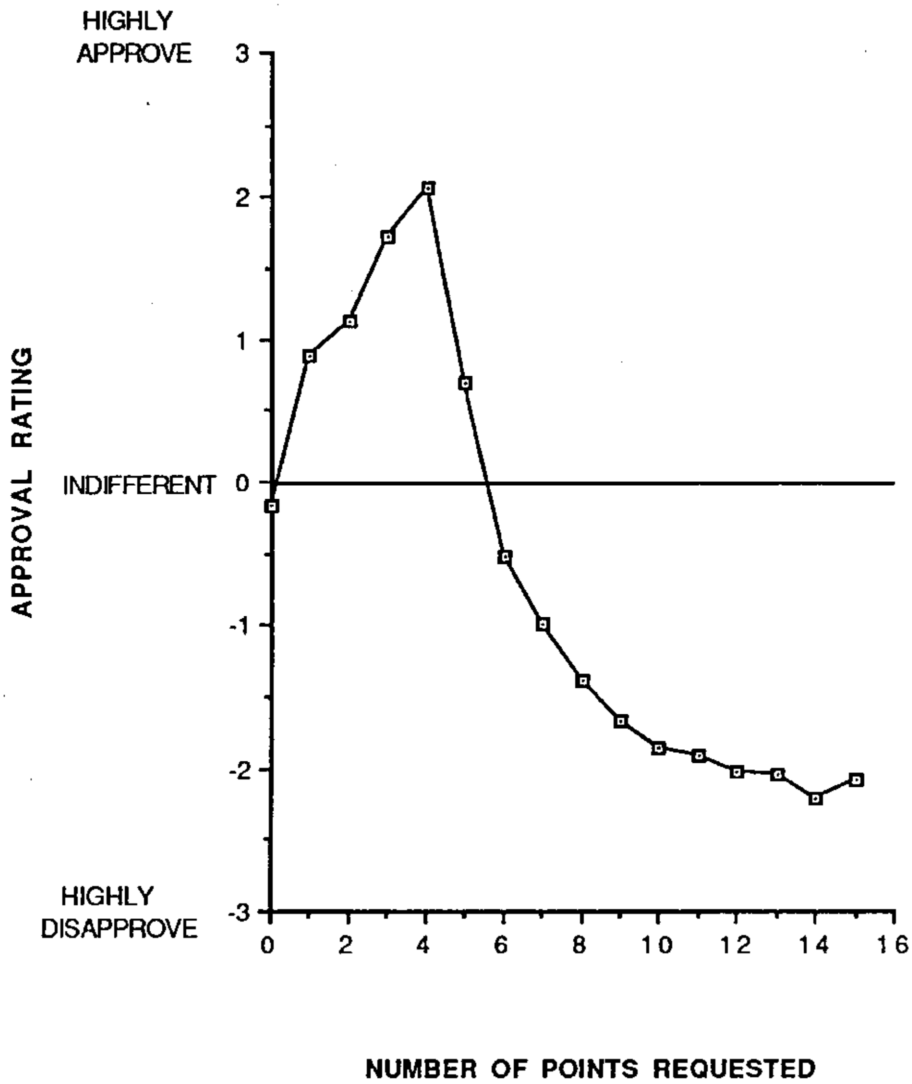
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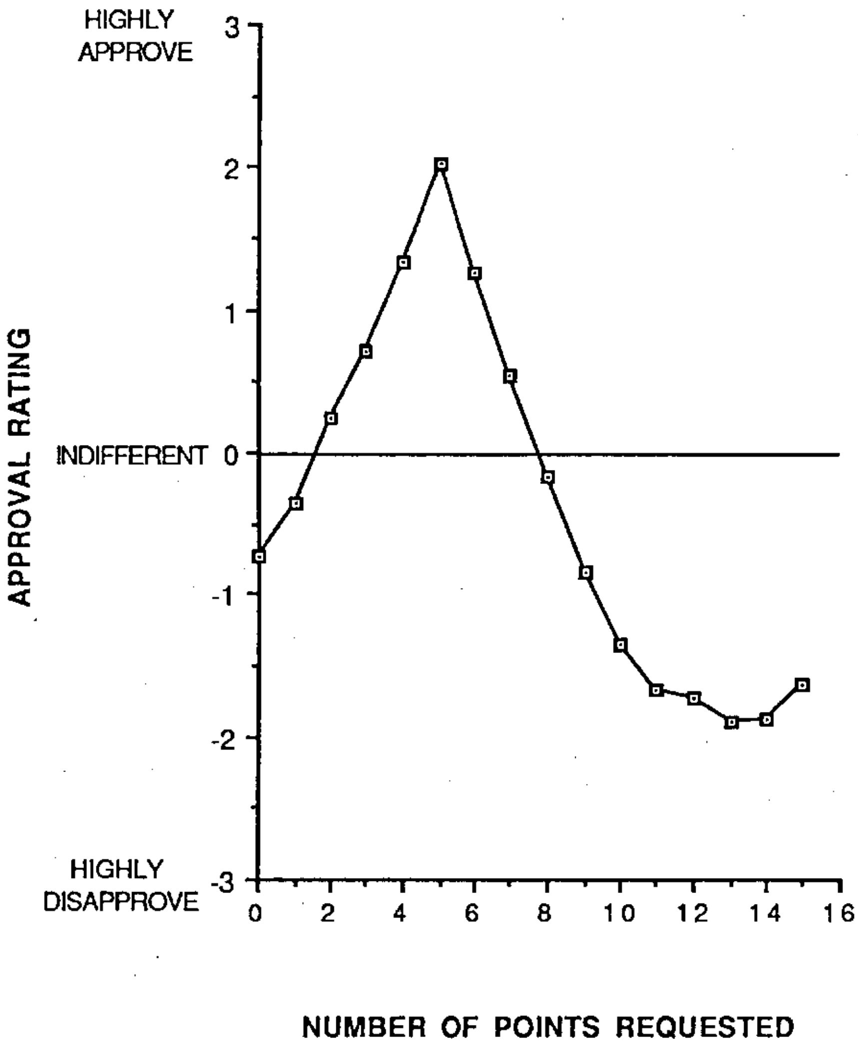
Figure 2.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NUMBER OF POINTS REQUESTED

Figure 3.