3-1-1979

# The Effects of Manning Levels on Maintenance Mechanisms and Rejection of a Deviate

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# THE EFFECTS OF MANNING LEVELS ON MAINTENANCE MECHANISMS AND REJECTION OF A DEVIATE

A Thesis

Presented to the

Department of Psychology

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

University of Nebraska at Omaha

by

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March 1979





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Acknowledgements

I sincerely and gratefully acknowledge the guidance received from the following committee members: Dr. Maurice Connor, Dr. Dennis Dossett, Dr. John Newton, and Dr. James Thomas. I am especially grateful to Dr. Carl Greenberg (Chairman), who served as both mentor and friend throughout the study. The present study was greatly enhanced by the breadth and depth of knowledge provided by these five faculty members.

In addition, I thank Bill Grisham, John Leu, and Stephen Paige for their suggestions. I also extend my appreciation to Janet Car and Pamela Flory for their dedication and assistance with the data collection process.

A final but very special appreciation is directed toward Pamela Joy, my parents, and Little "E" for their continuous display of faith, encouragement, and support.

# The Effects of Manning Levels on Maintenance Mechanisms and Rejection of a Deviate

"Psychology has been so busy selecting from, imposing upon, and rearranging the behavior of its subjects that it has until very recently neglected to note behavior's clear structure when it is not molested by tests, experiments, questionnaires, and interviews" (Barker, 1963, p. 24). This relatively lucid scrutinization of behavior has been the major concern of what is referred to as behavior setting or undermanning theory. The original theory was derived from Barker (1960) and his extensive observations of the behavior settings within two towns. According to Barker (1968), a behavior setting is an ecobehavioral unit which is characterized by regularly occurring behavior patterns coordinated with the characteristics of the physical environment and occurring at a specifiable place and time. Behavior settings entail such places and activities as piano lessons, baseball games, church services, and club meetings. Close inspection of these settings reveals that each fulfills the definition of a behavior setting. For instance, a baseball game occurs at a specified time, only within the confines of a baseball park. It has regularly occurring activities such as running, throwing, and selling peanuts. In addition, these activities are coordinated with the location of the playing field, seats, and refreshment stand.

A significant distinction between occupants of behavior settings should be noted. Those occupants having a role of responsibility are referred to as performers, while those not occupying a set role are denoted as non-performers (Wicker, McGrath, & Armstrong, 1972). At a

baseball game the players, coaches, manager, and concessionaires are the performers, while the fan in the stands falls under the category of non-performer.

In Barker's (1960) observations of "Midwest," Kansas, U.S.A., and "Yoredale," Yorkshire, England he noted that Midwest had 1.2 times as many public behavior settings and 1.7 times as many performances as Yoredale. He also noted that the inhabitants of Midwest assumed performer roles three times as often as their English counterparts.

Barker interpreted these findings as supportive of the notion that the inhabitants of the behavior settings had an active interest in maintaining the setting, since they were afforded certain reinforcements for such maintenance. In the comparison of the two towns, he found the occupants of Midwest needing to occupy more positions of responsibility and to accept less competent residents in order to perpetuate the settings. He therefore labeled the settings in Midwest as undermanned, in relation to those in Yoredale. His general proposition was that behavior settings are capable of generating forces for their own maintenance. In application, undermanning theory suggests that having insufficient personnel results in the generation of forces on the inhabitants to maintain the setting. In Barker's terminology, the "claim" of the behavior setting on its members is greater when the situation is undermanned. He hypothesizes that this greater claim results in eleven different consequences for the inhabitants of undermanned settings. As set forth by Wicker (1973), these are:

1. Greater effort to support the setting and its functions, either by harder work or longer hours.

2. Involvement in more difficult and important tasks.
3. Participation in a greater diversity of roles and tasks.
4. Less sensitivity to and less evaluation of differences between people.
5. A lower level of maximal or best performance.
6. Greater functional importance of individuals within the setting.
7. More responsibility in the sense that the setting and what others gain from it depend on the individual occupant.
8. Viewing oneself and others in terms of task related characteristics, rather than in terms of social-emotional characteristics.
9. Setting of lower standards and fewer tests for admission into the setting.
10. Greater insecurity about the eventual maintenance of the setting.
11. More frequent occurrences of success and failure, depending upon the outcome of the setting's functions.

The research which has been conducted testing these eleven assumptions has predominantly concerned itself with the behavior and experiences of people within organizations. It has been generally assumed that the degree of manning varies directly with the size of the organization. Congruous with this assumption, Barker and Barker (1964), Gump and Friesen (1964a), Wicker (1969b), and Willems (1967) have all found a general tendency to have more people per behavior setting in larger organizations.

Schools and churches are two types of organizations which have had an extensive amount of research directed toward them. In this line of investigation, Baird (1969), Barker and Hall (1964), Campbell (1964),

Gump and Friesen (1964a), Wicker (1969a; 1969b), and Wicker and Mehler (1961) have found that members of small schools and churches enter a large number of different kinds of behavior settings and have more performances in these settings than do members of larger organizations. Participants in studies conducted by Campbell (1964), and Gump and Friesen (1964b), Wicker (1968), Wicker and Mehler (1971), and Willems (1964; 1967) reported more experiences of involvement, challenge, and obligation to participate when they were from small schools and churches. In addition, Wicker (1969b) found that members of small churches were more frequent attenders of worship services, spent more time in church, exhibited more approval of high levels of support for church activities, and donated a greater amount of money than did members of larger churches. Additional evidence for this line of research arises from the work of Wicker and Mehler (1971), Wicker and Kauma (1972), and Wicker (1969b).

Directing attention toward community size, Barker (1964) and Barker and Lecompte (1964) demonstrated that participation in different school and community activities was negatively related to the size of the community. In addition, Wright (1969) and Lamm (1973) have interpreted the results of their studies as supporting the hypothesis that members of undermanned settings participate to a greater degree than individuals in overmanned settings.

As Wicker (1973) has elucidated, these studies have concerned themselves with degrees of manning within different organizations. Given the assumption that undermanning is more characteristic of behavior settings in small organizations as opposed to those in large organizations, it follows that the inhabitants of the small organization behavior settings

should exhibit the typical characteristics of occupants of undermanned behavior settings. The data which have been consistent with this proposition have been construed as substantiating the state of undermanning as the causal factor in the occurrence of the eleven consequences forwarded by Barker. A major flaw in this supportive research lies in the fact that it has all been correlational. With such correlational designs, it is possible that the obtained results were due primarily to organizational size rather than the hypothesized degree of manning.

Another aspect of these studies is that their primary concern has been with the construct of undermanning. No clear comparisons have been made between undermanning (UM), adequate manning (AM), and overmanning (OM). Wicker, McGrath, and Armstrong (1972) have proposed a system to define the continuum of manning. To comprehend the distinctions between under, over, and adequate (optimal) manning, the concepts of maintenance minimum, capacity, and applicants must be defined. Their meanings are as follows: the maintenance minimum consists of the minimum number of persons required in order for the setting to be maintained; the number of persons which the setting can accommodate is the capacity; and the total number of persons who both seek to participate and meet the eligibility requirements is referred to as the applicants. Utilizing these three concepts, the different degrees of manning can now be defined. When the number of applicants is below the maintenance minimum, the setting is defined as UM. In the case where the number of applicants is above the capacity, the setting is OM. But if the number of applicants falls between the maintenance minimum and the capacity, the setting is referred to as AM.

Wicker, McGrath, and Armstrong (1972) assume that the conditions of over and undermanning are unstable states which move towards adequate manning. In the case of overmanning the resultant pressures serve to reduce the number of applicants or increase the capacity. In contrast, the undermanned state results in forces which tend to increase the number of applicants or reduce the scope of the setting.

In Barker's 1960 exposition of undermanning, he did not specify the nature of the forces which behavior settings generate when they are threatened by undermanning. But in a later article (Barker, 1968), he presented an information processing feedback model to describe the forces that are generated when a behavior setting is threatened by abolition. Within this article he made a two-fold distinction concerning the forces which he termed maintenance mechanisms. The employment of one type eliminates the interfering conditions, while the usage of the other modifies or counteracts the inappropriate circumstances. The mechanisms are referred to as veto and deviation-countering mechanisms, respectively.

Barker contended that the occupants of a behavior setting are sensitive to any event which may disrupt the setting or endanger its goals. For instance, the manager of a baseball team notes that the centerfielder is loafing, which does not coincide with his goals for the team. The manager may employ one of two maintenance mechanisms to alleviate the threatening situation. He may bring the undesirable behavior to the attention of the centerfielder and convince him to put forth more effort (deviation-countering mechanism), or he may place the player on the bench (vetoing mechanism). If these attempts are successful the team functions as it normally does and presumably wins games.

In relating these notions to degrees of manning, Barker (1968) states that AM and UM settings have coinciding behavior patterns. However, there is a difference in that the undermanning setting has a smaller number of occupants to accomplish the required behaviors. Over a period of time, the UM setting has more and more instances of task failure, as compared to AM settings. These inadequacies are recognized and reacted to with maintenance mechanisms. In contrast, since AM settings have a lesser magnitude of deficiencies, they do not enter an identical sequence of mechanism utilization as often.

Barker (1968) further postulated that the type of maintenance mechanism employed is a function of the degree of manning found in the setting. Vetoing mechanisms are more characteristic of AM settings, since the costs involved in replacing the deviant are usually less than the expenses incurred in modifying his behavior. In contrast, the UM setting usually elicits deviation countering mechanisms because the cost of replacing a deviant or maintaining the setting with a lesser amount of inhabitants is greater than the price of modifying the behavior of the deviant. The result of this differential occurrence of maintenance mechanisms is a difference in the prevailing direction of forces within the two types of settings. In the instance of UM, the forces are directed inward in that the inadequate components are retained. Thus, the deviation countering flows are discriminative since the inhabitants of the setting are accepted, while their deviant attributes are not. Within AM settings, the deficient occupant is often ejected from the setting. Here the forces are directed outward and there is no discrimination between the person and his deviant behavior.

Ultimately, Barker (1968) arrived at a series of comparisons concerning the degree of manning in a setting. He proposed that inhabitants of UM settings, as compared to those in AM settings, are more likely to engage in: 1) More program actions 2) More varied program actions 3) More maintenance actions 4) More varied maintenance actions 5) Stronger maintenance actions 6) More deviation countering actions 7) Fewer vetoing maintenance actions 8) More induced maintenance actions.

These eight distinctions are "the primary behavior differences between UM and AM settings" (Barker, 1968, p. 192). Supportive evidence for these eight hypotheses arises from a study conducted by Willems (1964). In this research, students from a number of small and one large high school were asked to indicate their reasons for attending certain extracurricular activities. Students were labeled as regular or marginal, depending on their grades, IQs, and social class. Marginal students were defined as having below average grades and intelligence, plus being from relatively lower class families than regular students. In addition to the class distinction, regular students also had average or better IQs and grades. Willems' results showed the small school students received twice as many pressures to participate compared with students from larger schools. Additionally, marginal students within the smaller schools received almost the same amount of pressures as students from the same school who were classified as regular. While in the larger schools it was found that marginal students had only one fourth as many pressuring behaviors directed towards them.

Wicker and Mehler (1971) also offer support for the notion that inward forces are more prevalent in undermanned settings. In comparing

new members of a large church to new members of a small church, they found the large church members receiving only one half as many invitations to be accompanied to various church events. Plus, the new members of the smaller churches found themselves inviting other members to participate three times as often as the new members of the larger churches.

More recently, Pence and Taylor (1978) have observed that dropout rate, which was utilized as an index of vetoing mechanisms, correlated +.58 with school size. In addition, manning correlated -.40 with the percent of seniors planning to attend college.

Again, all supportive evidence is restricted to studies of large and small organizations. It is apparent that undermanning research is in great need of studies which concern themselves with a finer level of analysis than organizational size. Up to the present there have been only a modicum of studies employing such methods.

Wicker (1968) made comparisons of the experiences of students from five different high schools. The subjective experiences probed were the feelings of competence, challenge, responsibility, and hard work. Several types of behavior settings within the schools were observed, with the degree of manning calculated by dividing the number of performers by the number of attenders. The findings indicated that: (a) There was a greater degree of undermanning for all but one behavior setting in smaller schools. (b) Within small and large schools, the kinds of settings varied in degree of manning. (c) Within schools of comparable size, the subjective experience of students varied with different degrees of manning (feelings of responsibility, competence, etc., were reported more frequently in undermanned settings). (d) When the

performer-non-performer differences were controlled, the small-large school differences disappeared.

A second study concerned with sub-organizational levels was a laboratory study conducted by Petty and Wicker (1971). The subjects involved were randomly assigned to work on a task in groups of two or three people. The task entailed driving a slot car around a circular track. The task was structured for optimal performance with three people, but two could perform it satisfactorily. Upon completion of the task, subjects were instructed to fill out a questionnaire based on a number of consequences of occupying UM settings. During the time which the subjects were completing the questionnaire, a confederate arrived posing as a late subject. The non-punctual subject was then given a chance to practice driving the car with the other members. During this practice, the confederate's performance was rather awkward. The original members of the group were then requested to decide secretly whether or not they desired the confederate to be a part of their group for a subsequent trial. It was found that members of undermanned groups were more likely to accept the experimental accomplice. It was also noted that members of UM groups had more feelings of involvement, importance, responsibility, and competence. Divergent from expectations, the subjects in both conditions set the same standards for admission of a newcomer to the group, plus there was no difference in confidence ratings of other group members on task-related and personality-related characteristics. Although this study concerns a behavior setting rather than an organizational unit, it is imperative to note that causal inferences concerning the effects of degrees of manning cannot be established since

manning conditions were confounded by the size of the groups.

Hanson and Wicker (1973) also conducted a study utilizing the same task as Petty and Wicker (1971). Improving on the earlier design, they isolated the variables of group size and degree of manning. This was achieved through variation of both size of the group and difficulty of the task. Task difficulty was manipulated by varying the number of obstacles located along the track. While Petty and Wicker (1971) looked at UM and AM groups, Hanson and Wicker (1973) examined AM and OM groups. Paralleling earlier findings, Hanson and Wicker (1973) found no differences in stated admission requirements due to degrees of manning. Petty explains this by appealing to what Coleman and Hammen (1974) refer to as operative and conceived values. Operative values are those which are related to actual behavior, while conceived values are those coinciding with idealistic notions. Petty remarks that stated requirements are probably based on conceived values, while the overt behavior of acceptance is based on operative values. This explanation is based on Petty and Wicker's (1971) finding that UM groups were more accepting of a newcomer, although their stated requirements did not differ from AM groups.

Hanson and Wicker (1973) also looked at the same subjective experiences as Petty and Wicker (1971), but their results were somewhat ambiguous and not comparable to those found in the former study. Therefore, the possibility exists that the differences between UM and AM groups do not parallel those differences existing between AM and OM groups.

A fourth and final study which has examined manning at the sub-organizational level was carried out by Wicker and Kirmeyer (1977).

Again, the slot car task was employed, but all three conditions of manning were included in the design. Degree of manning was again manipulated by varying the number of obstacles on the track. As predicted from undermanning theory, the feelings of being needed, expending effort, importance, etc., were most characteristic of UM groups, followed by AM groups, and lastly, OM groups.

Wicker (1973) suggested that three basic questions be examined over the continuum of manning conditions, one of which was verbal interaction patterns. Specifically, Wicker was interested in comments which are directed towards behavior modification and elimination of group participants. The present study sought to investigate this question by examining the behavior and subjective experiences of groups varying in degrees of manning. The general problem investigated was whether there is a causal relationship between the degree of manning of a setting and the type of maintenance mechanisms which are implemented.

In light of the focus on maintenance mechanisms, a general discussion of conformity literature seems in order. Since conformity is generally rewarded by the group and deviancy is punished, it is not surprising that the general tendency is toward conformity to group norms. Conformity is a factor which produces order in group processes. If members did not exhibit certain degrees of conformity, there would be no means of predicting other group members' behavior.

Evidently, not all group members exhibit the same degree of conformity to group norms. In an instance of deviance, other members usually apply some sort of sanction. Homans (1950) and Roethlisberger and Dickson (1939) have noted that members of work groups establish

production norms which are adhered to by most group members. However, when a laborer does deviate from the norm, his behavior elicits verbal ridicule and/or other forms of sanction. Such sanctions or maintenance mechanisms are also documented by Schacter (1951) and Freedman and Doob (1968).

In the Schacter study, newly formed clubs were asked to discuss and arrive at a consensus regarding the treatment of a delinquent boy. Schacter had one confederate in each group take the same position as the majority of group members and another deviate from this normative position. During the discussion, he observed a relatively sparse amount of communication directed at non-deviates, as compared to deviates. Following the discussion period, each individual made written nominations for various committee assignments and also indicated which members they would like to see transferred to other clubs. The results indicated that the deviant was more often nominated for the less prestigious of the committees, while the converse was true for the conforming confederate. The second means of assessment indicated that the individual members demonstrated a greater propensity to reject the deviate compared to the modal confederate. Supporting Schacter's work, Freedman and Doob (1968) found conforming group members nominating themselves for pleasant tasks and deviants for those tasks of an unpleasant nature.

A reasonable explanation of these conformity pressures arises from Festinger's (1950) group locomotion hypothesis. Festinger maintains that conformity is a factor which facilitates the group's movement or locomotion toward some goal. There are many situations in which continued deviancy is disruptive of the group's completion of its task.

For instance, the center-fielder who is loafing is likely to conform to the pressures generated by other members of the setting since conforming will contribute to the group goal of winning.

According to undermanning theory, relatively OM groups are more likely to utilize vetoing mechanisms, while relatively UM groups should demonstrate a greater propensity to employ deviation countering mechanisms. The small group communication research supports this basic tenet of undermanning theory. In light of the Schacter (1951) and Freedman and Doob (1968) studies, one might predict that group members would tend to place a deviate in a position of low status. Tying this to undermanning theory, it is hypothesized that an undermanned group will be less likely than an overmanned group to place the deviate in a low status position. This is due to the excessive degree of inward forces within an undermanned setting. Comparatively, overmanned groups are characterized by outward forces which would tend to enhance the group's propensity to place the deviate in a low status position.

## Statement of Hypotheses

Drawing upon the reviewed research, one general and a number of subsidiary hypotheses were proposed.

1. Occupants of UM groups will perceive their role as being of greater importance than individuals within AM and OM groups.
2. Occupants of UM groups will perceive themselves as participating to a greater degree than individuals within AM and OM groups.
3. Occupants of UM groups will perceive their expended effort as being greater than individuals within AM and OM groups.

4. Undermanned groups will demonstrate the lowest level of performance during the practice session, followed by AM and OM groups.
5. Those groups with a deviate will spend a greater amount of time communicating during a discussion period than those groups without a deviating accomplice.
6. On a continuum ranging from under to overmanned groups, those groups with a lesser degree of manning will exhibit a greater propensity to employ deviation-countering mechanisms. Conversely, those groups with greater degrees of manning will demonstrate a wider use of vetoing mechanisms than groups with lesser degrees of manning. This will be exhibited by the deviate being nominated to a position of lesser importance in OM groups, followed by AM and UM groups, respectively.

## Method

### Subjects

Subjects were solicited from undergraduate psychology courses at the University of Nebraska at Omaha. All subjects received extra credit in their respective courses for their participation in the study. The 180 subjects participated in groups of four, but of these, one subject was always a confederate. Thus, there were 60 groups of four individuals. All group members wore a tag, denoting them as member A, B, C, or D. In each experimental session, the confederate's letter identity was the letter D. Since no previous undermanning studies report differential results based on gender, the present study utilized only females in hopes of increasing the degree of homogeneity of task

performance. Two female confederates were utilized in order to avoid effects due to individual idiosyncracies. Each confederate participated equally in all experimental conditions.

Apparatus

The major piece of equipment was an Aurora slot car kit (Model 2105), consisting of a track, hand held trigger controls, and slot cars. The track was erected on a table approximately one meter off the ground. The track was approximately 10 meters in length. It was set up in the form of a symmetrical elipse with banked curves to increase task difficulty (see Appendix A). A stopwatch was employed for timing and limiting the discussion and practice sessions. A number of small wooden blocks served as barriers along the track.

Procedure

All subjects were instructed to have a seat outside the experimental room until all four were present. They were then escorted into the room, and given the following directions:

> You will be participating in a study which concerns group task performance. The task you as a group will perform is the driving of a slot car around this track, as quickly as possible. There are a number of different jobs that are to be performed in order to accomplish the task. There will be one person driving the car while being blindfolded, and the other members of the group must remove and replace the barriers located along the track each time the car approaches. If the car leaves the track due to hitting a barrier or excessive speed, the crewmembers are responsible for replacing it on the track at the same point where it initially

left the track. If the car becomes stalled or fails to move the crewmember may give it a shove to initiate forward movement. In addition, the crewmembers may direct verbal feedback toward the driver, concerning the speed and location of the car. Are there any questions concerning the nature of the task?

Upon answering any questions, the experimenter demonstrated how the hand-throttle controls the speed of the car, how the barriers were to be removed and replaced, and how the car was to be positioned in the proper slot in order for it to function properly. Again, any questions concerning the operation of the apparatus were answered. The group was then told:

Before we actually begin, you will each have a chance to practice the task. Since there are four group members, there will be four-two minute practice sessions, giving each person the opportunity to drive the car for one practice session. In order to identify each of you, here are alphabetically labeled tags. Person A will be the driver on the first practice session, Person B on the second, and so on. When Person A is driving, Persons B, C, and D will act as crewmembers.

(UM groups were told) Each crewmember will be responsible for removing and replacing two consecutive barriers.

(AM groups were told) Each crewmember will be responsible for one barrier.

(OM groups were told) Each crewmember should position yourself along the track as you best see fit and divide up the responsibilities accordingly. You need not use all group members to remove

the barriers.

It was important that the confederate always drove last in order to limit her performance level to that of the naive subjects. After all members had served as driver, the experimenter calculated the group's average number of laps per minute. Then the group members were told:

> The average number of laps which each driver completed was (X). This is equal to (X) per minute. Before initiating the actual task, you must predict how many laps your group can achieve in ten minutes. Your prediction should be based on a group consensus. If the predicted number of laps is not accomplished, the number of laps below the predicted number will be subtracted from the total number of laps accomplished. If you finish the predicted number of laps before the ten minutes is up you will be penalized one lap for every two completed over that predicted number. Thus, the object of your task is to predict the maximum number of laps you can achieve in exactly ten minutes. It is to your advantage to come up with the highest total number of laps when corrected for penalties because the group that has the highest score at the end of this study will receive $5 apiece for winning the competition. Therefore, try to obtain the highest number of laps as possible by matching your prediction with your actual results. You will have five minutes to arrive upon a decision. If you arrive at a decision before the allotted time has passed, inform me immediately by stating, "We're finished." As a reminder, in the practice trials your average number of laps per minute has been (X).

At the onset of the discussion, the stopwatch was turned on in order to time the length or limit the duration of the discussion session. At the termination of the discussion, the experimenter recorded the elapsed time and informed the group members:

> Before actually performing the task at hand, a short questionnaire needs to be completed. The purpose of the questionnaire is to assess your opinions and attitudes concerning the practice sessions which you just performed. This will help us interpret your actual task scores. In addition, you must be assigned to perform different jobs. It is not necessary to have all four people involved in the task. Thus, you may vote to have you or another group member be an observer to the task. I want you to tell me who you wish to be the driver, the crewmembers, and if you want an observer. Your votes will determine who is to hold these jobs. Do note that your responses to both sections of the questionnaire will be held in strict confidentiality. I will only inform you of who is to take which positions, but not how many votes any person received.

Once all questionnaires had been completed and returned, the subjects were debriefed (see Appendix D) and dismissed.

Design and Independent Variables

Two independent variables were manipulated within a 3 x 2 factorial design. The first manipulation was the degree of manning. UM refers to the case where there were six barriers along the track and only three group members to remove them. Although the number of members is not below the maintenance minimum, the number of tasks justifies a label of undermanning relative to the other conditions. The AM situation consisted

of three obstacles along the length of the track, providing each member with one task per lap. In the case of OM, two obstacles were used. This manipulation left one group member without a specific task. (See Appendix A). It is imperative to note that the manipulations involved the number of tasks, rather than group size.

A second manipulation concerned the role which the confederate assumed. In one half of the groups the confederate took a modal role. That is, she closely adhered to the group's prediction norm. In other instances, the confederate took the role of a deviate. When assuming this role, she disagreed with other group members and informed them that she felt the group could achieve one third more laps than the original norm.

Dependent Variables

Six measures of subjective experience were obtained from subjects. Subjects were asked to rate on a 9-point bipolar scale their subjective experiences of working hard vs. not working hard, responsibility vs. non-responsibility, unimportance vs. importance, expended effort vs. non-expended effort, participation vs. non-participation, and being needed vs. not being needed. Smaller numerical scores were associated with greater degrees of the subjective experience listed first on each of the aforementioned scales.

The post-discussion questionnaire (Appendix C) also provided a ballot whereby individuals could nominate other group members for one of the three positions. The hierarchical order of roles from highest to lowest was driver, crewmember, and observer, respectively.

Another dependent variable, the number of laps accomplished

(performance), was objectively measured by counting how many times the car went around the track in the specified time period. The track's length was premeasured and divided into halves so that the group's performance could be rounded to the nearest half.

Finally, the length of communication was assessed by measuring the amount of time it took for the group to arrive at a consensual or majority decision.

## Results

The data were analyzed with groups as the unit of analysis. Thus, the dependent variable scores were group means determined by averaging the scores of the three naive subjects within each group.

### Manipulation Checks

The manipulation check for the deviate/mode condition was based on the groups deviating-conforming rating of the confederate. On a scale ranging from 1 to 9, higher scores indicated greater degrees of deviation. As shown in Table 1, analysis of variance revealed that the individuals within the groups perceived the experimental accomplice as significantly less conforming when taking the deviate role ($M = 5.70$) than when the confederate played the role of the mode ($M = 3.98$), $F(1,54) = 17.98$, $p < .001$.

Insert Table 1 here

### Self Perceptions

As expected, groups perceived themselves as more important in UM settings ($M = 5.85$), than in AM settings ($M = 5.28$), and still less important in OM settings ($M = 4.98$), $F(2,54) = 4.78$, $p < .01$. A subsequent

Table 1

Analysis of Variance Summary for Subjects' Perception of Deviancy

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Total | 59 | 181.39 | 3.07 | |
| Manning (M) | 2 | 0.27 | 0.13 | 0.05 |
| Role (R) | 1 | 44.51 | 44.51 | 17.98* |
| MR | 2 | 2.94 | 1.47 | 0.59 |
| Residual | 54 | 133.67 | 2.48 | |

*$p < .001$

Tukey test indicated a significant difference ($p < .05$) between the OM and the other two groups.

Manning had an effect on expended effort, $F(2,54) = 5.99$, $p < .01$. The group mean ratings of their expended effort for the task were 4.00, 5.37, and 4.98, respectively, for UM, AM, and OM conditions. Again, a Tukey test was performed, which resulted in only one significant difference ($p < .05$), that between the UM and AM groups.

Contrary to predictions, manning did not exhibit a main effect on a number of self-perception variables. Persons within groups with lower manning levels did not perceive themselves harder working, $F(2,54) = 2.71$, n.s., nor did groups participating in lesser manned conditions view their degree of responsibility as significantly greater, $F(2,54) = 0.81$, n.s. In addition, manning levels did not affect the degree to which groups rated their participation level on the task, $F(2,54) = 2.95$, n.s. Finally, groups did not manifest any greater perception of being needed in the lesser manned conditions, $F(2,54) = 0.37$, n.s.

Task Performance

As predicted, manning significantly affected the mean number of laps accomplished by the groups, $F(2,54) = 5.99$, $p < .01$ (see Table 2). The mean number of laps accomplished was greatest for OM groups ($M = 15.31$), followed by AM ($M = 15.03$), and UM groups ($M = 13.19$). Additional analyses revealed the only significant difference ($p < .05$) was between UM and the additional separate conditions.

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Insert Table 2 here

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Table 2

Analysis of Variance Summary of Groups' Level of Performance Attained

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 301.67 | 5.11 | |
| Manning (M) | 2 | 53.05 | 26.53 | 5.99* |
| Role (R) | 1 | 7.07 | 7.07 | 1.59 |
| MR | 2 | 2.67 | 1.33 | 0.30 |
| Residual | 54 | 238.88 | 4.42 | |

*$p < .01$

Decision Time

It was initially hypothesized that groups with a deviating confederate would take a longer time to reach a decision, than those without a deviant accomplice. The data gathered supported this prediction, with the mean decision time for deviate and modal groups being 4.35 and 1.99 minutes, respectively. Table 3 demonstrates that the main effect for role of the confederate was significant, $F(2,54) = 72.82$, $p < .001$.

Insert Table 3 here

Voting

Voting behavior of naive subjects was scrutinized in a variety of modes. Although not all differences attained proper significance levels, a number of them did meet this criterion. Since voting data were assumed to be equal interval measurements, an analysis of variance was judged to be appropriate.

The role which the confederate assumed had a significant effect on whether groups voted for the accomplice as driver, $F(1,54) = 14.16$, $p < .001$. When deviating from the group norm, the confederate received an average of .1 votes per group, while within modal conditions she received .9 votes per group. The maximal amount of votes which a confederate could receive was three per group.

Nomination of the confederate as crewmember was significantly affected by both role of the confederate and level of manning. The main effect of manning led to the confederate receiving an average of 2.3 votes in UM conditions, 2.6 in AM conditions, and 1.7 in OM groups, $F(2,54) = 5.76$, $p < .01$. A subsequent Tukey test indicated that the

Table 3

Analysis of Variance Summary for Groups' Time to Decision

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 150.87 | 2.56 | |
| Manning (M) | 2 | 5.14 | 2.56 | 2.25 |
| Role (R) | 1 | 82.96 | 82.96 | 72.82* |
| MR | 2 | 1.27 | 0.63 | 0.56 |
| Residual | 54 | 61.51 | 1.14 | |

*$p < .001$

only significant difference was between the AM and OM conditions.

The means of the number of votes the confederate received for crewmember in the deviate and non-deviate conditions, respectively, were 2.50 and 1.90. An analysis of variance on these data revealed a significant effect due to the confederate's role, $F(1,54) = 7.40$, $p < .01$.

An analysis of variance revealed a significant effect for manning on the number of votes the confederate received for observer, $F(2,54) = 6.94$, $p < .01$. The mean number of votes each confederate received for observer, from each group in the under, adequate, and overmanned conditions were, 0.10, 0.15, and 0.65, respectively. A follow-up Tukey test found no significant difference between the UM and AM group means, while the difference between these separate groups and the mean for OM groups was significant ($p < .05$).

In addition to the main effect, a significant two-way interaction of role x manning was found, $F(2,54) = 3.56$, $p < .05$ (see Table 4). As expected, the confederate in the OM-deviate condition received the greatest number of votes for this position. The average number of votes the confederate received in each condition were as follows: (a) UM-deviate = 0.10 (b) UM-mode = 0.10 (c) AM-deviate = 0.10 (d) AM-mode = 0.20 (e) OM-deviate = 1.00 (f) OM-mode = 0.30 (see Figure 1). Statistical analysis showed that all differences were insignificant except between the overmanned deviate group and the other five conditions, $p < .05$.

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Insert Table 4 and Figure 1 here

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All votes for the confederate were combined to yield a composite voting score. The numerical weights assigned to each vote were as such:

Table 4

Analysis of Variance Summary for Confederate Being Nominated for Observer

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Total | 59 | 20.60 | 0.35 | |
| Manning (M) | 2 | 3.70 | 1.85 | 6.94* |
| Role (R) | 1 | 0.60 | 0.60 | 2.25 |
| RM | 2 | 1.90 | 0.95 | 3.56** |
| Residual | 54 | 14.40 | 0.27 | |

*$p < .01$

**$p < .05$

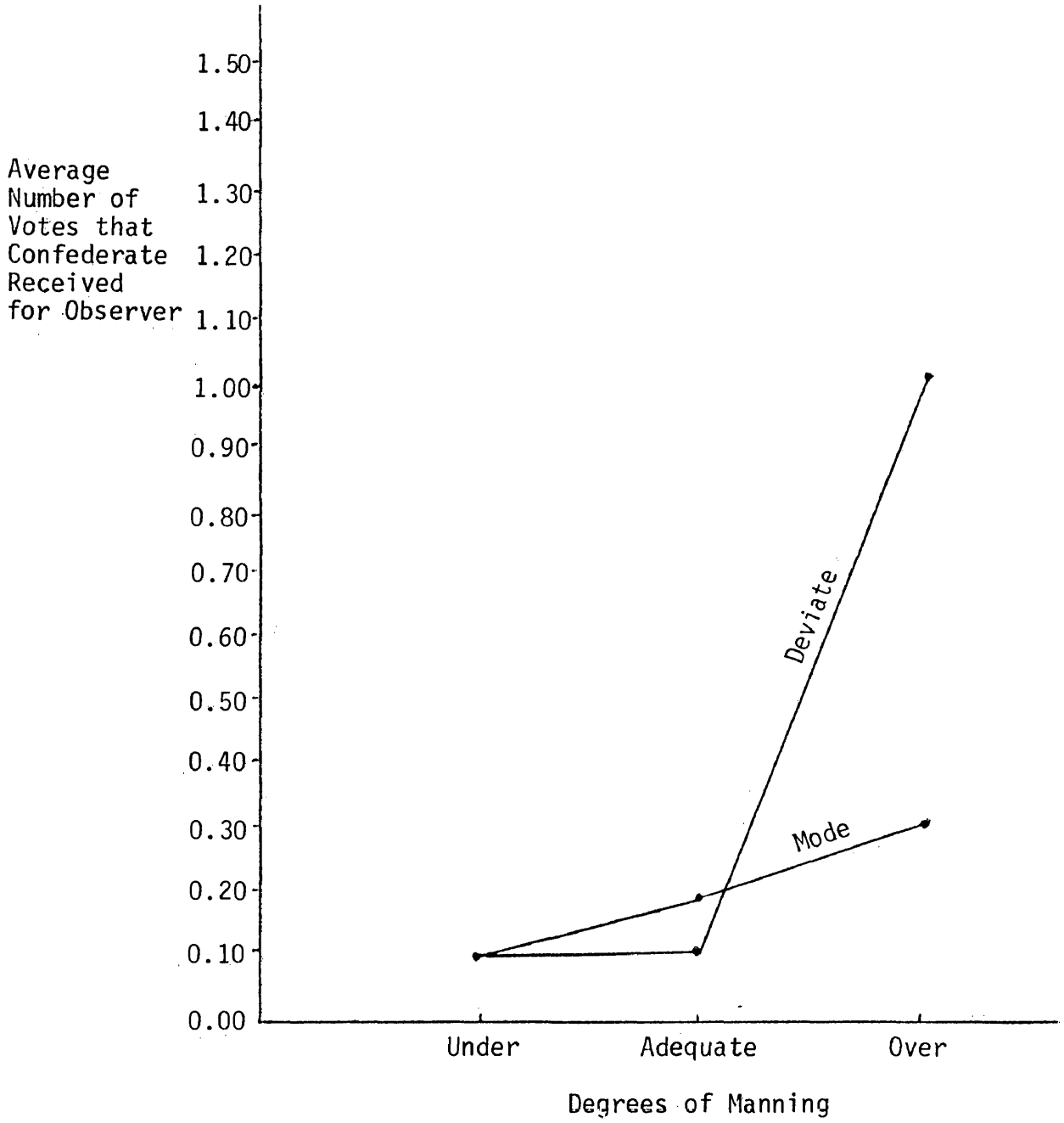


Figure 1. Average number of votes received by confederate for observer position as a function of manning.

3 points-driver; 2 points-crewmember; and 1 point-observer. The role of the confederate was found to have a significant main effect on this variable, $F(1,54) = 12.94$, $p < .001$. The expressed means were 5.70 for deviates, and 6.70 for modes.

Another dependent variable was the number of instances where the majority (2 or more) of the naive subjects nominated the confederate for the position of observer. Manning had a main effect upon this variable, $F(2,54) = 4.80$, $p < .01$. The means for the under, adequate, and overmanned groups, respectively, were 0.00, 0.00, and 0.20. As suspected, further analysis revealed that the only significant difference was between overmanned and the individual remaining two conditions, $p < .05$.

Although the number of instances when a majority nominated the confederate as observer occurred within the deviate condition, the interaction effect of manning x role was demonstrated to be insignificant, $F(2,54) = 1.2$.

Confederate Evaluations

Mean ratings for groups were determined for the dimensions of liking, helpfulness, sincerity, talkativeness, competence, and deviation. The difference between these mean scores for all naive participants and the average scores of the deviate and modal confederates were then computed. An analysis of variance was performed to determine whether the role of the confederate had a significant effect on these perceptions.

The results indicated that the role of the confederate had a significant effect on the degree of liking manifested toward the confederate $F(1,54) = 4.55$, $p < .05$. The average difference score obtained for modes was .24, while for deviates it was .79. Thus, the deviate was

liked to a lesser degree than the modal accomplice.

The dimension of rated helpfulness was also affected by the role manipulation. The means of the difference scores were .58 and -0.11, respectively, for deviates and modes. An analysis of variance showed the difference between means to be significant, $F(1,54) = 10.68$, $p < .01$. Thus, the mode was viewed as substantially more helpful than the deviate.

Another dependent variable on which the role manipulation had a significant main effect was sincerity, $F(1,54) = 3.71$, $p < .05$. The respective means for deviates and non-deviates were .36 and -.02. Again, the deviate was viewed in more negative terms than was the mode.

As mentioned in the manipulation checks section, deviancy was significantly effected by the role manipulation, $F(1,54) = 29.79$, $p < .001$. As would be expected, the modal confederate was rated as significantly less deviating ($M = 0.05$) than the confederate taking a deviant role ($M = 1.79$).

The role of the confederate produced no main effect on either of the following attributions: a) Groups did not discern any significant difference between the talkativeness of the two types of confederates, $F(1,54) = 1.46$, n.s. b) Groups did not discriminate any significant discrepancy between the competency of the confederates, $F(1,54) = 0.13$, n.s.

Voting on the Basis of Discrepancy Scores

Groups' ratings of the confederates on the perceived traits of liking, helpfulness, sincerity, talkativeness, and competence were summed and compared with the same index obtained from the perceptions of other naive participants. The difference between the two indices was analyzed

by dichotomizing the confederates' scores at their median level of discrepancy from the other subjects' index. On this basis, confederate scores were classified as highly similar to the naive participants or highly discrepant from them.

An analysis of variance revealed that this discrepancy score had a main effect on the composite voting score each confederate received, $F(1,48) = 4.28$, $p < .05$. It was found that highly discrepant confederates received a lower composite voting score ($M = 5.83$) than did their counterparts who were perceived as less discrepant ($M = 6.57$).

In addition, as shown in Table 5, there was a significant two-way interaction effect of role x discrepancy, $F(1,48) = 6.23$, $p < .05$, on the composite voting score. The computed means were 5.67, 5.72, 7.17, and 6.00, respectively, for the conditions of low discrepancy-deviate, high discrepancy-deviate, low discrepancy-mode, and high discrepancy-mode. A Tukey test revealed that only the low discrepancy-modal confederate received a significantly ($p < .05$) higher composite voting score than the other three groups.

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Insert Table 5 here

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## Discussion

Barker's (1960, 1968) theory of undermanning asserts that the degree of responsibility derived or assumed by a member of a behavior setting will vary inversely with the degree of manning in the setting. When a setting is relatively undermanned, participants tend to emit a variety of behaviors to maintain the setting. In contrast, when the setting is overmanned the demands experienced by the members are of a lesser

Table 5

Analysis of Variance Summary for Composite Score of Confederates

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Total | 59 | 85.60 | 1.45 | |
| Manning (M) | 2 | 2.72 | 1.36 | 1.33 |
| Role (R) | 1 | 11.39 | 11.39 | 11.17 |
| Discrepancy (D) | 1 | 4.36 | 4.36 | 4.28* |
| MR | 2 | 6.71 | 3.36 | 3.29 |
| MD | 2 | 0.03 | 0.01 | 0.01 |
| RD | 1 | 6.35 | 6.35 | 6.23* |
| MDR | 2 | 2.05 | 1.02 | 1.00 |
| Residual | 48 | 48.93 | 1.45 | |

*$p < .05$

magnitude, leading to lesser degrees of maintenance responsibilities.

This hypothesis is but one of Barker's (1960) eleven original hypotheses. Of these, the present study attempted to gather support for four specific hypotheses. The initial hypothesis tested was that members of relatively undermanned settings perceive themselves as being more important than those who participate in relatively overmanned settings. Congruent with the hypothesis, the present study found that individuals within OM groups perceived themselves as less important than the occupants of either AM or UM groups.

The second hypothesis stated that undermanned groups would perceive themselves as participating to a greater degree as compared to overmanned groups. The results did not offer any support for this hypothesis, since no significant difference was found across groups.

The final hypothesis concerning setting occupants' subjective experiences was that lesser manned groups would perceive themselves as expending more effort than those groups exposed to conditions of greater manning. The results supported this prediction to a certain degree. Although UM setting groups saw themselves as expending significantly more effort than groups within AM settings, the perceptions of groups in OM settings did not significantly differ from either alternative condition.

Turning from subjective experience to measured performance, it was posited that UM groups would demonstrate the lowest level of performance, followed by AM and OM groups, respectively. The results conformed to this hypothesis. UM groups performed at a significantly lower level than did groups within the other two manning conditions.

Another hypothesis was that groups with a deviate member would take a longer time to arrive at a decision than those groups without a deviate. The results supported this hypothesis. Groups containing deviates took over twice as much time to arrive at a decision, as those groups with a modal confederate. Thus, it appears that groups were discriminating between modes and deviates which lead to more or less verbal interaction depending on the position taken by the confederate.

The final and major hypothesis of the present study arises from a number of Barker's 1968 contentions. That is, on a continuum ranging from under to overmanned groups, those with greater degrees of manning will employ vetoing mechanisms to a greater extent. This should result in the deviate being nominated to hold a less central position in settings with greater degrees of manning. A number of resultant indices served to support this hypothesis. It was found that within the UM and AM groups, the naive participants seldomly voted the confederate to the position of observer. In contrast, OM groups nominated the confederate for the observer position in a large number of instances. The results further indicated a significant two-way interaction of manning and role. The likelihood of the confederate receiving observer nominations was low in the UM-deviate, UM-mode, AM-deviate, AM-mode, and OM-mode conditions, while in the OM-deviate condition there was a fairly strong tendency for the confederate to be nominated for an observer position. Thus, as expected, the deviate was incorporated into the group in all settings except the overmanned setting. In the overmanned groups she was ostracized to a position of non-participation for the emission of deviant behavior. In contrast, modes were accepted and voted to an

active participating role in all degrees of manning.

Other dependent variables linked to the hypothesis that relatively overmanned groups tend to utilize vetoing mechanisms, were the votes the confederate received for driver, the number of votes she received for crewmember, the composite voting score, and the frequency of the confederate receiving a majority (2 or more) of votes for the observer position.

The results showed that when deviating, a confederate seldom received votes for the driver position. In contrast, when taking a modal position, she often was nominated for the position of driver. If driving is construed as the most central position, the present results support the notion that deviates will be more susceptible to being voted to a less central role.

Although the interaction of role x manning had no significant effect on the likelihood of being voted to a crewmember position, each variable independently exerted a main effect on this dependent variable. The results indicated that a confederate in the AM condition received a significantly greater number of nominations for crewmember, than when participating in OM settings. Thus, it appears that AM groups attempt to incorporate the confederate into the group to a greater degree than OM groups. With regard to the main effect of role, modes were found to receive fewer votes for crewmember than deviates. At face value, this finding might be interpreted as a deviation from the main hypothesis. But if one considers that the modes were voted to the driver position a large percentage of the time while very few deviates received such votes, it appears to be a reasonable finding. In order to better interpret

this finding the variable of composite voting score was created. The confederate received a considerably higher composite score, indicative of more central positioning, when taking the modal role as compared to when she deviated. Thus, the present interpretation of why deviates received more votes for crewmember than modes appears to have some substantiation.

The dependent variable defined as receiving a majority of votes for observer was found to be affected by the level of manning. The OM setting was the only one in which a majority of persons nominated the confederate for the observer position. This supports the hypothesis that groups with relatively greater degrees of manning will utilize vetoing mechanisms to a greater extent. In contrast, the majority of voters always sought to incorporate the confederate into the group within the UM and AM settings.

An additional factor, about which no initial hypotheses were made, was the degree of perceived discrepancy between other naive subjects in the groups, and the experimental accomplices. The results indicated that when taking the modal position, a confederate was perceived as very similar to the naive participants. In contrast, a confederate taking a deviant role was perceived in generally more negative terms (i.e., less helpful, less likeable, less sincere, and more deviant). When all factors were combined to form an index of total discrepancy, the same tendency of viewing deviants as more discrepant was found.

This overall perception of discrepancy was related to the composite voting score of the confederate. As might be expected, the confederate viewed as more discrepant attained a lower score than those perceived as

less discrepant.

Finally, there was a two-way interaction between role and discrepancy on the composite score. It appears that perceived discrepancy had no effect on the accomplice's composite score when she took the role of deviate, but when taking the modal role she obtained significantly lower composite scores when viewed as discrepant, as opposed to when she was perceived as similar.

Thus, it appears that deviation along a specific dimension leads other members in the setting to exhibit stimulus generalization. That is, being discrepant on one specific topic increases the propensity to generalize that the individual is different on a number of other unrelated traits. As Festinger (1964) has suggested, an initial commitment to an evaluation may lead the observer to be more concerned with congruity rather than accuracy. Although this generalization is not guaranteed by a discrete act of deviancy, it will consistently lead to being ostracized from central group positions. This reasoning is supported by the composite voting score of the deviates not being effected by discrepancy, while the score of the modes was significantly effected.

In general, the present study has gathered support for a number of Barker's (1960) original assumptions, while failing to do so for others. But more importantly, it is among the initial supportive evidence for the contention that relatively OM groups tend to employ vetoing mechanisms to a greater extent than lesser manned groups. Or conversely, relatively UM groups tend to utilize deviation-countering mechanisms to a greater extent than groups in OM settings.

Although a modicum of previous research has been concerned with the

same issue, the present study was not confined to a comparison of large versus small organizations. Controlled laboratory research seemed imperative since previous results may have been confounded by organizational size. Although the present study does not present unequivocal evidence that results of other studies were not due to organizational size, it does tend to bolster the validity of the conclusions they have drawn.

The present study also provides a good deal of support for the contention that OM settings tend to utilize vetoing mechanisms, rather than deviation-countering mechanisms utilized by lesser manned settings. Although both mechanisms produce a certain degree of the desired behavior, they have differential impacts on setting inhabitants. In UM settings the goal is to attain uniformity without standardization of less salient behavior and ideas. In settings characterized by OM, the tendency is toward absolute standardization or rejection. Therefore, it is apparent that UM settings exhibit a considerably greater degree of tolerance than overmanned settings.

Such findings would seem to have a number of implications for organizational settings. For instance, UM settings would apparently be more likely to satisfy job security needs than OM settings. In the OM setting the individual employee is likely to witness a number of vetoing mechanisms elicited by marginal degrees of behavioral discrepancy, while occupants within UM settings will observe deviation-countering mechanisms in reaction to the same behavior. This will probably lead to a greater degree of job security among those individuals in the undermanned environment. This higher level of security may become manifested by higher motivation

or job satisfaction, since Herzberg, Mausner, Peterson, and Capwell (1957) have found job security to be the most important factor to non-managerial employees. Although they have not demonstrated smaller organizations to be relatively undermanned nor posited the same security moderator, Porter and Lawler (1965) have reported that smaller organizational units have a higher level of job satisfaction.

Consideration of these implications would seem imperative to those individuals concerned with organizational structure. Their proper application of undermanning theory could possibly avoid wasted training and solicitation expenditures, due to excessive employee turnover.

In another vein, the UM setting closely parallels the work setting which has been enriched or enlarged. The term, job enrichment, denotes the addition of more responsibility to the job, while, enlargement, refers to increasing the number of operations performed (Meyers, 1968). The undermanning manipulation most likely utilizes both enrichment and enlargement since it is adding more tasks and responsibility to each job. Greenberg (1979, in press) has also equated strategies of job enrichment with the assumptions of behavior setting theory. He has posited that in addition to seeking corresponding goals (i.e., lower absenteeism, lower turnover, and higher quality production), both operations seek to elicit these behavioral manifestations by lowering the ratio of personnel to tasks. The major distinction between the two approaches is in the way this ratio is reduced. Undermanning theory would seek to suppress the personnel-task ratio by reducing the number of personnel, while enrichment strategies would manipulate the ratio by assigning more and varied tasks.

Results of the present study seem to implicate that an additional corresponding goal for the two interventions is to increase the propensity to utilize deviation-countering mechanisms, accompanied by a lesser tendency to employ vetoing mechanisms. This would hopefully lead to an increase in tolerance for other setting members followed by an increase in additional desired work behaviors.

By interpreting undermanning in this perspective, a good deal of supportive evidence is gathered for its utility. Lawler (1969), Biganne and Stewart (1963), and Ford (1969) have all reported job enrichment to have a positive effect on behavior. Closely coinciding with these studies of enrichment and enlargement, undermanning theory does not address positive effects on the sheer quantity of production. Rather, all three interventions contribute to the quality of the product and the subjective experiences involved. In light of Lawler's (1969) conclusion that both enrichment and enlargement are required procedures, it would appear that undermanning is the more parsimonious approach.

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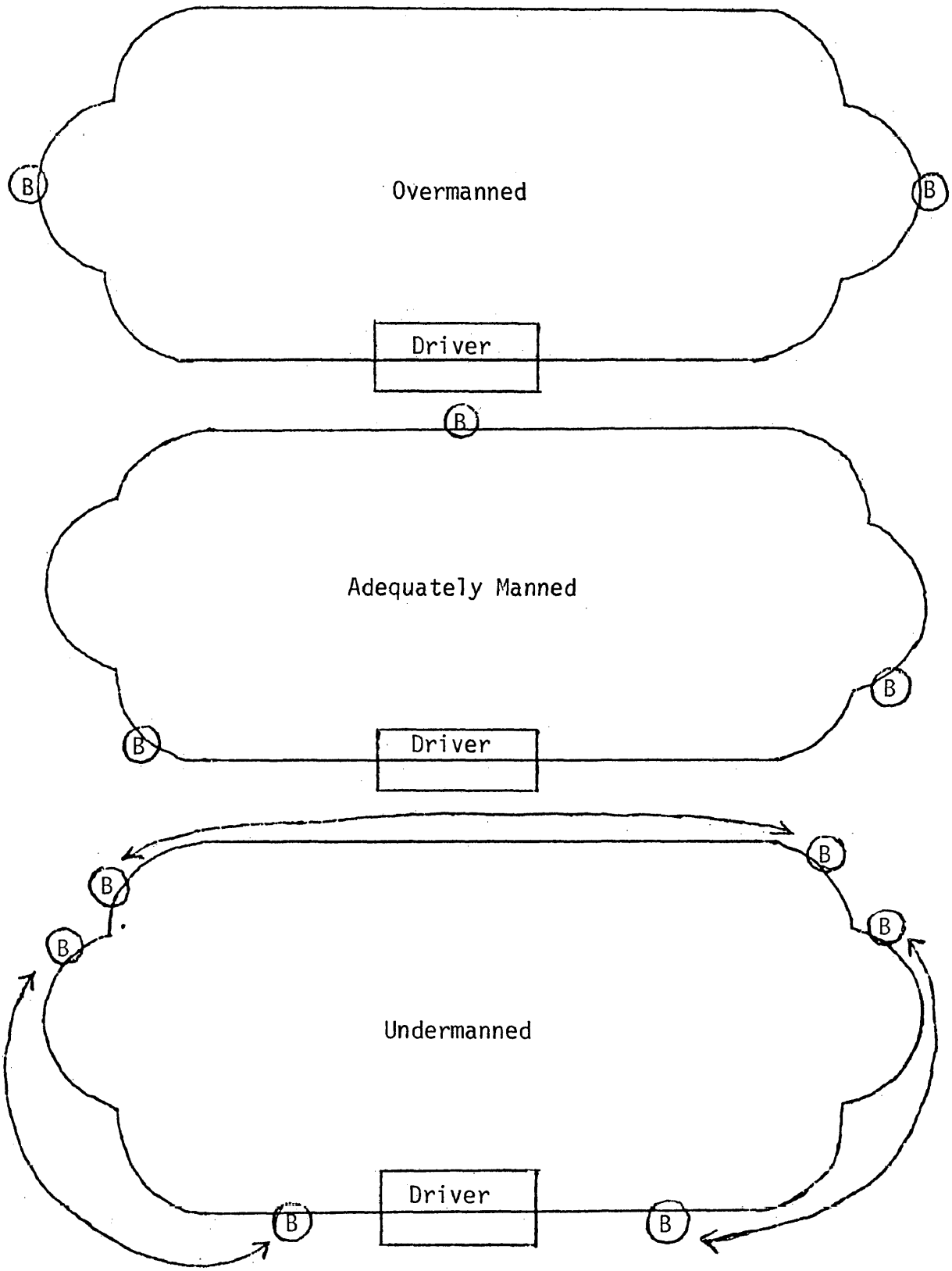
# Appendix A

## Diagrams of three conditions of manning




Note: B = Barrier

# Appendix B

## Analysis of Variance Summary Tables

Analysis of Variance Summary Table for Subjects' Perception of Importance

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 57.96 | 0.98 | |
| Manning (M) | 2 | 7.74 | 3.87 | 4.78* |
| Role (R) | 1 | 1.79 | 1.79 | 2.19 |
| MR | 2 | 4.48 | 2.24 | 2.75 |
| Residual | 54 | 43.95 | 0.81 | |

*$p < .01$

Analysis of Variance Summary Table for Subjects' Perception of Expended Effort

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Total | 59 | 117.34 | 1.99 | |
| Manning (M) | 2 | 19.88 | 9.94 | 6.00* |
| Role (R) | 1 | 6.48 | 6.48 | 3.91 |
| MR | 2 | 1.50 | 0.75 | 0.45 |
| Residual | 54 | 89.48 | 1.66 | |

*$p < .01$

Analysis of Variance Summary Table for Groups' Performance Measured in Laps per Minute

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Total | 59 | 74.58 | 1.26 | |
| Manning (M) | 2 | 12.35 | 6.18 | 5.62* |
| Role (R) | 1 | 2.12 | 2.12 | 1.93 |
| MR | 2 | 0.72 | 0.36 | 1.20 |
| Residual | 54 | 59.39 | 1.10 | |

*$p < .01$

Analysis of Variance Summary Table for Groups' Likelihood to Vote Confederate as Driver

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 49.00 | 0.83 | |
| Manning (M) | 2 | 1.90 | 0.95 | 1.40 |
| Role (R) | 1 | 9.60 | 9.60 | 14.16* |
| MR | 2 | 0.90 | 0.45 | 0.66 |
| Residual | 54 | 36.60 | 0.68 | |

*$p < .001$

Analysis of Variance Summary Table for Groups' Likelihood to Vote Confederate as Crewmember

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Total | 59 | 53.60 | 0.91 | |
| Manning (M) | 2 | 8.40 | 4.20 | 5.76* |
| Role (R) | 1 | 5.40 | 5.40 | 7.40* |
| MR | 2 | 0.40 | 0.20 | 0.27 |
| Residual | 54 | 39.40 | 0.73 | |

*$p < .01$

Analysis of Variance Summary Table for the Composite Voting Score Obtained by the Experimental Confederate

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 85.60 | 1.45 | |
| Manning (M) | 2 | 2.80 | 1.40 | 1.21 |
| Role (R) | 1 | 15.00 | 15.00 | 12.94* |
| MR | 2 | 5.20 | 2.60 | 2.24 |
| Residual | 54 | 62.60 | 1.16 | |

*$p < .001$

Analysis of Variance Summary Table for Majority Vote for Observer Position

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 3.73 | 0.06 | |
| Manning (M) | 2 | 0.53 | 0.27 | 4.80* |
| Role (R) | 1 | 0.07 | 0.07 | 1.20 |
| MR | 2 | 0.13 | 0.07 | 1.20 |
| Residual | 54 | 3.00 | 0.06 | |

*$p < .01$

Analysis of Variance Summary Table for Discrepancy of Liking for Experimental Confederate

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 61.02 | 1.03 | |
| Manning (M) | 2 | 0.85 | 0.43 | 0.42 |
| Role (R) | 1 | 4.62 | 4.62 | 4.55* |
| MR | 2 | 0.68 | 0.34 | 0.34 |
| Residual | 54 | 54.87 | 1.02 | |

*$p < .05$

Analysis of Variance Summary Table for Discrepancy for Helpfulness of Experimental Confederate

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 46.10 | 0.78 | |
| Manning (M) | 2 | 0.94 | 0.47 | 0.70 |
| Role (R) | 1 | 7.22 | 7.22 | 10.68* |
| MR | 2 | 1.47 | 0.73 | 1.09 |
| Residual | 54 | 36.47 | 0.68 | |

*$p < .01$

Analysis of Variance Summary Table for Discrepancy of Sincerity of Experimental Confederate

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 36.69 | 0.62 | |
| Manning (M) | 2 | 0.62 | 0.31 | 0.52 |
| Role (R) | 1 | 2.20 | 2.20 | 3.71* |
| MR | 2 | 1.86 | 0.93 | 1.57 |
| Residual | 54 | 32.00 | 0.59 | |

*$p < .05$

Analysis of Variance Summary Table for Total Discrepancy Score for Experimental Confederate

| Source of Variance | Degrees of Freedom | Sum of Squares | Mean Square | *F* |
|---|---|---|---|---|
| Total | 59 | 147.27 | 2.46 | |
| Manning (M) | 2 | 0.64 | 0.32 | 0.19 |
| Role (R) | 1 | 51.16 | 51.16 | 29.79* |
| MR | 2 | 0.75 | 0.37 | 0.22 |
| Residual | 54 | 92.73 | 1.72 | |

*$p < .001$

# Appendix C

## Questionnaire

The following statements are concerned with your opinions and views concerning the practice sessions. For each item, please check the space which most closely defines your view and opinion.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Overall, I worked hard | | | | | | | | | | Overall, I didn't work hard |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |
| Overall, I was personally responsible for our group's performance | | | | | | | | | | Overall, I was not personally responsible for our group's performance |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |
| Overall, I played an unimportant role in the execution of the task | | | | | | | | | | Overall, I played an important role in the execution of the task |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |
| Overall, I expended a great deal of effort | | | | | | | | | | Overall, I did not expend much effort |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |
| Overall, the performance of the task was facilitated by my participation | | | | | | | | | | Overall, the performance of the task was not facilitated by my participation |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |
| Overall, I was needed | | | | | | | | | | Overall, I was not needed |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |

On the following scales, please rate the other group members on the following dimensions (leave your member letter blank). Place the appropriate number corresponding to the scale point in the space provided.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Dislike | | | | | | | | | | Like |
| | extreme amount | | moderate amount | | | moderate amount | | extreme amount | | |

Member: A_____ B_____ C_____ D_____

Not helpful 1 2 3 4 5 6 7 8 9 Helpful

(1, 2: very much; 3, 4: moderate amount; 6, 7: moderate amount; 8, 9: very much)

Member: A_____ B_____ C_____ D_____

Insincere 1 2 3 4 5 6 7 8 9 Sincere

(1, 2: very much; 3, 4: moderate amount; 6, 7: moderate amount; 8, 9: very much)

Member: A_____ B_____ C_____ D_____

Quiet 1 2 3 4 5 6 7 8 9 Talkative

(1, 2: very much; 3, 4: moderate amount; 6, 7: moderate amount; 8, 9: very much)

Member: A_____ B_____ C_____ D_____

Competent 1 2 3 4 5 6 7 8 9 Incompetent

(1, 2: very much; 3, 4: moderate amount; 6, 7: moderate amount; 8, 9: very much)

Member: A_____ B_____ C_____ D_____

Conforming 1 2 3 4 5 6 7 8 9 Deviating

(1, 2: very much; 3, 4: moderate amount; 6, 7: moderate amount; 8, 9: very much)

Member: A_____ B_____ C_____ D_____

Below are four ballots which no one other than I will view. Please check (✓) the position which you would like the other three group members to hold, as well as yourself. Note that you may vote for more than one person for each position.

| | | | |
|---|---|---|---|
| Member A | Driver_____ | Crewmember_____ | Observer_____ |
| Member B | Driver_____ | Crewmember_____ | Observer_____ |
| Member C | Driver_____ | Crewmember_____ | Observer_____ |
| Member D | Driver_____ | Crewmember_____ | Observer_____ |

# Appendix D

## Debriefing

Before you begin the task, I would like you to answer a few questions.

1. How do you feel about this task, do you feel that it is an interesting task?
2. How confident are you that you can achieve the exact number of laps which your group has predicted?
3. How did your group come to a consensus?
4. Was there anyone in the group that you felt detracted from coming to a consensus? If so, who?
5. Would your votes concerning the positions have changed if all members had been in agreement?
6. Would the group prediction have changed if the number of barriers were increased/decreased?
7. Would your responses to the questionnaire have been any different if the number of barriers had been increased/decreased?
8. Would you have rather been responsible for the removal of a greater/lesser number of barriers?
9. What do you think were the relevant factors which I am concerned with (number of laps, subjective perceptions of the task, who you voted into certain jobs and why, the number of barriers, the time it took to reach a consensus, etc.)?
10. In achieving a consensus, do you feel that it was a true consensus, or did the majority vote down any dissension?
11. If there was any disagreement concerning the actual prediction, did you stick with your own prediction or did you sway in the direction of the dissenter(s)?

12. Do you have any ideas as to what the experiment is actually concerned with?

After going over these questions, the subjects were informed that:

Due to time considerations you will not actually perform the task a second time. Instead, the prize money will be awarded on the basis of a lottery. When all groups have performed the task, we will randomly determine which group is to receive the prize money. At that time you will be notified by mail if your group is chosen.

At this time, I would like to thank you for your cooperation and participation in this study. Please do not avow any information concerning the experiment to any other students, since it may effect their naivete concerning the study and ultimately the actual results.

# Appendix E

## Dependent variable means

Mean Table

| Dependent Variables | Undermanning | | Adequate Manning | | Overmanning | |
|---|---|---|---|---|---|---|
| | Deviate | Mode | Deviate | Mode | Deviate | Mode |
| worked hard | 3.83 (0.84) | 4.50 (1.50) | 4.63 (1.04) | 5.43 (1.44) | 5.07 (1.81) | 4.90 (1.04) |
| responsibility | 4.97 (1.16) | 5.08 (1.45) | 4.77 (0.93) | 4.93 (1.00) | 4.44 (1.12) | 4.70 (1.09) |
| importance | 6.33 (1.01) | 5.37 (0.87) | 5.10 (1.10) | 5.47 (0.86) | 5.20 (1.03) | 4.77 (0.32) |
| expended effort | 3.47 (1.00) | 4.53 (1.41) | 5.07 (0.98) | 5.67 (1.42) | 4.83 (1.65) | 5.13 (1.13) |
| participation | 3.80 (0.96) | 3.83 (0.97) | 4.07 (0.75) | 4.42 (1.23) | 3.20 (0.82) | 3.80 (1.00) |
| needed | 3.33 (0.57) | 3.37 (1.00) | 3.47 (1.18) | 3.73 (0.91) | 3.10 (0.72) | 3.67 (1.12) |
| decision time | 4.84 (0.30) | 2.12 (0.84) | 4.41 (0.93) | 2.08 (1.32) | 3.78 (1.32) | 1.78 (1.30) |
| # of laps | 13.41 (2.60) | 12.97 (2.11) | 15.67 (1.57) | 14.39 (2.19) | 15.48 (1.40) | 15.14 (2.47) |
| deviation | 5.57 (1.64) | 4.03 (1.81) | 6.10 (1.89) | 3.77 (0.76) | 5.43 (1.83) | 4.13 (1.20) |
| driver | 0.20 (0.42) | 1.00 (1.16) | 0.00 (0.00) | 0.50 (0.97) | 0.10 (0.32) | 1.20 (1.23) |
| crewmember | 2.70 (0.48) | 1.90 (1.10) | 2.90 (0.32) | 2.30 (1.06) | 1.90 (0.74) | 1.50 (1.08) |
| observer | 0.10 (0.32) | 0.10 (0.32) | 0.10 (0.32) | 0.20 (0.42) | 1.00 (0.82) | 0.30 (0.68) |
| majority observer | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.30 (0.48) | 0.10 (0.32) |
| composite voting score | 6.10 (0.57) | 6.90 (1.29) | 5.90 (0.32) | 6.30 (1.06) | 5.10 (0.99) | 6.90 (1.66) |

Note: Value in parentheses is standard deviation.

N = 10 per cell

# Appendix F

## Discrepancy Score Means

Mean Table

| Discrepancy Variables | Undermanning | | Adequate Manning | | Overmanning | |
|---|---|---|---|---|---|---|
| | Deviate | Mode | Deviate | Mode | Deviate | Mode |
| Like | 0.97 (1.18) | 0.20 (0.91) | 0.48 (0.94) | 0.22 (0.93) | 0.93 (1.14) | 0.30 (0.92) |
| Help | 0.67 (0.70) | -0.36 (0.87) | 0.27 (1.12) | 0.00 (0.49) | 0.80 (0.99) | 0.02 (0.58) |
| Sincere | 0.30 (0.83) | 0.30 (0.86) | 0.20 (0.82) | -0.10 (0.40) | 0.58 (0.94) | -0.27 (0.65) |
| Talkative | 0.33 (1.69) | -0.57 (1.62) | 0.22 (1.51) | 0.38 (1.96) | 0.82 (1.52) | -0.02 (1.73) |
| Competence | -0.05 (0.91) | -0.15 (0.44) | 0.18 (0.60) | -0.22 (0.63) | -0.08 (1.23) | 0.27 (0.57) |
| Deviation | -1.57 (1.44) | -0.03 (1.06) | -1.78 (1.79) | 0.19 (0.68) | -2.03 (1.82) | 0.00 (0.39) |
| Composite Discrepancy Score | 2.22 (2.53) | -0.57 (2.42) | 0.98 (3.12) | 0.28 (2.91) | 3.05 (3.20) | 0.30 (2.80) |

Note: Value in parentheses is standard deviation.

N = 10 per cell