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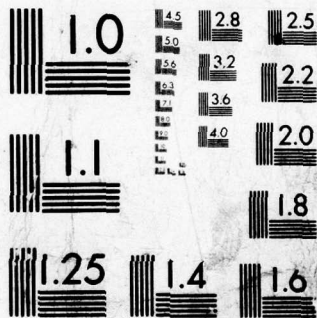
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Technical Report 404

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**THE IMPACT OF MALE AND FEMALE
LEADERS ON THE GROUP PERFORMANCE,
MORALE, AND PERCEPTIONS OF
WEST POINT CADETS**

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Robert W. Rice and Lisa S. Richer
State University of New York at Buffalo
and
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U. S. Army

Research Institute for the Behavioral and Social Sciences

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20. toward women tended to attribute successful performance of female-led groups to luck and successful performance of male-led groups to the ability and motivation of the leader.

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WEST POINT CADETS**

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Women in the Army

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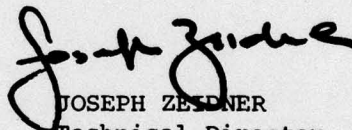
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FOREWORD

An important part of the research of the Personnel and Manpower Technical Area of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) supports the overall effort to integrate women more completely into the Army. Leadership is a specific and important area in which women will contribute to the Army in the future. This report explores the effects of leader sex, leadership style, attitudes toward women, and task structure upon morale and group performance.

The research was accomplished in 1977 under grant DAHC19-77-G-0008 (Project SENTINEL) by personnel of the U.S. Military Academy and the State University of New York (SUNY) at Buffalo under the technical mentorship of Nora Kinzer, ARI. CPT Bill Bachman, CPT Ray Brownfield, CPT Fred Johnson, CPT Tom Meriwether, MAJ Chum Robert, MAJ Bob Seigle, and MAJ Mary Willis aided in the research, and Lynn Hertel, Aimee Levine, Brian Smith, Leasel Smith, and JoAnne Watson helped process the data at SUNY.


JOSEPH ZEIDNER
Technical Director

THE IMPACT OF MALE AND FEMALE LEADERS ON THE GROUP PERFORMANCE,
MORALE, AND PERCEPTIONS OF WEST POINT CADETS

BRIEF

Requirement:

To explore the interacting effects of sex roles and leadership roles among cadets in the first class at West Point to include women.

Procedure:

From the class of first-year cadets at West Point, 72 groups were carefully selected, each consisting of a leader and three male followers. Half the leaders were male, and half were female. Followers held negative attitudes toward women as leaders in half the groups, and the other half held positive attitudes. Half the leaders were primarily task-oriented on the least-preferred coworker (LPC) scale (low LPC score), and the other half had a relationship-oriented leadership style (high LPC score). Each group performed a structured task (making a scale drawing of a building) and an unstructured task (writing a proposal for increasing reenlistment while maintaining unit effectiveness).

Group task performances were scored, and a questionnaire measured participants' attitudes and perceptions after each task.

Findings:

The sex of the leader, the attitudes toward women of the followers, and the type of task all influenced group performance. Groups with male leaders performed better on the average than groups with female leaders, although in some circumstances the female-led groups performed better. Groups with negative follower attitudes toward women performed better on the structured drawing task than on the unstructured proposal, whereas groups with positive attitudes did better on the proposal than on the drawing. Groups with negative attitudes tended to attribute good performance in groups led by women to good luck, whereas they attributed good performance in groups led by men to hard work and ability. Correlations between group performance and the leader's LPC score followed expected patterns for male leaders but not for female leaders.

Utilization of Findings:

These findings, and their implications for the integration of female cadets, were presented to the U.S. Military Academy at West Point.

THE IMPACT OF MALE AND FEMALE LEADERS ON THE GROUP PERFORMANCE,
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THE IMPACT OF MALE AND FEMALE LEADERS ON THE GROUP PERFORMANCE,
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INTRODUCTION

In the summer of 1976, the U.S. Military Academy admitted its first female cadets with the class of 1980. Prior to this event, a long-term, comprehensive research project (Project Athena) was designed to evaluate the impact of integrating female cadets into the academy.

Project Athena was sponsored jointly by the Office of the Deputy Chief of Staff for Personnel and the U.S. Military Academy. The objective of the project is to provide a series of research reports that describes, through systematic analysis, the impact of the admission of women on the academy and on individual cadets.

By late 1977, Project Athena had focused primarily on the collection and analysis of cadet, faculty, and staff attitudes toward women (and toward women cadets in particular). This study attempts to supplement these survey efforts by focusing on the effect that sex of the leader and sex role attitudes have on group performance and morale in a small-group laboratory simulation.

There is no well-defined body of empirical research dealing with sex roles and leadership. For example, in his comprehensive review of leadership research, Stogdill (1974) provides no systematic coverage of this issue. In fact, the terms "female," "women," and "sex role" do not appear in his table of contents or index. The only mention of sex roles is a brief paragraph suggesting that sex roles and leadership should be considered in future research (p. 381).

Our search of the sex role literature generally supports the impressions drawn from the Stogdill sourcebook. Although the small-group research concerning sex differences is considerable (Broverman et al., 1972; Strodbeck & Mann, 1956; Vinacke, 1959), little of this research has addressed questions of leadership. Even leadership research concerning sex roles generally has not focused on the effect of female leadership on outcome measures such as group performance and morale. The only studies of this type uncovered by our search of the literature found no differences in group performance or morale as a function of the leader's sex (Bartol, 1973; Jacobson & Effertz, 1974). However, the results of these studies are equivocal because of several methodological difficulties. More commonly, research concerned with sex of the leader has focused on leadership processes. For example, Fallon and Hollander (1976) examined the relative influence of male and female leaders in a group decisionmaking task.

Overview of the Research Plan

Because of the absence of well-defined literature dealing with the sex role/leadership role question, it was felt that an exploratory study of these issues was appropriate. For the present study, short-term laboratory groups were created to examine the effects of four independent variables:

1. The sex of the group leader (male vs. female).
2. The attitudes of male followers toward women (positive vs. negative as measured by Spence and Helmreich's (1972) Attitudes Toward Women Scale [AWS]).
3. Leadership style (task-oriented vs. relationship-oriented as measured by Fiedler's (1967) Least-Preferred Coworker (LPC) scale).
4. The structure of the task (structured vs. unstructured).

With two levels for each of the independent variables, it was possible to use a 2 x 2 x 2 x 2 factorial analysis of variance design to examine the impact of these variables on the following general classes of dependent variables:

1. Effectiveness of the group on the assigned task.
2. Leader and follower satisfaction (morale).
3. Leader and follower perceptions of leader behavior.
4. Leader and follower evaluations of group and leader performance.
5. Leader and follower attributions concerning the causes of group and leader performance.

Research Questions

The design of this research (described in detail in the "Method" section) allows for the exploration of several different questions related to the sex role/leadership role issue. Given the absence of a well-defined body of research and theory relating sex roles and leadership roles, no formal hypotheses were offered. The statement of general questions addressed by the research seemed more appropriate to the exploratory nature of the research. These general research questions were as follows:

1. Does the Sex of the Leader Influence Performance and/or Morale of Small Task Groups? Groups with male and female leaders were compared on measures of both morale and group performance. The design of the

study allowed us to examine task structure, leadership style, and follower attitudes toward women as possible moderators of the relationship between sex of leader and these measures of group effectiveness.

2. Do Male Subordinates' Attitudes Toward Women Influence Group Performance and/or Morale of Small Task Groups? A growing body of empirical data is using the Spence and Helmreich (1972) Attitudes Toward Women Scale (AWS). However, none of this research has examined the possible impact of such attitudes on the interaction of small task groups with either male or female leaders. The design of this study allowed us to examine main effects and interactions involving the Follower AWS variable.

3. Are Member Attributions Concerning Leadership Process and Leader Attributes Influenced by the Sex of the Leader? Considerable research outside the realm of leadership has indicated that attributions are influenced by sex role information (Deaux, 1977). For example, in the case of successful performance, internal attributions (e.g., skill) are offered to explain the behavior of male actors, whereas external factors (e.g., luck) are seen as the cause of success of female actors. The present study provided an opportunity to explore this type of attributional bias within the context of the leadership process.

4. Is Fiedler's (1967) Contingency Model of Leadership Effectiveness Valid for Female Leaders? Although there has been a great deal of empirical research on the Contingency Model, the subject populations in these studies have been almost exclusively male. An unpublished study by Linda Nelson at the University of Utah compared the predictive powers of the model for male and female leaders in two of the eight leadership situations (octants) for which the model offers predictions. The predicted relationships between leadership style (LPC) and group performance were found for male but not for female leaders. This provided the opportunity to explore further the comparative validity of the Contingency Model for male and female leaders.

METHOD

Subjects

The subjects for this study were 288 first-year cadets at the U.S. Military Academy. Subjects were selected from the entire class of first-year cadets on the basis of pretest scores needed to fill the cells of the experimental design. A personal letter from the Office of Military Leadership at the Academy requested selected cadets to participate in the study. Each subject worked in one of the 72 four-person groups participating in the study.

Procedures. Demographic and pretest data were collected prior to the experiment. As indicated in the descriptions of the independent variables below, these data were collected from 1 week to 11 months before the experiment.

The experiment was conducted during a 2-hour period on an evening that no other official academy activities were scheduled for first-year cadets. When cadets arrived at the classrooms used for the study, they were assigned to their task group. Only four groups worked in each classroom. To minimize intergroup contact, each group worked in a separate corner of the room.

After the groups were assembled, one of the eight uniformed Army officers who served as research monitors distributed experimental materials and instructions. General instructions were issued to all groups simultaneously over a closed-circuit television system.

Following an initial explanation of the general goals and procedures of the study, the groups began working on their first 30-minute task. After this task, all subjects completed a postexperimental questionnaire designed to assess various perceptions and attitudes relating to the group task experience. The same questionnaire was also administered following work on each group's second task. Upon completion of the second questionnaire, all cadets were invited to meet with the research team for a thorough explanation of the goals and methods of the study.

Independent Variables

Described below are the procedures used to create two levels of each of the independent variables.

Sex. Half of the groups had male leaders and half had female leaders.

Attitudes Toward Women. All groups had three male followers.¹ Half of the groups had three followers with negative attitudes toward women as measured by Spence and Helmreich's AWS scale (1972). The remaining groups had three male followers with positive AWS scores.

¹ It would have been desirable to manipulate the sex composition of the followers as well as the sex of the leader. However, because of the relatively small number of female cadets available, this was not possible. Also, since the Army is still primarily a male institution, the crucial question concerns the effectiveness of women leaders in predominantly male groups. When these women cadets join the regular officer corps of the Army, they will be dealing primarily with such groups.

The AWS was administered to all first-year cadets in July 1976, 11 months before the experiment. The cut-off points for classifying subjects were ≥ 38 (positive AWS) and ≤ 34 (negative AWS). These cut-off values are consistent with the norms reported by Spence and Helmreich (1972).

Leadership Style. A 22-item version of Fiedler's (1967, 1972) Esteem for Least-Preferred Coworker (LPC) scale was used to measure leadership style.² Half of the groups had leaders classified as having task-oriented leadership styles (low LPC scores). The remaining groups had leaders classified as having relationship-oriented leadership styles (high LPC scores).

The LPC scale was completed by first-year cadets 1 week before the experiment. The cut-off values for classifying subjects were ≥ 89 (high LPC, relationship-oriented) and ≤ 74 (low LPC, task-oriented). These cut-off values are consistent with the LPC norms provided by Posthuma (1970).

Task Structure. All groups worked on both a structured and an unstructured task. Thirty minutes were allowed for each task. The order in which groups worked on the two tasks was counterbalanced.

The structured task required the group to work together to create a scale drawing of a building. This task had been used in an earlier study of West Point cadets (Chemers & Skrzypek, 1972) and of civilians (Rice & Chemers, 1973). The original drawings were given in one type of measurement, and the group had to use two sets of conversion tables before a scaled line could be drawn.

Performance on this task was assessed on the basis of the number of lines correctly placed on the scale drawing produced by the group. To assess the reliability of these scoring procedures, two raters scored the drawings independently. The correlation between these two sets of scores was .99 ($n = 72$). Any disagreements on the scores of the two raters were worked out in conference. The scores used in statistical analyses are those agreed upon through this conference procedure.

² The present version of the LPC scale included the following bipolar adjective pairs: pleasant-unpleasant, friendly-unfriendly, incapable-capable, helpful-frustrating, reliable-unreliable, unenthusiastic-enthusiastic, tense-relaxed, distant-close, irresponsible-responsible, cold-warm, cooperative-uncooperative, supportive-hostile, boring-interesting, incompetent-competent, quarrelsome-harmonious, self-assured-hesitant, efficient-inefficient, gloomy-cheerful, open-guarded, proficient-not proficient, rejecting-accepting, productive-not productive.

The unstructured task required each group to work together to write a proposal documenting specific actions that the cadets, when they became junior officers, could take to increase reenlistment rates in their units, while at the same time maintaining high standards of unit effectiveness. Discussion/proposal tasks of this type have been used in previous small group studies involving both cadet (Chemers & Skrzypek, 1972) and civilian populations (Rice & Chemers, 1973).

Performance on this task was assessed by having two judges evaluate the written proposals on three dimensions: (a) the originality of the suggestions, (b) the practicality of the suggestions, and (c) the completeness and organization of the written proposal. As part of the instructions for the task, the subjects were told that these criteria would be used to judge their performance.

To generate a performance score for the proposal task, the written work of each group was rated on a 10-point scale on each of the three dimensions by two independent judges. To assess the reliability of these scoring procedures, the correlations between the scores provided by the two judges were calculated for each of the three dimensions. Intercorrelations were high for all three dimensions: organization and completeness ($r = .77$), originality of suggestions ($r = .84$), and practicality of suggestions ($r = .88$).

Given the substantial intercorrelations among the three criteria (r 's range from .53 to .78), the three measures were summed to create a single composite measure of group performance. The correlation between the composite scores of the two raters was high, $r = .93$. The average composite scores of the two raters were used in all statistical analyses of group performance. Based on the Spearman-Brown prophecy formula, the reliability of these average scores is estimated to be .96.

To make scores on the two tasks comparable, both were converted to standardized T-scores with a mean of 50 and a standard deviation of 10.

Dependent Variables

Group Performance. Scoring procedures and reliability information were presented above in the description of each task.

In addition to objective measures of group performance, a postexperimental questionnaire measured various perceptions and attitudes relevant to the task phase of the experiment. Two versions of this questionnaire were used: one for leaders and one for followers. The two questionnaires were equivalent except for grammatical structure on some items (use of first person versus third person in reference to the leader). For purposes of analysis, leader and follower responses were treated separately.

additional factors were internal to the followers (motivation, intelligence, and followership ability of the followers). The seventh factor was external to both leaders and followers (luck). The contribution of each of these factors to group performance was rated on an 8-point semantic differential scale (with "to a great extent" and "not at all" listed as the scale anchors).

Attributions About Leader Performance. A similar format was used to assess attributions about the causes of the "leader's performance as a leader." Again, there were several factors internal to the leader (ability to lead, hard work, and expert ability on the task). Another factor was internal to the followers (cooperation of followers). Finally, two additional factors were external to both the leader and the followers (task difficulty, luck). The same scale format was used for these attributions as for the group performance attributions described above.

RESULTS AND DISCUSSION

Each dependent variable was analyzed separately with the univariate $2 \times 2 \times 2 \times 2$ (Leader LPC x Leader Sex x Follower AWS x Task Structure) analysis of variance described above. These analyses resulted in 795 different F tests (15 tests for each of 53 dependent variables). A total of 84 of these tests provided F ratios significant at the $p < .05$ level. Thus, we have more than twice as many significant effects as expected by chance alone. All F tests significant at $p < .05$ are identified with an asterisk. Each column in Table 1 presents results for a different dependent variable. If the brief labels given to dependent variables in this table are not clear, the reader should consult the method section or the appendix. (Note that individual items from the postexperimental questionnaire are identified by item number to facilitate cross-checking.)

The following format will be used to describe and discuss the findings. First, results concerning objective measures of group performance will be described and discussed. The second part of this section will summarize the many significant effects found in leader and follower responses to the postexperimental questionnaire. The third part will focus on data providing a test of Fiedler's Contingency Model of leadership.

Because of the large amount of data to be discussed, description and interpretation of results are combined in this section. The final two sections of the report will attempt to integrate these findings into a coherent set of general conclusions and implications the data have for effective integration of women into the corps of West Point cadets.

Table 1

Summary of Significant F Tests*

Dependent variables	Group Atmosphere	LBRS-Initiation of Structure	LBRS-Consideration	Leader Contribution- % (1)	Member Contribution- % (1)	Perceived Success of Group (2)	Member Motivation (4a)	Leader Intelligence (4b)	Leadership Ability of Leader (4c)	Effective Followership (4d)	Luck (4e)	Member Intelligence (4f)	Leader Motivation (4g)	Importance of Having Leader (5)	Concern with Task Goal (6)	Success on Next Task (7)	Appropriateness of Leader Behavior (11)	Leader Fulfilled Duties (12)	Leader Expert Ability (13a)	Leadership Ability of Leader (13b)	Task Difficulty (13c)	Luck (13d)	Leader Hard Work (13e)	Member Cooperation (13f)	Expectation for Next Task (14)	Work with Group Again (15)
Leaders' rating																										
A (Leader LPC)								*	*						*											
B (Leader Sex)								*	*																	
C (Leader AWS)								*	*																	
A x B								*	*																	
A x C								*	*																	
B x C								*	*																	
A x B x C								*	*																	
D (Task Structure)	*	*		*	*	*	*	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
A x D								*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
B x D								*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
C x D								*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
A x B x D								*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
A x C x D								*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
B x C x D								*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
A x B x C x D	*	*						*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Table 1 (continued)

Summary of Significant F Tests*

Dependent variables	Group Atmosphere	LBRS-Initiation of Structure	LBRS-Consideration	Leader Contribution-% (1)	Member Contribution-% (1)	Perceived Success of Group (2)	Member Motivation (4a)	Leader Intelligence (4b)	Leadership Ability of Leader (4c)	Effective Followership (4d)	Luck (4e)	Member Intelligence (4f)	Leader Motivation (4g)	Importance of Having Leader (5)	Concern with Task Goal (6)	Success on Next Task (7)	Appropriateness of Leader Behavior (11)	Leader Fulfilled Duties (12)	Leader Expert Ability (13a)	Leadership Ability of Leader (13b)	Task Difficulty (13c)	Luck (13d)	Leader Hard Work (13e)	Member Cooperation (13f)	Expectation for Next Task (14)	Work with Group Again (15)
Followers' rating																										
A (Leader LPC)				*	*																*					
B (Leader Sex)				*	*																*					
C (Follower AWS)		*																								
A x B											*											*				
A x C																						*				
B x C	*	*																				*	*			
A x B x C																						*	*			
D (Task Structure)	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
A x D																										
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A x B x C x D			*			*						*														

Note. *Indicates significance at the $p < .05$ or better. Parentheses in boxheads indicate question number (see appendix for questionnaire).

As a final stylistic note, the reader should be aware that F ratios and probability levels will not be presented in the text itself; this information is contained in the tables relevant to each effect. Unless otherwise specified, all results presented have achieved significance with $p < .05$ or stronger. Finally, degrees of freedom is 1/64 for all the F tests (both the within and between error terms happen to have $df = 64$ for this design).

Group Performance

Results from the analysis of variance on the objective measures of group performance are summarized in the first column of Table 1. Three of these effects were significant: Leader Sex, Task Structure x Follower AWS, and Leader LPC x Leader Sex x Follower AWS. In examining the mean scores reflecting these effects, recall that performance scores for both tasks were converted to standardized T scores ($X = 50$, $SD = 10$) to insure comparability across the two tasks. (Of course, this procedure insures that one does not detect a main effect for Task Structure.)

The main effect for Leader Sex indicated that groups with male leaders ($X = 51.90$) performed better than did groups with female leaders ($X = 48.10$).

Figure 1 shows the Task Structure x Follower AWS interaction. Groups composed of followers with positive attitudes toward women performed better on the proposed task, whereas groups composed of followers with negative attitudes toward women performed better on the drawing task.

The final significant effect for group performance was the Leader LPC x Leader Sex x Follower AWS Interaction. As shown in Figure 2, the relationship between LPC and group performance was quite different for male and female leaders.

Among female leaders, there was no difference in the effectiveness of groups with high- and low-LPC leaders when followers had positive attitudes toward women. However, in groups having followers with negative attitudes toward women, task-oriented (low LPC) female leaders were much more effective than relationship-oriented (high LPC) female leaders.

Among male leaders, the Leader LPC x Leader Sex x Follower AWS interaction indicated that follower attitudes toward women introduced a complete reversal in the relationship between leader LPC and group performance. In groups with positive follower attitudes toward women, groups with task-oriented (low LPC) leaders were more productive than groups with relationship-oriented (high LPC) leaders. In groups with negative follower attitudes toward women, the opposite pattern prevailed: groups with relationship-oriented (low LPC) leaders were more productive than groups with task-oriented (high LPC) leaders.

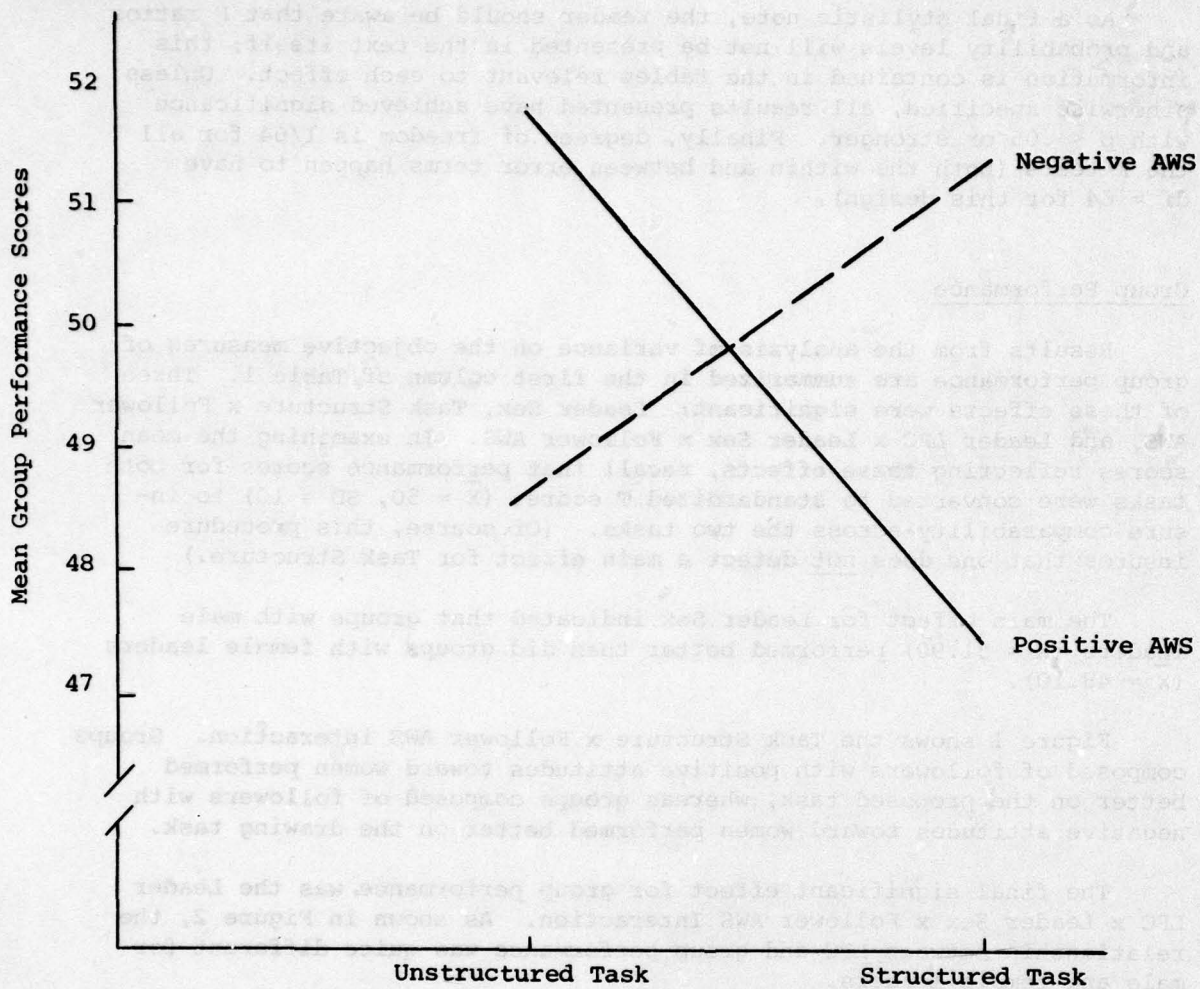


Figure 1. Interaction of Task Structure x Follower AWS on group performance.

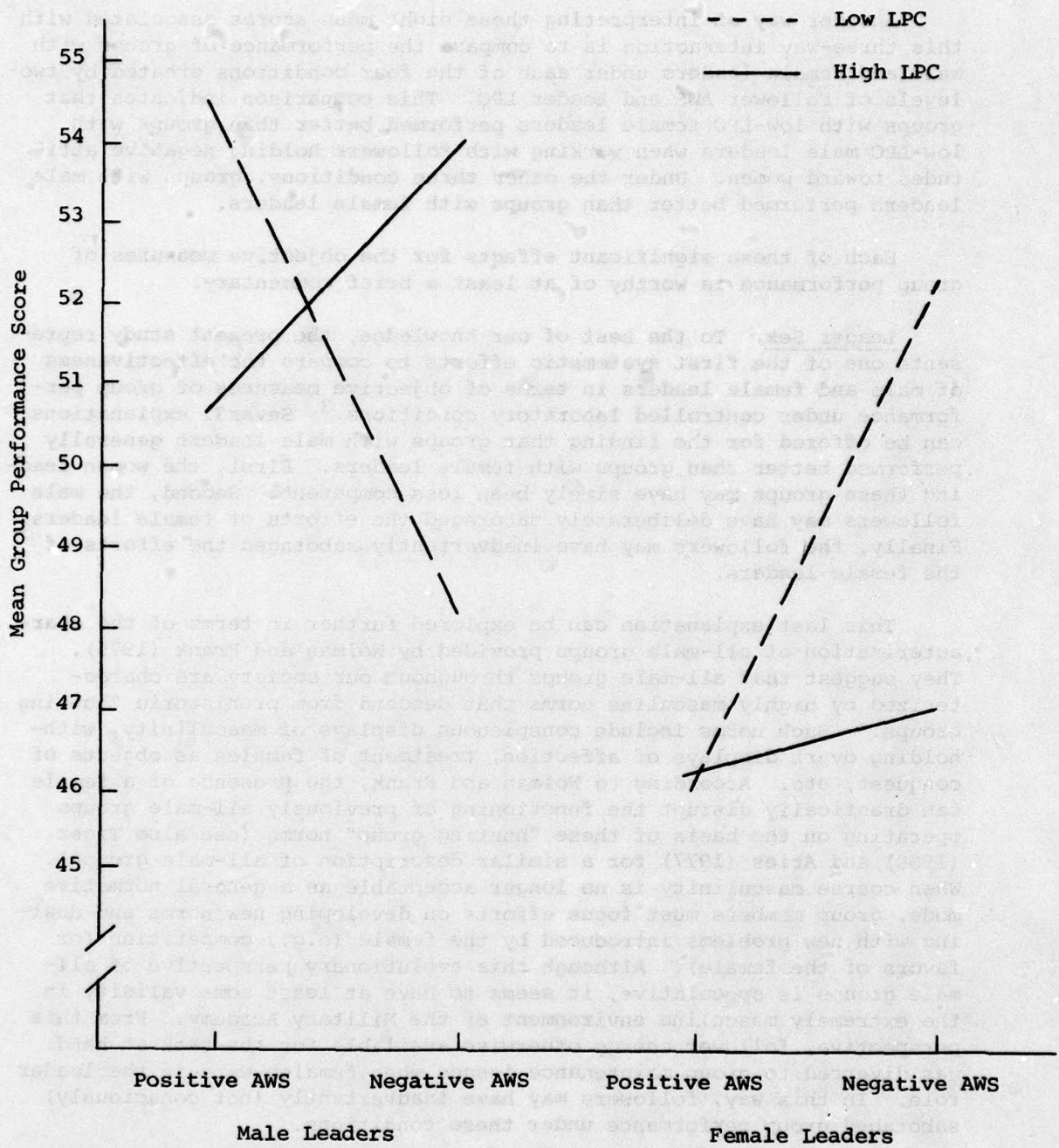


Figure 2. Interaction of Leader LPC x Leader Sex x Follower AWS on group performance.

Another way of interpreting these eight mean scores associated with this three-way interaction is to compare the performance of groups with male and female leaders under each of the four conditions created by two levels of Follower AWS and Leader LPC. This comparison indicates that groups with low-LPC female leaders performed better than groups with low-LPC male leaders when working with followers holding negative attitudes toward women. Under the other three conditions, groups with male leaders performed better than groups with female leaders.

Each of these significant effects for the objective measures of group performance is worthy of at least a brief commentary.

Leader Sex. To the best of our knowledge, the present study represents one of the first systematic efforts to compare the effectiveness of male and female leaders in terms of objective measures of group performance under controlled laboratory conditions.³ Several explanations can be offered for the finding that groups with male leaders generally performed better than groups with female leaders. First, the women leading these groups may have simply been less competent. Second, the male followers may have deliberately sabotaged the efforts of female leaders. Finally, the followers may have inadvertently sabotaged the efforts of the female leaders.

This last explanation can be explored further in terms of the characterization of all-male groups provided by Wolman and Frank (1975). They suggest that all-male groups throughout our society are characterized by highly masculine norms that descend from prehistoric "hunting groups." Such norms include conspicuous displays of masculinity, withholding overt displays of affection, treatment of females as objects of conquest, etc. According to Wolman and Frank, the presence of a female can drastically disrupt the functioning of previously all-male groups operating on the basis of these "hunting group" norms (see also Tiger (1969) and Aries (1977) for a similar description of all-male groups). When coarse masculinity is no longer acceptable as a general normative mode, group members must focus efforts on developing new norms and dealing with new problems introduced by the female (e.g., competition for favors of the female). Although this evolutionary perspective of all-male groups is speculative, it seems to have at least some validity in the extremely masculine environment of the Military Academy. From this perspective, follower energy otherwise available for the task at hand was diverted to group maintenance issues when females were in the leader role. In this way, followers may have inadvertently (not consciously) sabotaged group performance under these conditions.

³ Jacobson and Effertz (1974) also made such a comparison, but their study was limited to a single 5-minute task. Under conditions of this limited interaction they found no differences in the performance of groups with male and female leaders.

Unfortunately, the design of this study does not provide an empirical basis for choosing between the several alternative explanations of the Leader Sex effect on group performance. The function of this study has been to document the fact that sex of the leader can influence group outcomes. Our postexperimental questionnaire data collected from both leaders and followers may provide some clues regarding the dynamics of this effect. However, full explanation of this phenomenon will require additional research that objectively measures the group process underlying the observed differences in performance by groups with male and female leaders.

Process research of the type suggested above could have important organizational implications. Such research could identify factors (tasks and contexts) which hinder or facilitate the effectiveness of male and/or female leaders. Organizational practices intended to improve leadership effectiveness of both male and female leaders could be based on such research.

Finally, the superior performance of groups with male leaders should not be interpreted as evidence that groups with male leaders will always perform better than groups with female leaders. Most likely, future research will show that the relative effectiveness of male and female leaders is contingent on the tasks and context of the group. Further research is needed to map out the nature of these contingencies.

Follower AWS. The Follower AWS x Task interaction group performance is best interpreted by examining the nature of the two tasks. It seems that the drawing task fits the stereotype of a masculine task, i.e., reliance on calculations, spatial arrangements, and rapid production requirements. The proposal task, however, is somewhat less masculine in that it stresses verbal and group interaction skills in both the discussion and writing phases of the task. The interaction effect indicates that groups composed of followers with traditional masculine attitudes (i.e., negative AWS) performed better on what appears to be a stereotypically masculine task. Conversely, groups composed of followers with more liberated sex-role attitudes (positive AWS) performed more effectively on the apparently less masculine task. This interpretation fits well with the growing body of empirical data concerning the attitudinal and behavioral correlates of the AWS score. To the best of our knowledge, it is the first time attitudes toward women have been related to a measure of task performance (on either an individual or group level of analysis).

Leader LPC. The implications of the significant Leader LPC x Leader Sex x Follower AWS will be explored more fully in the section assessing Fiedler's Contingency Model. For present purposes, it is sufficient to note that this interaction demonstrated different relationships between leader LPC and group performance for male and female leaders. Such results suggest that LPC scores and/or situational factors (in this case follower attitudes toward women) can have quite different meanings for male and female leaders. At the least, these findings indicate that further examination of potential sex bias may be worthwhile with regard

to measurement procedures, theory, and organizational practices (e.g., selection, training, evaluation) related to leadership. The increasing numbers of females in management positions gives special urgency to evaluating possible sex bias of these sorts.

Postexperimental Questionnaire Data

Following each task, all members of the group completed a postexperimental questionnaire. Leader and follower data were analyzed separately. The responses of the three followers in each group were combined to provide an average follower response to each item. These mean follower scores formed the data submitted to statistical analysis for each of the dependent variables.

As shown in Table 1, 52 separate analyses of variance were carried out on the variables derived from the postexperimental questionnaire (26 for leader responses and 26 for follower responses). To present the results from so many analyses, the data will be organized in terms of clusters of variables showing similar effects. We will begin by discussing variables yielding significant main effects associated with Task Structure, Leader Sex, and Follower AWS. We will then discuss first-, second-, and third-order interactions. In many cases these higher order interactions moderate the simpler effects shown in main effects or lower order interactions. In this sense, the description and interpretation of results will progress from lesser to greater levels of complexity.

Some of the 15 main effects and interaction effects tested failed to produce a consistent pattern of results for several of the dependent variables. Instead, only one or two dependent variables showed the effect. Unless these scattered effects were of special theoretical or practical importance, they were labeled as miscellaneous effects and described in the final part of this section. In this way, all the significant effects presented in Table 1 are at least described in terms of mean scores portraying the effect. However, the more robust and apparently more meaningful results are given primary attention.

Task Structure. As shown in Table 1, 27 variables from the postexperimental questionnaire showed significant Task Structure main effects. Of these, 12 were leader responses and 15 were follower responses. These two sets of results are treated separately below.

Leaders

The 12 leader variables yielding significant main effects as a function of Task Structure were (1) group atmosphere, (2 and 3) perceptions regarding the percentage of the final group outcome resulting from contributions by the leader and the average percentage resulting from each of the three followers, (4) attributions concerning the degree to which

member motivation influenced group performance, (5 through 7) attributions concerning the degree to which the leader's expert ability, the leader's general leadership ability, and task difficulty influenced the performance of the leader, (8) perceived success of the group, (9) perceptions of how well the group would perform on a similar task in the future, (10) degree to which the leader would enjoy leading this group again, (11) LBRS score for Initiating Structure, and (12) importance of having a group leader. Table 2 gives the mean scores on these variables for leaders working on the drawing (structured) and proposal (unstructured) tasks.

The leader data show a consistent pattern of better morale and a stronger sense of accomplishment on the drawing task. On that task, leaders indicated that group atmosphere was better, that the group had been more successful, that they expected to do better on future tasks with this group, and that they would enjoy working with this group in the future. A marginal effect ($p < .06$) indicated that leaders also felt that they had better fulfilled the duties of leadership on the drawing task. In short, the cadet leaders liked the drawing task and felt that they and their groups had performed well on this task.

The leader attribution items showing this main effect generally indicate that leaders felt that factors internal to the leader had a strong causal impact on group performance on the proposal task. Leaders felt that they made a greater contribution to group performance, relative to followers, on the proposal task. Similarly, they felt expert ability and leadership ability were stronger determinants of their own performance as leaders on the proposal task. Conversely, leaders made weaker external attributions (task difficulty and follower motivation) on the proposal task. Finally, leaders felt it was more important to have a leader for the proposal task. In short, leaders felt a greater sense of personal responsibility on the proposal task than on the drawing task.

Followers

Fifteen follower variables yielded significant Task Structure effects: (1) group atmosphere, (2 and 3) perceptions regarding the degree to which leader and members contributed to group performance, (4) attributions concerning the degree to which follower cooperation influenced the performance of the leader, (5 through 7) attributions concerning the degree to which follower motivation, ability of the followers to be effective followers, and follower intelligence influenced the performance of the group, (8) perceived success of the group, (9) perceptions of how well the group would perform on a similar task in the future, (10) degree to which followers felt they could be successful in leading the group, (11) LBRS score for Initiating Structure, (12) perceptions of the leader's concerns for task success (versus interpersonal success), (13) general appropriateness of the leader's behavior, (14) degree to which leader fulfilled the duties of leadership, and (15) desire to work under direction of this leader on a similar task in the future. Table 2

Table 2
Main Effects for Task Structure

Variable	Structured task	Unstructured task	F
Leaders' rating			
Group atmosphere	68.80	59.30	14.05***
Leader Contribution (1)	25.44 ^b	31.35	11.64**
Follower Contribution (1)	24.85 ^b	22.88	11.64**
Member Motivation (4a)	6.14	5.58	5.59*
Leader Expert Ability (13a)	4.57	5.14	8.12**
Leadership Ability of Leader (13b)	5.19	6.50	4.97*
Task Difficulty (13c)	5.22	4.57	4.33*
Perceived Success of Group (2)	6.76	5.90	24.06***
Success on Similar Task (7)	6.83	6.04	23.04***
Enjoy Working with Group Again (15)	6.83	6.43	5.49*
LBRS-Initiating Structure	32.30	29.75	12.89***
Importance of Having Leader (5)	4.65	5.47	8.99**
Extent Leader Fulfilled Duties (12)			3.74
			(p < .06)
Followers' rating			
Group Atmosphere	67.46	58.93	62.37***
Leader Contribution (1)	25.19 ^b	29.29	5.50*
Follower Contribution (1)	24.98 ^b	23.56	6.08*
Member Cooperation (13f)	7.20	6.26	43.23***
Member Motivation (4a)	5.66	5.14	11.37**
Effective Followership (4d)	6.01	5.10	28.96***
Member Intelligence (13f)	6.48	6.07	9.82**
Perceived Success of Group (2)	6.60	5.73	36.53***
Success on Similar Task (14)	6.57	5.80	2.73*
Member Success in Leading (15)	6.57	6.01	24.13***
LBRS-Initiating Structure	28.30	26.05	19.58***

Table 2 (continued)

Main Effects for Task Structure

Variable	Structured task	Unstructured task	F
Concern for Task Goals (6)	6.41	6.00	11.51**
Appropriateness of Leader Behavior (11)	6.29	5.86	8.04**
Extent Leader Fulfilled Duties (12)	6.01	5.61	7.68**
Work with Leader Again (16)	5.71	5.46	4.85*
Luck (4e)	2.23	2.48	3.62
			(p < .06)

^a Except where otherwise noted, single-item scores range from 1 to 8; composite scores are simple sums of several eight-point items.

^b Score is in percent.

*p < .05.

**p < .01.

***p < .001.

shows the significant mean scores for followers working on the drawing and proposal task. The picture suggested by these data is much like that found in the leader data.

Followers, like leaders, indicated higher morale, satisfaction with the leader, and feelings of success on the drawing task. They rated group atmosphere higher and indicated that they would enjoy working under this leader in the future. They also felt the group was more successful on the drawing task. Further, followers described the leader as engaging in more Initiation of Structure on this task and felt that the leader's behavior was generally more appropriate. They also felt that the leader had better fulfilled the leadership responsibilities on the drawing task and that they could be more effective themselves if they were to be a leader on this task. As was the case with leaders, follower responses indicate that working on the drawing task was a very positive experience (relative to working on the proposal task).

The attribution items for followers also tend to corroborate the leader data. The leader was generally seen as a more crucial force on the proposal task. Followers perceived that leaders contributed more (and members less) on the proposal task than on the drawing task. They also felt that follower cooperation, their effectiveness as followers, follower motivation, and follower intelligence were less important contributors to group and leader performance in the proposal task than on the drawing task. Finally, in a marginal effect ($p < .06$), followers saw luck, an external factor, as being a more important cause of group performance on the drawing task. Taken together, the attribution data indicate that followers felt that the leader was more responsible for performance of the group on the proposal task than on the drawing task.

The leader and follower data dealing with task effects are highly similar. Both indicate that the morale and perceived effectiveness of the group and the leader were higher on the drawing task. Our informal observation of the groups during the experiment support these data. The cadets appeared far more active, involved, and happy while working on the drawing task. The second finding, shown in both the leader and follower data, concerns attributions of responsibility. Both sources attributed performance on the proposal task to the leader and felt that the followers were more responsible for performance on the drawing task. There are several important implications in these findings.

First, these data further document the often overwhelming effects of the task variable on group process. As Hackman (1968) has shown, the nature of the group task is often the most important single determinant of various aspects of group process and group outcomes.

Second, the attribution results are interesting in their own right. The finding that leaders are perceived to be more responsible for performance of unstructured group tasks seems to fit in with the general tone of path-goal approaches to leadership (House & Mitchell, 1974).

This approach to leadership proposes that the structure of the situation can moderate the impact of different forms of leader behavior. Perhaps attributional processes, similar to those identified here, play some role in these moderating effects. Future research in the path-goal tradition should perhaps include measures of attribution processes to elucidate the moderator effects proposed.

Third, and most important for this study, these main effects for Task Structure are helpful in understanding the interaction effects discussed later that involve the Task Structure variable. The drawing task appeared to fit much better with the engineering and math skills emphasized during the first year of the West Point curriculum. The proposal task, however, may have presented a more frustrating situation to the cadets, because the topic for discussion may have been beyond their experiences at the academy. Whatever the reason, it is clear that cadets felt more comfortable and at ease with the drawing task than with the proposal task. The reaction to these two tasks was an important factor in many interaction effects.

Follower AWS. Table 1 shows that significant main effects for Follower AWS were seen on four measures provided by the postexperimental questionnaire (three from followers and one from leaders).

Leaders

As indicated in Table 3, the only leader response yielding a significant Follower AWS effect concerned attributions about ability to lead as a determinant of leadership performance. Leaders in groups composed of followers with positive attitudes toward women indicated that this was a more important factor than did leaders in groups with followers holding negative attitudes toward women.

Followers

Three follower responses yielded significant main effects for Follower AWS: (1) consideration behavior as measured by the LBRS, (2) overall evaluation of how well the leader fulfilled the leadership role, and (3) attributions about the degree to which luck determined the leader's performance. These results indicated that followers with negative attitudes toward women perceived the leader to be less considerate, less effectively fulfilling the duties of the leader role, and more strongly influenced by luck.

Taken together, the leader and follower data presented here suggest that the AWS measure may tap a more general syndrome of negativism. Followers with negative attitudes toward women were also generally negative in their perceptions of both male and female cadets leading their groups. Apparently this general negativism was perceived by leaders, who felt their own ability had less impact on leader performance. As shown in the section dealing with Leader Sex x Leader AWS interactions,

the difficulties created by negative AWS followers were more severe in groups with female leaders. However, these main effects suggest that to some extent followers with negative attitudes toward women created a difficult situation for both male and female leaders.

Table 3
Main Effects for Follower AWS

Variable	Positive	Negative	F
Leaders' rating			
Leadership Ability of Leader (13b)	5.58	5.21	5.03*
Followers' rating			
LBRs--Consideration Extent Leader Fulfilled Duties (12)	6.05	5.71	5.99*
Luck (13d)	6.06	5.56	5.17*
	5.69	5.43	3.89*

*p < .05.

Leader Sex. As indicated in Table 1, 10 postexperimental questionnaire measures showed statistically significant main effects for the Leader Sex variable. Both leader (4 variables) and follower (6 variables) questionnaire data reflect this effect.

Leaders

Four leader responses to the postexperimental questionnaire yielded significant Leader Sex main effects: (1) strength of social versus task goals of the leader, (2 and 3) attributions about the degree to which leader intelligence and leadership ability contributed to group performance, and (4) attributions about the degree to which expert task ability of the leader influenced the leader's performance. Table 4 presents the mean scores for these four variables.

These leader responses show a consistent pattern of self-deprecation on the part of female leaders. Compared to male leaders, female leaders made weaker internal attributions about the causes of performance by themselves and the group. Female leaders indicated that their own intelligence, leadership ability, and expert ability on the task were less

important determinants of performance than did male leaders. In a less evaluative dimension, female leaders described themselves as being less concerned about task success (relative to interpersonal success) than did male leaders.

Table 4
Main Effects for Leader Sex

Variable	Male	Female	F
Leaders' rating			
Concern for Task Goals (6)	6.54	5.78	5.66*
Leader Intelligence (4b)	5.53	4.83	4.75*
Leadership Ability of Leader (4c)	5.58	5.00	3.99*
Leader Expert Ability (13a)	5.21	4.50	5.17*
Followers' rating			
Leader Contribution (1)	25.63	28.85	4.66*
Follower Contribution (1)	24.78	23.74	4.54*
Concern for Task Goals (6)	6.39	6.02	3.90*
Member Success in Teaching (15)	6.44	6.14	3.87*
Task Difficulty (13c)	4.85	4.28	5.68*
Leader Expert Ability (13a)	4.50	4.02	4.43*
Perceived Success of Group (2)	6.30	6.01	3.35
			(p < .07)

*p < .05.

Followers

Six follower variables yielded a significant main effect as a function of Leader Sex: (1 and 2) magnitude of leader and follower contributions to group performance, (3) the strength of social versus task goals of the leader, (4) follower expectations about their own ability to be a successful leader on this task, and (5 and 6) attributions about the degree to which task difficulty and expert ability of the leader contributed to the performance of the group. Table 4 gives the mean follower scores for groups with male and female leaders on each of these variables.

Contrary to our expectations based on the existing sex-role literature, there was not a general pattern of denigrating the performance of female leaders in these follower data. Instead, the results were mixed with regard to the direction of evaluations of male and female leaders.

Only two significant results summarized in Table 4 fit in well with generally held sex-role stereotypes. Relative to female leaders, male leaders were seen as being more concerned with task success (as opposed to interpersonal success). Also, the expert ability of the leader was seen as a greater contributor to leadership performance for male leaders than for female leaders.

On the question asking subjects to estimate the percentage of total group productivity attributable to each group member, there was a tendency to favor female leaders. Female leaders were seen as making a somewhat greater contribution than male leaders. Conversely, the average contribution of male followers was seen as being somewhat less for groups with female leaders than for groups with male leaders. On the surface, these data seem to favor female leaders. However, a marginally significant effect ($p < .07$) indicated that followers evaluated the quality of group performance less favorably under female leaders than under male leaders. Thus, in attributing greater responsibility to female leaders, these followers may have actually been blaming females for the relatively poor performance of their groups. Obviously this interpretation of the data is highly speculative.

The final two results described in Table 4 are difficult to interpret in terms of general biases related to sex roles. Followers reported that the difficulty of the task was a stronger determinant of leader performance for male leaders than for female leaders. Also, followers imagined that if placed in the leadership role they could perform more successfully in groups with male leaders than in groups with female leaders.

The general absence of significant Leader Sex effects among follower questionnaire data is noteworthy. Although there were some scattered findings for this factor, there was not a general pattern of sex bias that one would expect on the basis of past literature. Male followers did not uniformly downgrade group atmosphere, the performance of the leader, and their expectations regarding future task success when working with female leaders. There was marginal tendency to downgrade performance of groups led by females, but these data do not necessarily show sex bias, since groups with female leaders actually did perform less effectively on this task.

The absence of a general sex bias among male followers in this experiment can reflect several things. First, cadets may have been aware of the focus of the project, since they knew that the Office of Military Leadership was sponsoring both this study and Project Athena. Under such conditions, male cadets may have tried to disguise their true biases. In hopes of avoiding such a problem, however, no mention of Project Athena was made in any communication with cadets involving the present study. A second interpretation of these findings is that they reflect a true absence of general sex bias among this group of male cadets. Results concerning Leader Sex x Follower AWS interactions discussed in the next section of this report support the second of these conclusions. These

interactions show a pattern of strong sex bias only for male cadets who indicated negative attitudes toward women in the AWS measure completed a full year before the experiment.

The leader self-attribution data provide an interesting extension of previous work in this area by Deaux and her associates (Deaux, 1976). This research has shown that attributions about the causes of successful performance can be influenced by the sex of the actors. With male actors, observers tend to attribute success to factors internal to the actor (skill). With female actors, observers tend to attribute success to factors external to the actor (luck). The present data suggest that some aspects of this phenomenon are transferable to self-attributions. Female leaders made weaker internal attributions about the causes of their groups' performance and their own performance as group leaders (intelligence of leader, leadership ability, expert ability on the task at hand). These findings are consistent with other attribution research outside the realm of leadership. For example, Deaux and Farris (1974) found a similar bias in self-attributions by females. As shown in the Leader Sex x Follower AWS effects discussed in the next section, this tendency for biased self-attributions by females is strongest when they are working with males who hold negative attitudes toward women.

Leader Sex x Follower AWS. Table 1 indicates that 12 variables showed statistically significant Leader Sex x Follower AWS interactions. Both follower and leader responses to the postexperimental questionnaire reflect these effects. Data from these two sources are reported separately below.

Leaders

Six leader variables yielded significant Leader Sex x Follower AWS interactions: (1) importance of having a leader (2) appropriateness of the leader's behavior, and (3 through 6) attributions regarding the contributions of four different factors as determinants of the leader's performance (cooperation of members, task difficulty, leader's expert ability on the task at hand, and luck). Table 5 shows the relevant mean scores for these six leader responses.

There are two distinct patterns among these data. Four variables show complete crossovers in the Leader Sex x Follower AWS interaction: evaluations regarding the general appropriateness of the leader's own behavior and attributions concerning luck, task difficulty, and cooperation of members as determinants of leader performance. In groups with positive AWS followers, female leaders felt that their behavior was more appropriate and saw all three of these external factors as stronger determinants of leader performance than did male leaders. In groups with negative AWS followers, the opposite pattern prevailed; male leaders felt their behavior was more appropriate and rated these three factors as stronger contributors to leader performance than did female leaders.

Table 5

Interaction of Leader Sex x Follower AWS

Variable	Positive		Negative		F
	Male	Female	Male	Female	
Leader's rating					
Importance of Having Leader (5)	4.83	5.29	5.75	4.39	5.29*
Member Cooperation (13f)	7.17	7.50	7.50	7.19	4.05*
Task Difficulty (13c)	4.39	5.25	5.28	4.42	7.64**
Leader Expert Ability (13a)	5.00	5.06	5.42	3.94	6.01*
Luck (13d)	1.81	2.56	2.61	2.08	4.75*
Leadership Ability of Leader (13b)					
Followers' rating					
Group Atmosphere	46.30	46.60	47.90	46.60	4.54*
LBRS-Initiating Structure	26.80	29.00	28.30	24.55	10.02**
Luck (4e)	2.39	1.94	2.27	2.82	4.39*
Luck (13d)	2.19	1.78	2.01	2.66	9.14**
Leader Hard Work (13e)	4.41	4.96	5.10	4.58	4.78*
Member Cooperation (13f)	6.51	6.76	7.06	6.60	4.66*
Appropriateness of Leader Behavior (11c)	6.16	6.69	6.64	6.28	3.58
					(p < .06)

*p < .05.

**p < .01.

Attributions about the degree to which expert ability influenced leader performance and the perceived importance of having a group leader showed a different form of the Leader Sex x Follower AWS interaction. In groups with positive AWS followers, there was no real difference between male and female leaders on either response. However, in the groups with negative followers, there was a dramatic difference, indicating that female leaders felt it was less important to have a leader and that the leader's expert ability had little influence on the performance of the leader. A marginal ($p < .06$) effect for attributions concerning the influence of general leadership ability showed exactly the same pattern.

Followers

Six follower variables yielded significant interactions of this type: (1) the Group Atmosphere scale; (2) LBRS Initiating Structure; (3) attributions about luck as a contributing factor to group performance; and (4 through 6) attributions about luck, hard work, and cooperation of members as determinants of the leader's performance. Table 5 gives the relevant mean scores for these six follower responses. All six variables show a similar pattern. Followers with negative attitudes toward women provided less favorable postexperimental questionnaire responses when led by a female than when led by a male. The details of these several follower responses are given below.

Followers with negative attitudes toward women rated group atmosphere more favorably under male leaders than under female leaders. Followers with positive attitudes toward women showed little difference in group atmosphere ratings under male and female leaders. Basically the same pattern was shown on the followers' descriptions of Initiating Structure behavior on the part of the leader.

The four follower attribution items showed a slightly different pattern than described for the two previous variables. Followers with negative attitudes toward women tended to make less flattering attributions about the causes of group and leader performance under female leaders than under male leaders. These followers indicated that hard work on the leader's part and the cooperation elicited from other group members were stronger determinants of the leader's performance for males than for females. However, these same followers saw luck as being a stronger determinant of both leader and group performance for female than for male leaders. Conversely, followers with positive attitudes toward women tended to make more flattering attributions with female leaders than with male leaders. They reported that hard work and member cooperation were stronger determinants of performance by female leaders and that luck played a bigger factor for male leaders. Figures 3 and 4 present these results for the hard work and luck variables, respectively.

The data reflecting the Leader Sex x Follower AWS interaction fit well with the previous work involving the AWS and with Deaux's (1976) work involving sex biases in attributions.

Construct Validity for the AWS

Both leader and follower results presented in this section can be interpreted as providing strong construct validation evidence for the AWS. Male followers indicating negative views of women on the AWS also expressed negative views of women leaders on the postexperimental questionnaire. When in a group with female leaders (relative to groups with male leaders), these followers described group atmosphere less favorably, described female leaders as initiating less structure in the group, and made less favorable attributions about the causes of leader and group

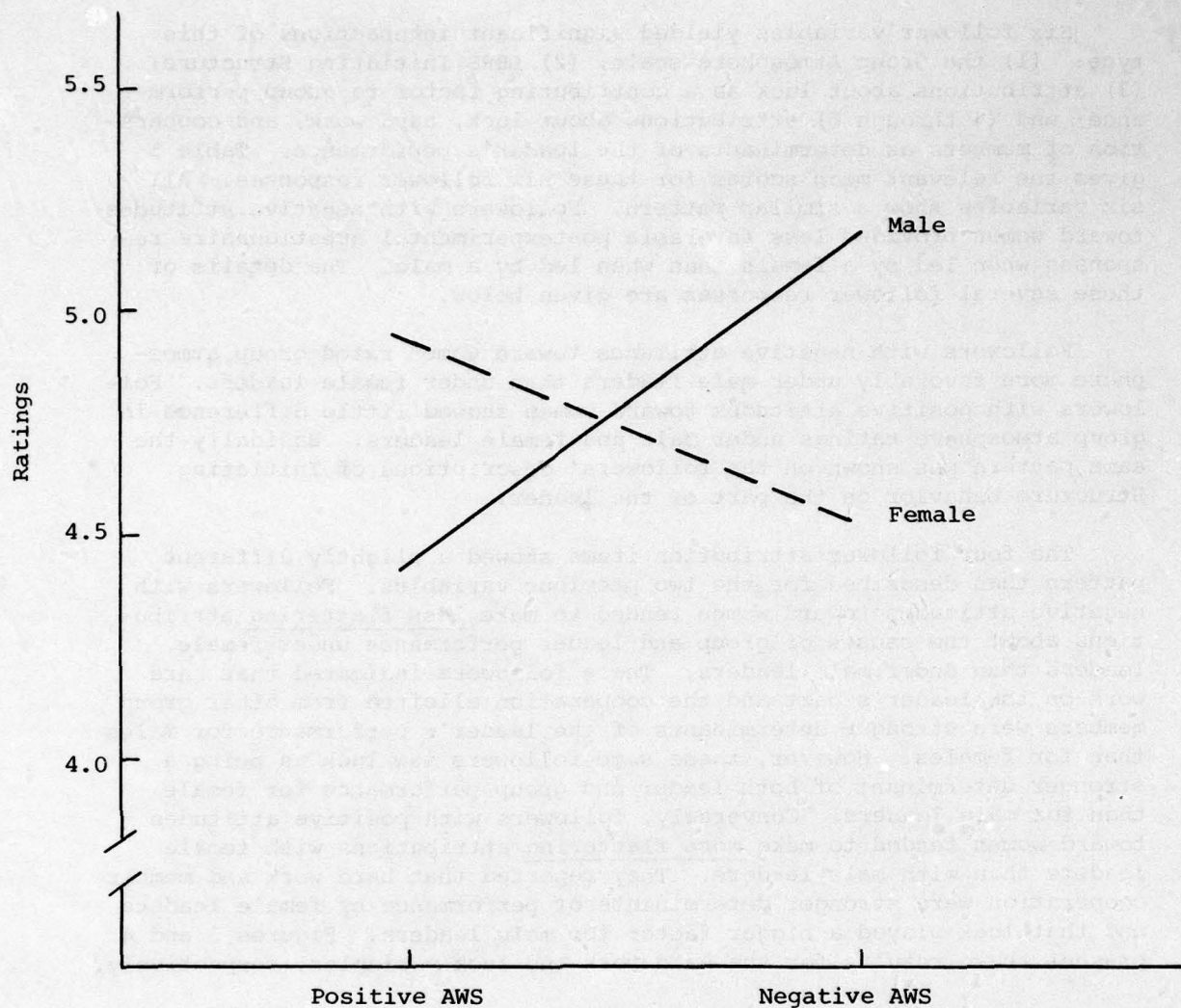


Figure 3. Interaction of Leader Sex x Follower AWS on member ratings of hard work as a contributing factor to leader performance.

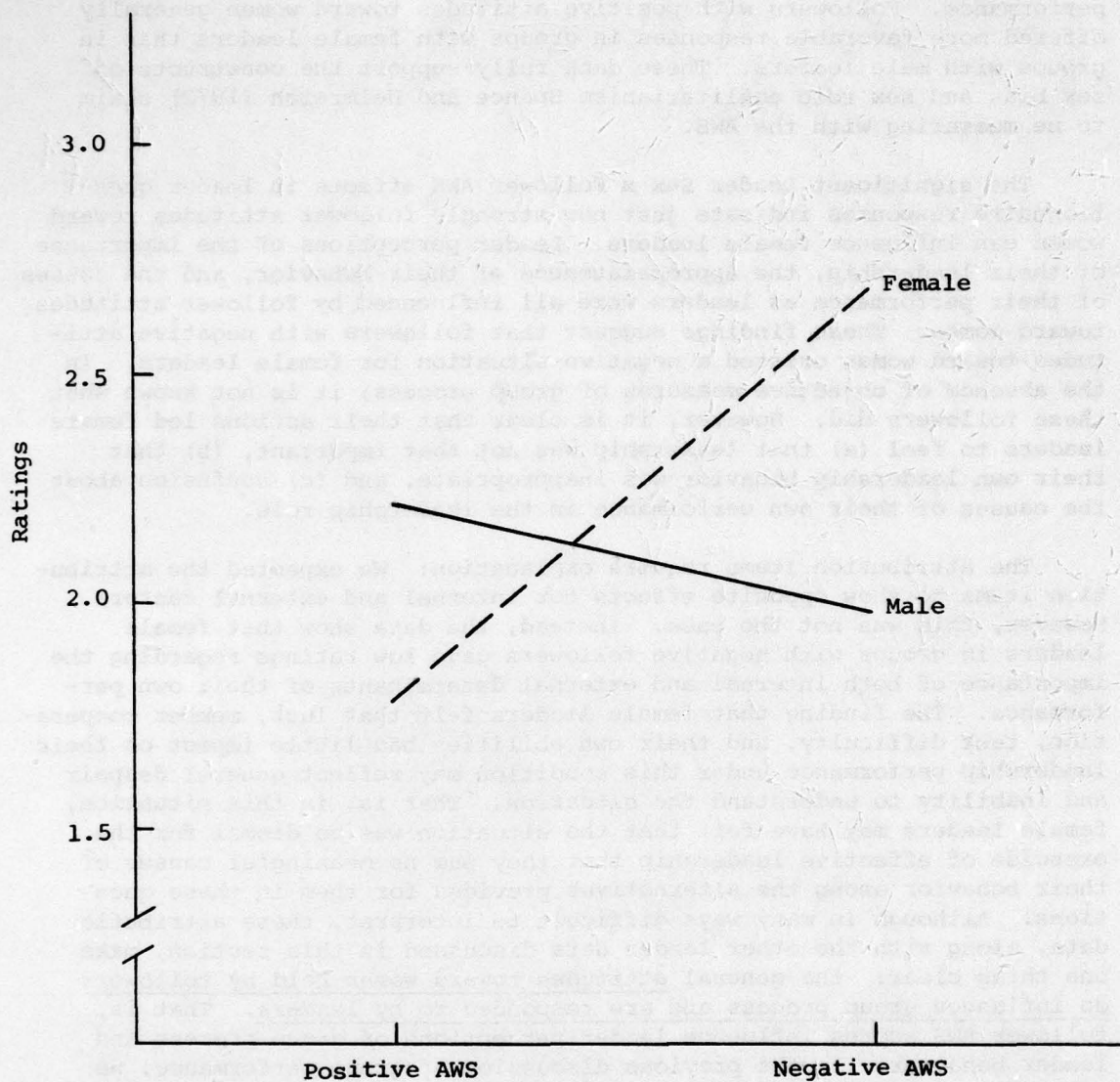


Figure 4. Interaction of Leader Sex x Follower AWS on member ratings of luck as a contributing factor to leader performance.

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performance. Followers with positive attitudes toward women generally offered more favorable responses in groups with female leaders than in groups with male leaders. These data fully support the constructs of sex bias and sex role egalitarianism Spence and Helmreich (1972) claim to be measuring with the AWS.

The significant Leader Sex x Follower AWS effects in leader questionnaire responses indicate just how strongly follower attitudes toward women can influence female leaders. Leader perceptions of the importance of their leadership, the appropriateness of their behavior, and the causes of their performance as leaders were all influenced by follower attitudes toward women. These findings suggest that followers with negative attitudes toward women created a negative situation for female leaders. In the absence of objective measures of group process, it is not known what these followers did. However, it is clear that their actions led female leaders to feel (a) that leadership was not that important, (b) that their own leadership behavior was inappropriate, and (c) confusion about the causes of their own performance in the leadership role.

The attribution items require explanation. We expected the attribution items to show opposite effects for internal and external factors. However, this was not the case. Instead, the data show that female leaders in groups with negative followers gave low ratings regarding the importance of both internal and external determinants of their own performance. The finding that female leaders felt that luck, member cooperation, task difficulty, and their own abilities had little impact on their leadership performance under this condition may reflect general despair and inability to understand the situation. That is, in this situation, female leaders may have felt that the situation was so dismal for the exercise of effective leadership that they saw no meaningful causes of their behavior among the alternatives provided for them in these questions. Although in many ways difficult to interpret, these attribution data, along with the other leader data discussed in this section, make one thing clear: the general attitudes toward women held by followers do influence group process and are responded to by leaders. That is, follower AWS scores influence leader perceptions of group process and leader behavior. In the previous discussion of group performance, we described a significant Task Structure x Follower AWS effect in those data. To the best of our knowledge, this is the first empirical evidence for group effects of this type based on the Spence and Helmreich (1972) AWS measure. The AWS effects in the present study are even more impressive when one recalls that this measure was taken a full year before the experiment.

It is interesting to note that several of the variables indicate that male leaders were as strongly influenced by follower attitudes toward women as were female leaders. On five of the seven leader variables reported in Table 5, the difference between leader scores in groups with negative and positive followers was of a magnitude approximately as great as the difference shown by female leaders (attributions about the influence of expert ability and general leadership ability on

leader performance were the only variables that failed to show such differences among male leaders). Of course, the direction of these effects for male leaders was opposite that for females; e.g., male leaders made stronger attributions when working with negative AWS followers. Such results further document the strength of the AWS variable. Male leaders, as well as female leaders, react to such attitudes among their followers.

Attributional Biases

The follower data presented in this section support previous research by Deaux and her associates (Deaux, 1976) dealing with sex bias in attributional processes. This research has shown that luck is more often seen as the cause of success by a female, whereas skill is more often seen as the cause of success by a male. Similar results are found in the present study. These data extend previous work in this area in two ways.

First, the Leader Sex x Follower AWS results in follower responses on the postexperimental questionnaire indicate that the strength of sex role attributional bias can be moderated by general attitudes toward women held by the respondent. As discussed in the section dealing with main effects for the Leader Sex variable, followers did not show any general patterns of sex bias in attributions regarding female leaders. Only followers with negative attitudes toward women showed such a bias. Followers with positive attitudes toward women actually showed some tendency to bias their attributions in a direction favoring women. Precisely this same moderator effect was shown in a recent attribution study by Garland and Price (1977) using a different measure of sex role attitudes (the Women As Managers Scale, WAMS). Finally, note that leader self-attributions were also moderated by the attitudes of their followers.

The uncontrolled nature of the information flow in the present study provides the second extension of Deaux's basic findings. Previous experimental work has carefully controlled the information subjects receive about the quality of task performance. Usually a written scenario or a tape recording is used to indicate the degree of success achieved by a male or female target. In the present study, perceptions of success were not experimentally controlled. Instead, such perceptions were free to vary as one part of the group process experienced by all subjects. However, this sex bias in attributions expressed itself in statistically significant effects in such uncontrolled conditions. Such results suggest that the effect first discovered by Deaux and her associates is quite robust.

Task Structure x Follower AWS. As shown in Table 1, only one variable yielded a significant Task Structure x Follower AWS interaction: follower perceptions of the leader as being primarily concerned with task success (as opposed to interpersonal success). Table 6 presents the mean score for this measure.

Table 6

Interaction of Task Structure x Follower AWS

Variable	Positive		Negative		F
	Structured	Unstructured	Structured	Unstructured	
Followers' rating					
Concern for Task Goals (6)	6.41	5.74	6.41	6.26	4.66*

*p < .05.

Follower ratings of the leader's concern with task success (versus interpersonal success) suggest that followers with negative attitudes toward women felt the leader was primarily concerned with task success, regardless of the task. Perceptions of followers with positive attitudes toward women, however, were strongly influenced by the structure of the task (leaders were seen as primarily concerned about task success only on the structured drawing task). This effect is most easily interpreted if one assumes that negative AWS scores represent a general syndrome of traditionally masculine values and attitudes. One part of this proposed syndrome is instrumental, task-oriented values. Given such an assumption, the present data may reflect some distortion on the part of follower perceptions. That is, task-oriented (negative AWS) followers may have been projecting their own values when they rated the leader as being very concerned with task success under both conditions. On the other hand, those values among followers may have influenced the leader's actual concerns in the direction of task success on both tasks (in part as a reaction to task-oriented followers). Further research, with objective measures of group process, is needed to assess the relative merits of these two interpretations.

Task Structure x Leader Sex. Table 1 shows six statistically significant Task Structure x Leader Sex interaction effects (four variables were based on leader questionnaire responses and two variables were based on follower responses).

Leaders

The four leader variables showing this effect were (1) perceived importance of having a leader, (2 and 3) attributions concerning the degree to which hard work and expert ability on the part of the leader contributed to the leader's performance, and (4) attributions concerning the degree to which the leader's general leadership ability contributed to the performance of the group. Table 7 presents the relevant mean scores for these variables.

All four leader responses show the same pattern on the drawing task. While working on this task, male leaders (relative to female leaders) indicated that it was more important to have a leader and made stronger internal attributions about the causes of their own performance and the performance of the group (i.e., leadership ability, task expertise, and hard work). The pattern on the proposal task generally shows that the differences between the responses of male and female leaders was minimal. However, for the attribution of leader hard work, female leaders tended to make stronger attributions of this type on the proposal task.

Table 7
Interaction of Task Structure x Leader Sex

Variable	Male		Female		F
	Structured	Unstructured	Structured	Unstructured	
Leaders' rating					
Importance of Having a Leader (5)	5.28	5.31	4.00	5.64	8.53**
Leader Hard Work (13c)	5.22	4.92	4.56	5.33	5.70*
Leader Expert Ability (13a)	5.14	5.28	4.00	5.00	4.64*
Leadership Ability of Leader (13b)	5.81	5.36	4.61	5.39	6.19*
Followers' rating					
Hard Work (13e)	5.09	4.42	4.72	4.83	3.95*
Luck (4e)	2.03	2.63	2.42	2.33	6.96*

*p < .05.

**p < .01.

Followers

Two follower variables showed significant Task Structure x Leader Sex attributions: (1) attributions concerning the degree to which hard work contributed to the leader's performance and (2) attributions concerning the degree to which luck contributed to group performance. Table 7 shows the mean scores for both follower variables showing this effect.

Follower responses to the item concerning the contribution of the leader's hard work to leader performance were much more influenced by the task in groups with male leaders than in groups with female leaders. For male leaders, hard work by the leader was seen as a far stronger determinant of leader performance on the drawing task than on the proposal task. For female leaders, followers made similar attributions on both tasks.

Follower perceptions of luck as a contributing factor to group performance showed a somewhat different pattern. For female leaders, followers made equivalent attributions on both tasks. Followers of male leaders perceived luck to be a stronger determinant of group performance on the proposal task than on the drawing task.

Taken together, the data for these two follower responses suggest that stronger internal attributions (hard work) and weaker internal attributions (luck) were made for the male leaders working on the drawing task relative to the proposal task. For female leaders, task structure had no effect on follower attributions of this kind.

The leader responses showing the Task Structure x Leader Sex effect seem to fit well with Crandall's (1969) research. She found that males tended to overestimate the quality of their performance (relative to objective measures of performance). Females, however, tended to underestimate the quality of their performance. The present results show that this pattern is strong only on the drawing task. Recall that the previous discussion of this task suggested that the mathematical/spatial demands of this task fit the stereotype of a "masculine" task. The present data suggest that females may underestimate their own importance as the leader of a group working on a stereotypically masculine task. It appears that these women have not yet defined themselves as effective leaders in such situations, perhaps because of the newness of their exposure to this type of leadership situation.

Recall that two of these leader attribution items also showed significant Leader Sex main effects (leadership ability as a cause of group performance and leader's expert ability on the task as a cause of leader performance; see Table 1). The significant Task Structure x Leader Sex interaction for these data moderates the main effect, indicating general underestimation of such internal attributions by females. As discussed above, this Leader Sex main effect is due almost entirely to reactions to the more masculine drawing task.

Task Structure x Leader Sex x Follower AWS. Table 1 indicates that two variables showed statistically reliable Task x Leader Sex x Follower AWS interaction effects.

Leaders

This interaction was significant for leader responses to the post-experimental questionnaire item measuring perceptions of how important it was to have a leader for this situation. Table 8 shows the relevant mean scores for this variable.

Interpretation of a three-way interaction is necessarily complex. However, there are some strikingly clear comparisons within this complex pattern of means. Leader ratings of importance were different for male and female leaders as a function of follower attitudes toward women. This difference is particularly marked on the drawing task. When working in groups composed of followers with negative attitudes toward women, male leaders felt that it was important to have a leader on the drawing task ($\bar{X} = 6.00$), whereas female leaders indicated that it was not very important to have a leader on this task ($\bar{X} = 3.22$). The marginally significant effect ($p < .06$) for leader attributions about the degree to which their leadership ability influenced their performance as the leader also showed a similar but less dramatic effect. In groups with followers having negative AWS scores, male leaders felt that their leadership ability had considerable influence on their performance as leader on the drawing task ($\bar{X} = 5.28$). Female leaders under these conditions gave the lowest attribution score ($\bar{X} = 4.22$) of any condition represented in Table 8.

Followers

Attributions about the importance of follower intelligence as a determinant of group performance are the only follower responses yielding a significant Task x Leader Sex x Follower AWS effect. As indicated by inspection of the means for this variable presented in Table 8, this effect was somewhat similar to the leader data discussed above. Followers indicated that follower intelligence had the strongest impact on the group's performance on the drawing task when female leaders were working with followers who had expressed negative attitudes toward women. A somewhat different pattern was shown for the proposal task.

Taken together, these results suggest that the combination of female leaders, followers with negative attitudes toward women, and the structured task created a unique situation. These results may reflect either of two reactions by female leaders. First, after assessing the situation, female leaders may have consciously decided to adopt a low-profile leadership role encouraging high levels of follower participation. Alternatively, female leaders may have involuntarily found themselves in a position where they felt rather useless and where male followers believed that group performance was the result of follower intelligence. Perhaps the structure inherent in the task allowed such followers to ignore and even

Table 8
Interaction of Task Structure x Leader Sex x Follower AWS

Variable	Structured				Unstructured				F
	Male		Female		Male		Female		
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	
Leaders' rating									
Importance of Having Leader (5)	4.56	6.00	4.82	3.22	5.11	5.50	5.72	5.56	5.27*
Followers' rating									
Member Intelligence (4f)	6.68	6.63	6.11	6.48	6.00	6.26	6.19	5.85	3.92*

*p < .05.

overstep any directives on the part of female leaders. These same followers may have been more tolerant and accepting of such potentially unnecessary directives on the part of male leaders in this structured situation. On the other hand, the proposal task had little inherent structure; all followers, regardless of their attitudes toward women, had to look to the leader to provide structure for the group's work. The group performance data showed that the only condition where groups with female leaders performed better than groups with male leaders was on this task (i.e., low-LPC female leaders working with followers having negative attitudes toward women).

Leader LPC x Leader Sex x Follower AWS. As noted in Table 1, five variables taken from the postexperimental questionnaire yielded significant Leader LPC x Leader Sex x Follower AWS interactions (four variables represent leader responses and one variable is taken from follower questionnaires).

Leaders

The four leader responses showing significant three-way interactions of this type were (1) perceived success of the group, (2) attributions concerning the degree to which member motivation contributed to group performance, and (3 and 4) attributions concerning the degree to which luck and leadership ability influenced the leader's performance. Table 9 shows the relevant mean scores for these four variables. There is no general pattern in these several significant effects; each variable must be considered individually.

When asked to estimate how well their group performed on the task, leaders generally followed the pattern found in this same three-way interaction for objective measures of group performance shown in Figure 2 (despite the fact that none of the groups received feedback on the quality of their performance). This similarity between effects for actual and perceived task success is consistent with a correlation of .02 (n.s.) between these two measures for the proposal task and .44 ($p < .001$) for the drawing task.

The three attribution items showing this effect can be interpreted as higher order moderators of the simpler Leader Sex x Follower AWS effects found for leader attributions. Recall that these data generally indicated that female leaders made weaker attributions than did male leaders when working with followers holding negative attitudes toward women. The three-way interactions reported in Table 9 indicate that the style of the leader can moderate this effect.

Leader attributions about the strength with which leadership ability influenced the leader's performance indicate that only high-LPC female leaders reacted strongly to follower attitudes. Although high-LPC female leaders made stronger attributions of this type in positive groups ($\bar{X} = 5.35$) than in negative groups ($\bar{X} = 4.56$), low-LPC female leaders

Table 9

Interaction of Leader LPC x Leader Sex x Follower AWS

Variable	High LPC				Low LPC			
	Male		Female		Male		Female	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Leaders' rating								
Perceived Success of Group (2)	6.44	6.56	6.50	5.83	6.50	6.11	6.00	6.72
Member Motivation (4a)	5.50	6.11	6.61	5.17	5.61	5.61	5.78	6.50
Luck (13d)	2.00	1.89	2.17	2.22	1.61	3.33	2.94	1.94
Leadership Ability of Leader (13b)	5.39	5.50	6.39	4.33	5.78	5.50	5.28	5.00
Followers' rating								
Leadership Ability of Leader (13b)	4.70	5.33	5.35	4.56	4.85	4.72	4.44	4.76

(p < .06)

*p < .05.

showed little difference in attributions in these two conditions ($\bar{X} = 4.44$ vs. $\bar{X} = 4.76$). In general, attributions of this type by male leaders were not strongly influenced by follower attitudes toward women. Leader attributions about the influence of member motivation on group performance show generally the same pattern; again, it is the high-LPC female leaders who are most influenced by the sex-role attitude of their followers. These findings fit well with the general proposition that persons scoring high on the LPC scale are more concerned with and sensitive to the realm of interpersonal relations than are persons scoring low on the scale. That is, high-LPC female leaders appeared to be more sensitive and/or responsive to the general sex-role attitudes of their followers than did low-LPC female leaders.

The third attribution item, dealing with leader perceptions that luck influenced the leader's performance, showed a different pattern. These results show little difference between attributions made by male and female leaders with high LPC scores. However, among low-LPC leaders there is a dramatic sex difference. Female low-LPC leaders felt luck was a more important factor in determining leader performance in groups that held positive attitudes toward women. Conversely, male low-LPC leaders felt luck was a stronger determinant in groups that held negative attitudes toward women. Obviously, these data provide no support for the notion suggesting that the high-LPC females were more sensitive to the social conditions of their group.

These attribution data are admittedly puzzling. It is not clear why sex differences should be stronger for high-LPC leaders for two of these attributions and stronger for low-LPC leaders for a third attribution item. Perhaps the specific content of these items is responsible for this difference (leadership ability and follower motivation vs. luck). Future research is needed to see if there are some general classes of items that elicit different reactions from male and female leaders with task-oriented and relationship-oriented styles of leadership. Unfortunately, these three-way interactions do not consistently clarify and/or elaborate on patterns found in either of the simpler interactions involving these variables showing a substantial number of significant effects (i.e., Leader Sex x Follower AWS or Leader LPC x Follower AWS). The greatest value of the present data is the general demonstration that leadership style can influence sex differences in attributions related to leadership processes.

Followers

The only follower response showing a significant Leader LPC x Leader Sex x Follower AWS interaction was attributions concerning the degree to which ability to lead influenced leader performance. Table 9 presents the relevant mean scores for this effect. The most dramatic comparisons in these data concern reactions to high-LPC leaders. Followers with negative attitudes toward women indicated that ability to lead was a much stronger determinant of leader performance for high-LPC males than for

high-LPC females. Conversely, followers with positive attitudes toward women indicated that ability to lead was a much stronger determinant of leader performance for high-LPC females than for high-LPC males. Reactions to low-LPC leaders were far less dramatic, with negative followers showing no sex differences and positive followers indicating that ability was a stronger contributor for males than for females.

Task Structure x Leader LPC x Leader Sex x Follower AWS. Table 1 shows that 13 questionnaire responses yielded significant four-way interactions involving Task Structure, Leader LPC, Leader Sex, and Follower AWS (8 were leader responses and 5 were follower responses).

Leaders

The eight leader responses showing this significant four-way interaction were (1) group atmosphere, (2) perceived success of the group, (3) importance of having a leader, (4) LBRS ratings of Initiating Structure, and (5 through 8) attributions concerning the degree to which leader motivation, leader intelligence, leadership ability, and follower motivation were an influence on group performance. Table 10 presents the mean scores relevant to this interaction for each of the dependent variables involved.

These four-way interactions for leader questionnaire responses are complex and difficult to interpret. In the absence of any specific hypotheses regarding such effects, one can only look for general patterns of similarity across the results for several different variables. Only one meaningful comparison is readily apparent from these data. A number of variables indicated that female leaders felt that the leader role was unimportant and made negative self-attributions while working on the drawing task in groups holding negative follower attitudes toward women. Several variables showing the four-way interaction suggest that leader LPC can moderate this effect. Under these conditions, high-LPC female leaders (but not low-LPC female leaders) showed extremely low scores on leader ratings of how important it was to have a leader and attributions about the importance of member motivation and the contribution of leader intelligence to group performance. Leader group atmosphere shows a similar effect; only high-LPC female leaders working with negative followers failed to rate group atmosphere more favorably for the drawing task than for the proposal task. In summary, only high-LPC female leaders reacted adversely to the particular situation under discussion.

One possible explanation for the effect discussed above is that high-LPC persons are basically relationship oriented. We have speculated that negative male followers may have ignored or even overruled the attempt of females to lead on the drawing task. Such a rejection is likely to be more strongly internalized by a person primarily concerned with successful interpersonal relations. The low-LPC leader, however, is less likely to interpret such a rejection as a personal threat. As long as the group is perceived to be progressing on the task satisfactorily, a basically task-oriented person may be generally content with the situation and with himself/herself.

Table 10

Interaction of Task Structure x Leader LPC x Leader Sex x Follower AWS

Variable	High LPC				Low LPC				F
	Structured		Unstructured		Structured		Unstructured		
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	
Leaders' rating									
Group Atmosphere									
Male	6.67	7.41	6.13	5.86	7.08	6.74	6.30	5.82	6.03*
Female	7.47	5.97	5.92	5.97	6.60	7.11	5.87	5.61	
Initiating Structure									
Male	2.96	1.91	2.93	3.33	2.33	2.31	2.98	2.64	5.95*
Female	2.22	3.16	2.64	3.07	2.89	2.58	3.31	3.47	
Perceived Success of Group (2)									
Male	6.89	7.33	6.00	5.78	7.00	6.22	6.00	6.00	6.41*
Female	7.22	6.00	5.78	5.67	6.11	7.33	5.89	6.11	
Member Motivation (4a)									
Male	5.89	6.89	5.11	5.33	6.22	5.78	5.00	5.44	6.15*
Female	6.89	4.56	6.33	5.78	5.78	7.11	5.78	5.89	
Leadership Ability of Leader (4c)									
Male	5.22	6.44	5.67	5.00	5.89	5.67	4.67	6.11	6.75*
Female	5.78	3.78	5.78	4.89	4.11	4.78	5.33	5.56	
Leader Intelligence (4b)									
Male	5.44	5.89	6.22	4.89	5.56	6.11	4.22	5.89	4.59*
Female	5.78	3.56	5.00	4.33	4.67	4.44	5.33	5.56	

Table 10 (continued)

Interaction of Task Structure x Leader LPC x Leader Sex x Follower AWS

Variable	High LPC				Low LPC				F
	Structured		Unstructured		Structured		Unstructured		
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	
Leader Motivation (4g)									
Male	6.22	6.56	6.67	5.11	5.22	5.67	4.67	6.22	5.70*
Female	6.78	4.78	6.33	5.22	4.89	6.00	6.11	6.44	
Importance of Having Leader (5)									
Male	4.22	6.22	5.89	5.33	4.89	5.78	4.33	5.67	6.34*
Female	5.50	2.56	5.44	5.22	4.22	3.89	6.00	5.89	
Followers' rating									
Perceived Success of Group (2)									
Male	6.26	7.11	5.70	6.33	6.93	6.44	5.74	5.93	6.61*
Female	6.74	6.41	5.30	5.41	6.07	6.82	6.15	5.26	
Member Intelligence (4f)									
Male	6.59	6.93	6.26	6.33	6.78	6.33	5.74	6.19	4.21*
Female	6.07	6.56	5.78	6.04	6.15	6.41	6.60	5.67	
LBRS-Consideration									
Male	3.33	2.92	3.04	2.99	2.85	3.44	3.08	3.32	5.82*
Female	2.75	3.48	3.03	3.34	2.75	3.35	2.76	3.48	

*p < .05.

Followers

Three follower responses on the postexperimental questionnaire showed significant Task Structure x Leader LPC x Leader Sex x Follower AWS effects: (1) perceived success of the group, (2) LBRS ratings of consideration, and (3) attributions concerning the degree to which follower intelligence contributed to the performance of the group. Table 10 shows the mean scores relevant to these interaction effects.

The only result among the four-way interactions that suggests an immediate interpretation is the follower perceptions of success and attributions about the role of follower intelligence as a determinant of group performance. These data generally show much more favorable responses on the drawing task than on the proposal task. However, follower responses to groups with low-LPC females leading groups with positive followers were an exception to this trend; followers saw the group as being far more successful and felt leader intelligence played a stronger role on the proposal task than one would expect, based on the general trends shown by leaders in the other conditions. It is not clear why reactions were so favorable in low-LPC-led groups of this type. Perhaps the positive followers were sufficiently supportive of the low-LPC female leader in this condition for her to display the task-oriented skills thought to characterize low-LPC persons. That is, this condition may have represented an especially favorable situation where follower willingness to be led by a female was matched by a task-oriented female willing to exert a strong sense of direction.

The speculative nature of interpretations offered for either the leader or follower data discussed above should be recognized. These four-way interactions are extremely difficult to interpret meaningfully. No other patterns appear to exist in the four-way interactions common to several variables. Although many individual variables show interesting effects, it seems too speculative to offer anything in the way of an interpretation of these complex but isolated effects.

Miscellaneous 1--Leader LPC. As shown in Table 1, only one variable showed a significant Leader LPC main effect: leader attributions regarding the degree to which hard work by the leader was responsible for the leader's performance. Low-LPC leaders ($\bar{X} = 5.36$) felt that this factor was more important than did high-LPC leaders ($\bar{X} = 4.56$). This finding appears to be generally consistent with the view that low-LPC persons are more task oriented than high-LPC persons. That is, persons primarily concerned with task success may also see hard work on their part as being a more important determinant of their own behavior.

Miscellaneous 2--Leader LPC x Leader Sex. As shown in Table 1, only one variable showed a significant Leader LPC x Leader Sex interaction: leader evaluations of how well they fulfilled their leadership role relative to other West Point cadets. Table 11 gives the mean scores for this interaction. For males, low-LPC leaders evaluated their performance more favorably than did high-LPC leaders. Females showed precisely the

opposite pattern. The basis for these self-evaluations is difficult to identify. Neither group performance nor follower group atmosphere data provide any objective basis for these self-evaluations in terms of actual leadership effectiveness criteria. Neither of these outcome variables yielded a significant Leader LPC x Leader Sex effect. In the absence of any corroborative data, the meaning of this effect is difficult to interpret. It may reflect sex differences in the meaning of responses to the LPC scale, actual group processes, or leader perceptions of such experiences.

Table 11

Interaction of Leader LPC x Leader Sex

Variable	High LPC		Low LPC		F
	Male	Female	Male	Female	
Leaders' rating					
Extent Leader Fulfilled Duties (12)	6.11	6.50	6.56	5.81	7.62**

**p < .01.

Miscellaneous 3--Leader LPC x Follower AWS. Table 1 indicates that five variables showed significant Leader LPC x Follower AWS interactions. All variables represented leader responses to the postexperimental questionnaire: (1 through 3) attributions about the degree to which follower intelligence, leader intelligence, and leader motivation were the cause of group performance, and (4 and 5) attributions concerning the degree to which hard work by the leader and task difficulty were the cause of the leader's performance. Table 12 shows the mean scores reflecting this interaction effect for these variables.

With the exception of attributions about the impact of leader motivation on group performance, all attribution questions show the same pattern. In groups with followers holding positive attitudes toward women, high-LPC leaders made stronger attributions than did low-LPC leaders (i.e., high-LPC leaders indicated that task difficulty, leader's hard work, follower intelligence, and leader intelligence were all relatively strong contributors to group or leader performance. Conversely, in groups with followers holding negative attitudes toward women, low-LPC leaders made stronger attributional judgments than did high-LPC leaders. In addition, marginally significant effects for two additional

leader attribution questions showed precisely the same effect: leadership ability as a determinant of group performance ($p < .06$), and member ability to be effective followers as a determinant of group performance ($p < .07$).

Table 12

Interaction of Leader LPC x Follower AWS

Variable	High LPC		Low LPC		F
	Positive	Negative	Positive	Negative	
Leaders' rating					
Member Intelligence (4f)	6.94	6.03	5.69	6.94	13.73***
Leader Intelligence (4b)	5.61	4.67	4.94	5.50	5.54*
Leader Motivation (4g)	6.50	5.42	5.65	5.22	8.28**
Leader Hard Work (13e)	5.42	3.89	5.11	5.61	10.48**
Task Difficulty (13c)	5.31	4.64	4.33	5.31	5.27*

- * $p < .05$.
- ** $p < .01$.
- *** $p < .001$.

Leaders' attributions about the degree to which leader motivation influenced group performance showed a somewhat different pattern. High-LPC leaders made stronger attributions of this kind in groups with both positive and negative followers than did low-LPC leaders. However, the difference between these two kinds of leaders was greater when followers held positive attitudes toward women than when followers held negative attitudes toward women.

These data further demonstrate the robustness of the attitudes toward women variable. Such attitudes held by followers influence the manner in which group leaders perceive the causes of leader and group performance. Such results provide further evidence that follower attitudes toward women must manifest themselves in some form of observable behavior within the group.

The moderating effect of LPC on the relationship between follower attitudes and leader attributions is difficult to interpret. It is not clear why task-oriented (low LPC) leaders should make stronger attributions in groups with negative followers, while relationship-oriented (high LPC) leaders should make stronger attributions in groups with positive followers. However, one can speculate that followers with traditional masculine values (negative AWS scores) fit in better with the

task-oriented style of low-LPC leaders. Further, followers with egalitarian sex-role values (positive AWS scores) may have fit in better with the relationship-oriented style of high-LPC leaders. This compatibility of leadership style and follower values may have somehow influenced leader attributions. The highly speculative nature of these conjectures should be clearly recognized. This compatibility argument would be stronger if there were data indicating that these combinations of leader style and follower values influenced factors other than leader attributions (e.g., group atmosphere, group performance, descriptions of leader behavior, evaluations of the leader, etc.). However, such data are not found in the present study.

Miscellaneous 4--Task Structure x Leader LPC x Leader Sex. Table 1 notes only one significant Task Structure x Leader LPC x Leader Sex interaction--leader's responses concerning the degree to which the leader's expert ability contributed to the leader's performance. The mean scores for this interaction are presented in Table 13.

This attribution item can be interpreted as a higher order moderator of the simpler Task x Leader Sex effect also found for leader attributions on this item. Recall that this data indicated that female leaders made weaker attributions than male leaders about their expert ability on the drawing task, while the difference between the responses of male and female leaders was minimal for the proposal task. The three-way interaction reported in Table 13 indicates that the style of the leader can moderate this effect. Leader attributions about the degree to which their expert ability influenced the leader's performance indicates that low-LPC males reacted quite differently to the two tasks than did the other groups of subjects. High-LPC males, low-LPC females, and high-LPC females all made stronger attributions of this type on the proposal task than on the drawing task. However, low-LPC male leaders made stronger internal attributions of this type on the drawing task than on the proposal task. Thus, the pattern found in the simpler Task Structure x Leader Sex interaction was due almost exclusively to the influence of male low-LPC leaders (relative to the other three groups of subjects).

This pattern for low-LPC males seems to fit in quite well with the general proposition that persons scoring low on the LPC scale feel comfortable and are effective in a highly structured task. The task-related concerns of the low-LPC person may be more appropriate and more influential in a highly structured situation such as this. The reason why this pattern was seen for male but not for female low-LPC leaders is puzzling. Perhaps the situation was not as structured and comfortable for low-LPC female leaders by mere virtue of being a female leader in a group of males that normally function in all-male groups. Or perhaps the LPC scale does not measure task versus interpersonal orientations in the same way it does for males. More research with both male and female subjects is needed before such speculations can be adequately evaluated.

Table 13

Task Structure x Leader LPC x Leader Sex

Variable	Structured		Unstructured		F
	High Male	Low Female	High Male	Low Female	
Leaders' rating					
Leader Expert Ability (13a)	4.50	4.22	5.80	3.80	5.22
			5.33	4.89	5.11
					5.26*

*p < .05.

Tests of the Contingency Model

One important function of this study was to assess the validity of Fiedler's (1967, 1971) Contingency Model of leadership effectiveness for female leaders. Because the research leading to the development of Fiedler's theory was based almost exclusively on male subjects, it is important to determine if the theory is also valid for females. (There is considerable controversy over the validity of the model even for male subjects; see Ashour, 1973; Fiedler, 1971, 1973; and McMahon, 1972.)

Fiedler's model proposes that the relationship between leadership style (as measured by the LPC scale) and leadership effectiveness (as indicated by group task performance) is contingent upon the demands of the situation. The general thesis of the theory proposes that task-oriented leaders (low LPC) are more effective than relationship-oriented (high LPC) leaders in very favorable or very unfavorable situations; relationship-oriented (high LPC) leaders are thought to be more effective than task-oriented leaders in situations of intermediate favorableness. In addition to this general thesis, the model offers specific predictions concerning correlations between leader LPC and group performance for each of eight conditions classified in terms of three situational factors: leader-member relations, task structure, and position power of the leaders. The median correlations for each of these eight conditions provided the empirical base from which Fiedler developed the Contingency Model. These median correlations between leader LPC and group performance also provide point predictions against which evidential validity data can be compared. The design of the present study provides both a relatively "strong" and relatively "weak" procedure for assessing the validity of such predictions for female leaders.

"Strong" Tests. A relatively "strong" test of the model for female leaders is provided by assuming that follower attitudes toward women represent a reasonable way to operationalize the leader-member relations factor. Conceptually, the leader-member relations variable refers to the degree to which followers support and endorse the leader's claim to his/her role and the leader's efforts to influence group process. It is assumed that leader-member relations are generally poor in a group of followers with negative attitudes toward women when a female is assigned to the leader role. Conversely, leader-member relations are assumed to be good when a female leader works with male followers holding positive attitudes toward women. The significant Leader Sex x Follower AWS interaction for follower group atmosphere scores and the general pattern of significant Follower AWS effects in other postexperimental questionnaire data for both leaders and followers provide strong support for the general validity of these assumptions.

To classify the treatment levels of the present study as representing an octant in Fiedler's model, further assumptions are required regarding task structure and position power. Since all the cadets were peers and no special powers to reward or punish were given to the leaders,

it was assumed that position power would be weak for all leaders. Further, it was assumed that the proposal task was unstructured and the drawing task was structured. Analyses of these tasks in previous research appear to support assumptions regarding task structure (Fiedler, 1967, 1971; Chemers & Skrzypek, 1972; Rice & Chemers, 1973, 1975).

Given the above assumptions, we have experimental conditions corresponding to octants 2, 4, 6, and 8 of the Contingency Model. Table 14 presents the variables representing each octant, the predicted correlations, and the obtained correlations. The direction of the predicted and obtained correlations are similar for only two of the four octants (4 and 8). Further, only one of these correlations (octant 8, $r = -.43$) is significant with 18 groups per condition (r of .47 is needed to be significant at $p < .05$). These data do not support the validity of the Contingency Model for female leaders.

Table 14

Test of the Contingency Model for
Female Leaders

Condition	Assumed octant	Predicted correlation	Obtained correlation
Positive AWS-drawing task	2	-.58	+.15
Positive AWS-proposal task	4	+.47	+.04
Negative AWS-drawing task	6	+.20 ^a	-.11
Negative AWS-proposal task	8	-.43	-.45*

^aThis prediction is based on interpolation of the correlation reported for octants 5 and 7; Fiedler (1964) presented no original data for this octant at that time.

* $p < .05$.

"Weak" Tests. The design of the present study also provided the opportunity for a second, somewhat weaker, test of Contingency Model predictions for both male and female leaders. Based on normative data provided by Posthuma (1970), leader responses to the group atmosphere scale

following each task were used to classify leader-member relations as either good (leader GA \geq 67) or moderately poor (leader GA \leq 66). Again assuming that position power is weak for all leaders and that one task was structured and the other unstructured, we have conditions corresponding to octants 2, 4, 6, and 8 of the Contingency Model. This test of Contingency Model predictions is clearly weaker than the strong test reported above, since it relies on a post hoc classification of groups as having good or moderately poor leader-member relations. Such ratings of group atmosphere are potentially confounded with perceived success of the group. However, given the complex pattern of correlations predicted by the model and the often weak correlation between actual and perceived group performance, the danger of this potential confounding may not be as great as it first appears. This procedure for assessing leader-member relations has been used in studies claiming to provide tests of the model by both Fiedler (1966) and his critics (e.g., Graen, Alvares, Orris, & Martella, 1971). In short, these procedures do not provide the optimal test of the model, but there is clearly a precedent for such procedures in the Contingency Model literature.

Table 15 shows the predicted and obtained correlations for octants 2, 4, 6, and 8 for both male and female leaders. The results for male leaders appear to provide substantial support for the model. All four correlations for males are in the predicted direction, and correlations for octant 2 ($r = -.39$) and octant 4 ($r = +.67$) are both significant. While in the predicted direction, it should be noted that the correlation for octant 8 was only $-.02$.

The results for female leaders provide weaker support for the model. Three of the four correlations are in the predicted direction, and only octant 6 has a significant correlation ($r = .55$).

General Evaluation. This study found no substantial evidence supporting the validity of the Contingency Model for female leaders. This conclusion is based on results from both the strong and weak tests of the model, with greater emphasis on the strong tests. The match between predicted and obtained correlations for female leaders did not appear to be much beyond chance expectations. The combined results of the strong and weak tests of the model indicate that only five of the eight correlations were in the predicted direction, and only two of the eight correlations were significant. However, in defense of the model when applied to females, both the significant correlations were in the predicted direction.

The results of the present study are consistent with unpublished research by Linda Nelson of the University of Utah. In testing two octants of the model, she found statistically significant support for the model for male but not for female leaders. The patterns of leader LPC/group performance correlations in the present study for males and females suggest a similar conclusion. Several explanations can be offered for the apparent failure of the model to predict the relationship between leader LPC and group performance, because it is moderated by situational

favorableness. First, responses to the LPC scale may have different meanings for male and female respondents. Second, the various situational factors employed by Contingency Model research may affect male and female leaders differently. Finally, the nature of the "contingent" relationships between leader LPC and group performance may be different for males and females (e.g., task-oriented females may perform most effectively in situations of intermediate favorableness even though relationship-oriented males are thought to perform most effectively in such situations). Given the almost exclusive use of male subjects in previous Contingency Model research, it is not possible to choose among these alternatives. More research directly comparing Contingency Model measures and relationships for male and female leaders is needed before a choice can be made on empirical grounds.

Table 15

Tests of the Contingency Model for
Male and Female Leaders

Leader	Situation		Predicted Correlation	Obtained correlation	
	GA	Task Octant		Females	Males
high	drawing	2	-.58	-.22 (n=25)	-.39* (n=25)
high	proposal	4	+.47	-.18 (n=25)	.15 (n=25)
low	drawing	6	+.20	.55* (n=11)	.67* (n=11)
low	proposal	8	-.43	-.35 (n=11)	-.02 (n=11)

*p < .05.

In summary, the present data, in conjunction with similar results from Nelson's unpublished research, suggest that the Contingency Model cannot be applied directly to female leaders. At this point, it appears that the validity of the model may be limited to male leaders. If one assumes that dynamic leadership processes may be different for male and female leaders, such a conclusion is not surprising in light of the empirical data base from which the Contingency Model was derived. The research used by Fiedler (1964) to develop the Contingency Model included almost no female leaders; it is not surprising that predictions based on research with male leaders cannot be transferred without modification to female leaders.

The tone of the above comments is negative; it appears that the octant-by-octant predictions of the Contingency Model are not valid for female leaders. However, the LPC score of female leaders was significantly related to group performance in two of the eight situations for which such a correlation was computed. Further, the analysis of variance for the group performance data yielded a significant Leader LPC x Leader Sex x Follower AWS interaction. This effect indicated that the relationship between leader LPC and group performance was different for male and female leaders. Such results suggest that leadership style (as measured by Fiedler's LPC instrument) can be an important determinant of the success of groups led by females. However, the pattern of correlations between leader LPC and group performance for females does not appear to match predictions derived from research using male leaders. Conceivably, a different pattern of correlations between leader LPC and group performance holds for females than for males. The significant correlations found in this study suggest that further research on this problem could be fruitful.

Finally, the favorable validation evidence for male leaders found in this study requires some comments. These data support Fiedler (1964, 1967, 1971) in his proposition that one can predict group task performance on the basis of the leader's LPC score and a relevant assessment of the situational factors. These data are clearly inconsistent with conclusions by critics questioning the validity of the model (e.g., Ashour, 1973; Graen et al., 1971). For example, Graen et al. concluded that the model has lost the capacity to guide meaningful research (1971, p. 2). Contrary to that proposition, the present results suggest that at least for male leaders, the Contingency Model can provide valid predictions of the relationship between leader LPC and group performance. Further research into the dynamics of the leadership processes underlying such relationships should be encouraged.

CONCLUSIONS

To integrate the results discussed above into some general conclusions, it is useful to go back to the four research questions this study attempted to address. The study generally provided a number of statistically significant results related to each question.

Does the Sex of the Leader Influence Performance and/or Morale of Small Task Groups?

The present results indicate that sex of the leader definitely can influence both objective measures of performance and subjective measures of follower morale, satisfaction, and perceptions of group process. Furthermore, many of the leader's own subjective responses to the postexperimental questionnaire showed strong results related to the sex of the leader.

Group Performance. The most important finding related to this question is the Leader Sex main effect for group performance. This result indicated that groups with male leaders generally performed better than did groups with female leaders. The Leader LPC x Leader Sex x Follower AWS interaction for the group performance variable moderated this general trend slightly (groups with female leaders performed better than did groups with male leaders under one experimental condition: groups composed of followers with negative attitudes toward women (worker) under a low-LPC leader). However, the general pattern in this data is clear--groups with male leaders generally performed better than did groups with female leaders. To the best of our knowledge, this is the first study to demonstrate that sex of the leader can have an impact on the task performance of a small group.

As noted in the earlier discussion of the group performance data, the design of this study does not allow us to identify or explain the group processes leading to differences in performance of groups led by males or females. By focusing on outcome rather than process variables, the strength of the present research was in detecting if sex of the leader can influence group performance. Given clear evidence that leader sex can be an important factor in the task performance of the group, it is now necessary for further research to seek out the processes underlying such effects. In the discussion of group performance data, there were three interpretations of the finding that male-led groups performed more effectively than did female-led groups. One important task for future research is to investigate the validity of these and other interpretations of differences in group performance associated with sex of the leader.

Morale and Other Follower Responses. The sex of the leader also proved to be an important factor in many of the subjective responses of followers. However, there were relatively few important Leader Sex main effects in these data. Far more important was the strong pattern of interactions involving the sex of the leader and the male followers' attitudes toward women.

Among groups with followers holding negative attitudes toward women, morale (as reflected by follower group atmosphere scores) was lower with female leaders than with male leaders. Follower perceptions of leader behavior and attributions concerning the causes of leader and group performance showed a similar pattern; such responses by followers with negative attitudes toward women were less favorable for female leaders than for male leaders.

Among groups with followers holding positive attitudes toward women, perceptions of leader behavior, attributions, and morale showed one of two patterns. For some variables, responses were actually more favorable in groups with female leaders than in groups with male leaders. For many other responses of this kind, followers with positive attitudes toward women showed no substantial difference in reactions to groups with male and female leaders.

Many of the leader responses to the postexperimental questionnaire suggest a pattern similar to that found for follower data. Morale, perceptions of leader behavior, and attributions were generally more favorable for female leaders when working in groups composed of followers with positive attitudes toward women than in groups with negative followers. Male leaders showed one of two patterns: (1) more favorable responses in groups with negative followers than in groups with followers holding positive attitudes toward women, or (2) no difference in leader responses as a function of follower attitudes toward women.

The effects in the questionnaire data from both leaders and followers make it clear that one cannot evaluate the impact of the leader's sex without also considering relevant characteristics of the follower (in this case, general attitudes toward women). Hollander (1978) has argued that a stronger focus on followers and leader-follower interactions is essential for an adequate understanding of leadership processes. The present data document this point.

In summary, the results strongly demonstrate the potential importance of leader sex as a factor in both performance and morale of small groups. If one adopts the social exchange perspective on leadership suggested by many prominent theorists (e.g., Graen, 1976; Hollander, 1978; Jacobs, 1970), these results suggest that sex of the leader is a potentially important resource in the social exchange processes that characterize leadership. That is, sex of the leader appears to influence the resources both leaders and followers are able to exchange in the mutual-influence relationship known as leadership. Further research focusing on perceptions of leader and follower resources as well as the actual exchange processes is needed to determine how sex of the leader influences leadership. The strong results of the "outcome" measures such as group performance, follower perceptions, and leader perceptions provide a strong justification for further "process" research of the type suggested here.

Do Male Subordinates' Attitudes Toward Women Influence Group Performance and/or Morale of Small Task Groups?

The results indicate that follower attitudes of this type definitely can influence both morale and performance of small groups. With regard to morale, the Leader Sex x Follower AWS interactions seen in so many of the postexperimental questionnaire data are the most relevant findings. The nature of these interactions for both leader and follower data was discussed previously in the section on sex of leader. In addition to these Leader Sex x Follower AWS interactions, there were also consistent results showing main effects for Follower AWS, Task Structure x Follower AWS interactions, and some higher order interactions involving the Follower AWS variable.

With regard to the group performance aspect of this question, the Task Structure x Follower AWS interaction is most relevant. This effect was interpreted in terms of the match between attributes of the task and attributes of the followers. Groups composed of male followers with

traditionally masculine attitudes toward women (negative AWS) performed better on the drawing task, a task characterized by stereotypically "masculine" demands such as spatial relations, mathematical calculations, and rapid production. On the other hand, groups composed of male followers expressing nontraditional masculine attitudes toward women (positive AWS) performed better on the proposal task, a task characterized by less stereotypically masculine demands such as group discussion and writing ability. The Leader LPC x Leader Sex x Follower AWS interaction provided further evidence that follower attitudes toward women can influence group performance. This effect generally indicated that the influence of follower attitudes toward women on the relationship between leadership style (LPC) and group performance was different for male and female leaders.

Taken together, the results of the present study provide strong construct validity evidence for the Spence and Helmreich (1972) AWS measure. Nearly all of the effects involving this variable were readily interpretable in terms of the traditional (negative AWS) and egalitarian (positive AWS) sex-role attitudes that Spence and Helmreich (1972) claim to be measuring.

The construct validity evidence provided by the present study extends previous research in several ways. First, these data clearly indicate that general attitudes toward women are relevant to leadership processes, i.e., follower attitudes toward women strongly influenced the reactions elicited by male and female leaders. Second, the results involving the Follower AWS variable were not limited to other subjective responses by the followers. In some sense, follower subjective responses of this type represent reliability rather than validity information for the AWS measure; i.e., general attitudes toward women are related to affective reactions to female leaders in an experimental setting approximately 1 year later. However, the AWS effects were also seen in objective measures of group performance. Further, many leader questionnaire responses were also influenced by follower attitudes toward women. Such results suggest that individual behavior and group process were influenced by follower attitudes toward women; i.e., these attitudes were related to behavior. Without this proposed link between attitudes and behavior, there seems to be no way to explain the influence of follower attitudes on group performance and leader questionnaire responses. The strong validation evidence for the AWS in the present data is even more impressive when one recalls that the AWS scores were collected almost a full year before the experiment took place.

The validity evidence presented here for the AWS measure raises an interesting question concerning the causes of attitudinal and behavioral correlates of such a measure. In the absence of objective measures of group process, there are two interpretations for the observed pattern of follower responses on the postexperimental questionnaire. Such results may reflect real behavioral differences in the leadership processes in groups composed of followers with negative attitudes toward women. That is, group atmosphere, leader behavior, and factors contributing to group and leader performance may actually be different in these two kinds of groups. Conversely, these data may reflect only perceived differences in

group process. As a result of preexisting attitudes toward women, these two types of followers may have perceived and evaluated similar group processes differently. Although not definitive, the present data provide support for the idea that both interpretations have some merit. It seems likely that much of the follower postexperimental questionnaire data reflects subjective distortions influenced by general attitudes toward women. However, group performance and follower questionnaire data also show significant effects related to AWS. These results indicate that the effects of follower attitudes toward women are felt beyond the confines of the respondent's own internal processes. Such attitudes apparently manifest themselves in some form of observable behavior that can influence the group leader as well as the overall task performance of the group. Further research incorporating objective measures of ongoing group process and/or experimental manipulation of group process variables is needed to evaluate the hypothesis offered here.

Are Member Attributions Concerning Leadership Process and Leader Attributes Influenced by the Sex of the Leader?

The objective of this question was to determine if the sex-bias in attributional processes identified by Deaux and her colleagues (Deaux, 1976, 1977) is reflected in attributions related to the leadership process, i.e., perceived causes of leader and group performance. The present data strongly support the existence of such bias in leadership-relevant attributions. However, the form of this bias was somewhat different than shown in previous work by Deaux.

Unlike Deaux's research, this study did not indicate that there is a strong general bias in other's attributions about the causes of performance in groups with female leaders. Rather, this bias was seen most strongly in one subgroup of followers: those holding negative attitudes toward women. The many significant Leader Sex x Follower AWS interactions for follower attribution data indicated that followers with negative attitudes toward women consistently made less favorable attributions for female leaders than for male leaders. Ability, mobilizing the cooperation of followers, hard work, and energizing member motivation were all seen by these followers as stronger determinants of performance in groups with male leaders than in groups with female leaders. These followers, however, viewed unfavorable factors (e.g., luck) as stronger determinants of performance for female leaders than for male leaders.

The attributions made by male followers with positive attitudes toward women were different from the attributions made by followers with negative attitudes. The Leader Sex x AWS interactions indicated that positive followers should fall into one of two patterns: (1) no difference in the attribution of male and female leaders or (2) somewhat more favorable attributions for female leaders than for male leaders. Thus, there was no hint of negative attributions regarding female leaders among this group of followers. If anything, these followers showed some bias toward more favorable attributions for females than for males.

The moderator effect of sex bias in attributions indicated by this Leader Sex x Follower AWS interaction is fully consistent with recent research by Garland and Price (1977). They also found sex-bias attributions to be limited to persons with traditional attitudes toward women (as indicated by low scores on the Women as Managers Scale, WAMS).

The leader responses to attribution questions provided a second important source of information regarding attributional biases. These data suggested sex differences in self-attributions as well as the better documented sex bias in attributions concerning the performance of male and female actors. The combination of Leader Sex main effects and Leader Sex x Follower AWS interactions for self-attributions provided a consistent picture. There was a general tendency for females (relative to males) to make weaker self-attributions regarding the degree to which positively valued internal factors were responsible for group and leader performance (e.g., leader intelligence, leader task expertise, and leadership ability of the leader). The Leader Sex x Follower AWS interactions indicated that these negative self-attributions by female leaders were strongest when they were working in groups composed of followers with negative attitudes toward women. Thus, self-attributions within the leadership context of the present study generally conform to follower attributional biases. This similarity in sex bias for attributions targeted to the self and to others is consistent with attribution research outside the realm of leadership reviewed by Deaux (1977). She indicates that the luck/ability sex bias is found in self-attributions as well as in attributions about the causes of another person's behavior.

Is Fiedler's Contingency Model of Leadership Effectiveness Valid for Female Leaders?

Results from the present study suggest that the validity of Fiedler's Contingency Model may be limited to male leaders. Correlations between leader LPC scores and group performance fit well with predictions generated from the Contingency Model for male leaders but not for female leaders. These results are fully consistent with the only other known study comparing the validity of the Contingency Model for both male and female leaders (an unpublished study by Linda Nelson of the University of Utah).

The general pattern of correlations between leader LPC and group performance for female-led groups did not conform to predictions from the model. However, a number of variables did show significant effects based on interaction effects involving LPC. Both objective measures of group performance and postexperimental questionnaire data from leaders and followers demonstrated such effects. Further, two of the eight leader LPC-group performance correlations used to test the model for females were statistically significant. Such results suggest that leadership style (as measured by LPC) may be an important factor in determining performance and group member reactions in groups led by female leaders. However, the pattern of such effects does not appear to match

the predictions based on the model. Future research is needed to determine if the model can be adapted to include leader sex as a variable or if a separate Contingency Model can be created for female leaders. Given the apparent lack of validity for the basic Contingency Model when applied to females, it is clear that modification is necessary if the model is to include female leaders.

The comparative validity data for male and female leaders have implications beyond the Contingency Model. If, as the present data suggest, the present form of the Contingency Model is valid only for male leaders, what is the status of other theories of leadership? Given the predominance of male subject populations, male researchers, research instruments developed by males, and research questions identified by males as being important, it seems likely that other theories may fare as poorly in this regard as did the Contingency Model. The same sex bias is also probably found in organizational practices derived from both implicit and explicit theories of leadership. As females become an increasingly important component of the leadership resources in organizations, it is crucial that the comparative validity of such theories and practices be assessed for male and female leaders. The present results suggest that it may often be inappropriate to transfer theory or practice based on male-dominated research directly to female leaders without comparative validity information. Comparative validity studies of the type suggested here would not only insure fairness and validity with regard to female leaders, but they could also add significantly to the richness of theory and practice related to leadership.

Limitations

There are several important limitations to the results and conclusions of the present study. The primary limitation is the necessarily artificial and short-term nature of any laboratory study of group processes such as leadership. Although a number of interesting results were found in this study, the external validity of results from a laboratory study may be questioned. This skeptical position is expressed by Osborn and Vicars (1976) in their assessment of field and laboratory studies. These authors note, ". . . the likelihood that artificial, short-term laboratory situations tend to elicit subject responses based on readily available stereotypes, while long-term, real-life, field settings include extensive interpersonal contact that provides subjects with a more realistic basis for their behavior. Thus, lab studies may yield deceptive data in overstating the total influence of sex stereotyping . . ." (p. 447). Working on unfamiliar tasks and making judgments of a single group or leader without adequate comparison figures may have opened the way for strong sex stereotyping influences. Further research is needed to determine if results from the present study can be generalized. As indicated previously, too few studies have assessed the relationship between leader sex and objective measures of performance in either laboratory or field settings to draw any firm conclusions at this point.

In addition to the general problems of any laboratory experiment, there were some special circumstances surrounding this particular experiment that may further limit the generalizability of the findings. First, the tasks both seem to be masculine in character. This is especially true for the drawing task. These masculine tasks were chosen deliberately to provide a rigorous test of comparisons between male and female leaders. With such tasks, the absence of significant differences between male- and female-led groups could have been important given the statistical power of the design and the high reliability of the performance scores. Although these tasks were advantageous in this sense, they introduce a possible limitation to the study. It is likely that the superior performance by groups with male leaders could be eliminated or reversed with other tasks.

Other data collected as part of Project Athena (Vitters et al., 1977) suggest a further limitation to the group performance effects found in this study. Generally, female cadets had less leadership experience prior to entering West Point than did their male counterparts. It is likely that few of these women had much, if any, experience in leading all-male groups on a predominantly masculine task. Conversely, much of the male cadets' leadership experience is of this type (e.g., as captains of athletic teams of school officers in all-male high schools). Thus, the relatively poor showing by groups with female leaders may reflect a lack of experience of female leaders in such situations.

The way groups were composed may have created another limitation. Because of the small number of female cadets available, it was necessary for all followers to be males. The results may have been different if both males and females had been assigned to the follower roles. Previous research has shown that the dynamics of all-male, all-female, and mixed-sex groups are often different (e.g., Aries, 1977). It is possible that the effects of leader sex could also be influenced by such composition variables.

A related issue concerns the degree of contact between male and female cadets before the experiment. Only one-third of the cadet companies making up the corps of cadets had female cadets. Given the highly structured nature of a first-year cadet's daily routine, informal contact with members of other companies is minimal. Thus, for many of the male cadets, this was their first close exposure to the female cadets. Because the women cadets were the subject of both academy discussion and national publicity, many of these male cadets were probably curious about the women. Under these circumstances, it seems possible that any disruptive effects created by the introduction of a female leader could have been short-lived. That is, in settings where males have had greater contact with female group members (especially female leaders), one may find results different from those reported for the present study.

IMPLICATIONS

In considering the implications of this research, one should keep in mind the original rationale for the study. Many previously all-male institutions were still in the very early stages of fully integrating women. In the case of the U.S. Military Academy, the process had been underway (in 1977) for little over 1 year. Generally, women had not yet achieved natural positions of leadership in such institutions, because they had been members of the system for such a short time. A laboratory simulation of the type used in the present study offers an attractive means of learning about the relationship between sex roles and leadership processes in such settings. A simulation of this type can reveal features of the leadership process that may not be seen in the natural environment for several years to come (e.g., when female cadets in the class of 1980 take on some of the leadership responsibilities of First Class cadets or become Army officers). In this sense, the simulation can provide a warning of potential problems the larger system may face later. Given such a warning, the system can adapt and change in ways that minimize the possibilities of such problems arising. The recommendations presented below are based on the assumption that the present study is a valid source of such warning signals. Of course, further research in field settings may be necessary to assess the correctness of this assumption.

As a final preliminary comment, this discussion will focus on the implications of this research for one institution: the U.S. Military Academy. However, these implications should also generalize to other organizations, both civilian and military, that are trying to integrate women into their work force.

The implications of the present study will be discussed in terms of three target groups. First, implications for Academy and Army officials will be considered. The remaining two sections will deal with actions to be taken with regard to male and female cadets.

Academy/Army Officials

Academy officials must confront the problem of male cadets holding traditional (sexist) attitudes toward women. The results of this study indicate that unit performance and morale can sometimes be adversely influenced by such attitudes.

In dealing with the problem of male cadets holding negative attitudes toward women, we suggest that the focus be on institutional changes rather than efforts to directly change the cadets in question. We suggest that the Academy not adopt a strategy of direct persuasion efforts. For example, lectures calling for a change in negative attitudes toward women are not likely to be effective. In fact, such a direct attack on the problem may result in a boomerang effect that would further strengthen negative attitudes. In place of a direct persuasion effort, we recommend the following institutional changes to improve attitudes toward women.

Female Role Models. The number of female officers to which the cadets are exposed should be increased. These women should be placed in roles that will merit the respect of the cadet corps. The performance of these female officers will play an important part in shaping the attitudes of cadets with regard to the performance capabilities of women officers in the Army. In addition, witnessing appropriate work relationships between male and female officers will have a positive impact on cadets' attitudes. Obviously, it is essential that these women be excellent Army officers. The academy should select these women officers with the same care and thoroughness as it selects male officers for academy duties. Finally, female role models of this type would also be beneficial to the female cadets as well as to male cadets.

Training in Subcultural Differences. In keeping with our concern about backlash (or boomerang) effects, we suggest that any immediate educational efforts dealing with women in the Army be placed within the larger context of cultural/subcultural differences. As part of their studies of leadership, cadets should be exposed to the notion that different subcultures in the United States have unique lifestyles that must be respected as creating legitimate differences among people (e.g., blacks, Chicanos, Jews). Within the context of understanding and respecting the legitimacy of such differences, the issue of sexism and sexual integration could be dealt with in a constructive manner. For example, the problem of female stereotypes and sex bias could be dealt with in the more general context of stereotyping and prejudice. Such training would benefit both male and female cadets and should be coeducational. This kind of approach would avoid problems associated with singling out the "women's issue" as a unique problem. Within such a context the results of this study could provide excellent educational materials.

Equal Employment Opportunity Requirements. As part of their leadership training, cadets should be made aware that Army officers are evaluated, in part, on the basis of their compliance with EEO regulations. Cadets should be informed that such regulations forbid discrimination on the basis of sex as well as race, religion, and related criteria. Cadets selected for leadership roles within the Academy should have behaviorally demonstrated their ability to comply with such regulations. The Army officers working with cadets (and serving as their role models) should also be evaluated, in part, on the basis of the effectiveness with which they comply to the sex bias component of EEO regulations. (This may involve nothing more than highlighting the fact that sex discrimination falls under EEO regulations and making it clear that officers at West Point will be judged on their compliance with these regulations.)

Informal Support. The results of this study suggest that female cadets may experience more failure than their male counterparts as they begin to assume leadership positions. The byproducts of these experiences could be self-deprecation, feelings of rejection, and isolation as their attempts at leadership are resisted (especially when working with males

holding negative attitudes toward women). The academy should support the formation of groups among women to combat these feelings. Given the strong support for athletics in the academy, women's athletic teams might be an appropriate form for such informal groups. The academy should encourage further development of such teams for women. Perhaps an officer should be assigned specific responsibilities for identifying interest in such teams and organizing the necessary equipment purchases, schedules, travel arrangements, etc. needed. Obviously, other types of interest clubs should also be encouraged.

Bias in Ratings of Women. The academy should be aware that the attributional bias demonstrated in the present study can also operate in other evaluation systems in which males rate females. For example, the LES ratings of female cadets may reflect the bias of males holding negative attitudes toward women. Such bias may also show up later in the careers of female cadets in the OER scores they receive from officers holding negative attitudes toward women.

Formal Organizational Support. Officials of the academy should continue their support and commitment to the successful integration of women. Because these officials are primary role models for both cadets and lower ranking officers, their support is critical to successful integration of females into the academy. As part of this formal support, the academy should make every effort to keep open the channels of communication from female cadets to academy officials. Such a channel would provide feedback to the academy with regard to the integration of female cadets. One special function could be to provide a legitimate channel for filing grievances related to noncompliance with EEO sex discrimination regulations. We do not suggest establishing a separate department to hear and act on such grievances. Rather, it should be insured that such information can pass through the existing chain of command, as do other cadet grievances. Obviously, such a feedback system will not be effective if the female cadets feel there are negative consequences for providing such information. If the academy wants this feedback, the program must be operated in a way that encourages rather than discourages the flow of communication.

Dissemination of Results. The results of this study, along with a supporting briefing, should be made available to key officers at the academy. This process will serve to raise relevant issues for discussion about the problems and implications already put forth.

Further Research. As stated in the conclusions section, this study raised a number of critical issues in relation to leadership processes for women. Because a thorough understanding of leadership is crucial to the mission of the academy, we recommend support of further research into these questions.

Male Cadets

Instruction. The results of this study should be made available to cadets during classroom time. The classroom discussion should focus on several key issues: (a) the differences in attitudes toward women that now exist among male cadets, (b) the effect of unfavorable attitudes toward women in a mixed-sex group on performance and morale, (c) the implications for effective leadership on their part, and (d) how these attitudes and stereotypes may be affecting other leadership ratings (i.e., LES and OER). Each of these issues has been discussed earlier.

Again, we believe it would be unwise to design classroom instruction on these issues apart from more general issues of human relations, within the context of leadership. As noted earlier, one approach to this goal would be to put male-female relations within the context of cultural and individual differences that effective leaders must learn to recognize and respect.

It should also be repeated that the flavor of this instruction should not be one of overt persuasion. That is, this instruction should not be guided by the intent of "correcting" the "erroneous" attitudes of men scoring low on the Attitudes Toward Women Scale. This approach may result in a boomerang effect in which negative attitudes are further strengthened. But more importantly, this approach would ignore the cultural basis of traditional attitudes toward the role of women. Given the culture in which these men were socialized, it is understandable that they hold such attitudes toward women. It is important that they be made aware of the consequences these attitudes can have for other group members and for the effectiveness of the group. However, it would be a mistake to publicly label, degrade, and demand a "change in attitude" from these men. Positive changes in the environment (the academy and the Army) are far more likely to result in positive changes toward women cadets and officers.

Female Cadets

The results of this study indicate that the female cadet leaders often made more negative self-evaluations and attributed less importance to their own leadership abilities (relative to the responses of male cadet leaders). This pattern of low self-evaluation was especially strong when women led groups composed of men holding negative attitudes toward women. These findings suggest a need to develop specific strategies for effective female leadership in predominantly male organizations. The mastery of such techniques should improve dramatically the self-confidence and effectiveness of female leaders.

There are several strategies for improving the self-confidence and skills of women cadets. The informal support groups (e.g., women's athletic teams and clubs) suggested earlier will go a long way in allowing the women to solve this problem on their own. The various changes in the institution suggested to improve the effectiveness and image of

female officers will also improve the situation of female cadets. Finally, some special training around the issues of effective female leadership in predominantly male organizations may be useful. Some special concerns about the timing, content, and methods of such training are presented below.

We felt strongly in 1977 that it would be a mistake to immediately initiate a special leadership training program for female cadets in the class of 1980. We felt that the female cadets in the class of 1980 had already been the object of much public and academy scrutiny. At that time, any strategy that targeted these women to receive "special training" might only have exacerbated the existing negative feelings toward them. Further, at this point in the career of almost all female cadets, their leadership experiences with all-male followings were minimal. These two points suggest that any training around the special issues facing female leaders should be delayed until their third or fourth years at the academy. At that point, with more experience and a more mature view of leadership, they will be able to profit more from training. At that time, it should also be easier to successfully handle any negative reactions among male cadets to special training of female cadets.

One goal of such a training program would be to inform women cadets about the various forms of resistance they may encounter in leading predominantly male groups. The second, more important, goal would be to develop strategies for successfully coping with these difficulties. One special focus should be to develop the ability to distinguish between pressures brought about by issues of sex-role bias and discrimination operating in a group setting as opposed to the pressures confronted by all leaders in structuring ambiguous situations and influencing human behavior. To achieve these training objectives, we recommend an informal experiential workshop design with opportunity for discussion rather than a more formal classroom setting.

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APPENDIX

POST-TASK QUESTIONNAIRE BOOKLETS

Post-Task I

Questionnaire Booklet

Leader _____

Group Identification Code _____ Member A _____ (Check one)
Member B _____
Member C _____
Member D _____

This booklet contains a series of questions regarding your reaction to the task you have just completed. There are no right or wrong answers to any of these questions. We are interested only in your opinions.

Your answers to these questions will be treated in strict confidence; only the research staff will see your answers. Reports of the study will be based on statistical analyses of aggregated data; no individual responses will ever be reported.

Please answer all questions as honestly and accurately as you can.

Questionnaire A

Please describe the atmosphere of your group during the task you just completed by placing an "X" in the appropriate space on the following scales.

- Friendly : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Unfriendly
- Accepting : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Rejecting
- Frustrating : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Satisfying
- Enthusiastic : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Unenthusiastic
- Nonproductive : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Productive
- Cold : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Warm
- Cooperative : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Uncooperative
- Hostile : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Supportive
- Boring : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Interesting
- Unsuccessful : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Successful

1) To what extent was each member of your group responsible for productive action on the task you just completed? That is, what percentage of the group's total productivity was a result of the effort of each member of the group? Note that the total must equal 100%.

Member A: ___ % of the group's productive action was the result of member A's contribution.

Member B: ___ % of the group's productive action was the result of member B's contribution.

Member C: ___ % of the group's productive action was the result of member C's contribution.

Member D: ___ % of the group's productive action was the result of member D's contribution.

2) Compared to all the other groups participating in this study, how successful do you think your group was on this task?

Far worse than most : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Far better than most

average

3) In your opinion, what were the 2 or 3 major determinants of your group's performance? That is, why did the group perform as well (or poorly) as it did on this task? Be brief, a few words for each determinant will do.

4) Indicate below the extent to which each of the following factors contributed to the performance of your group:

	Not at all	To a great extent
a) Motivation of group members	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	
b) Intelligence of leader	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	
c) Leadership ability of the leader	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	
d) Ability of members to be effective followers	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	
e) Luck	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	
f) Intelligence of followers	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	
g) Motivation of leader	: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	

5) How important was it for the group to have a leader while working on this task?

Not at all important	Very important
: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	

6) With which goal were you generally more concerned; with seeing that the group members got along well with each other, or seeing that the group performed well on the task?

Relatively more concerned with group relations	Relatively more concerned with task performance
: ___ : ___ : ___ : ___ : ___ : ___ : ___ :	

Questionnaire B

Listed below are a number of statements which may describe your behavior as the leader of your group during the task you just completed. Indicate how well each item describes your behavior by putting an "X" in the appropriate space.

We are interested in your first impression on each item. The best procedure is to read each item carefully and then record your initial response. Work carefully, but quickly.

Please do not omit any items, and mark each item only once.

- 1) You decided how the group should do the task and assigned specific duties to each group member.

: _____ : _____ : _____ : _____ : _____ : _____ :
Very true Generally true Generally not Not at all
of me of me true of me true of me

- 2) You treated other group members politely and with courtesy.

: _____ : _____ : _____ : _____ : _____ : _____ :
Very true Generally true Generally not Not at all
of me of me true of me true of me

- 3) Your actions were considerate and indicated a genuine concern for the feelings of the other group members.

: _____ : _____ : _____ : _____ : _____ : _____ :
Very true Generally true Generally not Not at all
of me of me true of me true of me

- 4) You made sure that the group followed the instructions and completed the task on time.

: _____ : _____ : _____ : _____ : _____ : _____ :
Very true Generally true Generally not Not at all
of me of me true of me true of me

- 5) You clarified the goals of the group and determined how the group would set about accomplishing those goals.

: _____ : _____ : _____ : _____ : _____ : _____ :
Very true Generally true Generally not Not at all
of me of me true of me true of me

13) Indicate below the extent to which each of the following factors contributed to your performance as a leader:

- | | | |
|---|---------------|----------------------|
| | Not at
all | To a great
extent |
| a) Your expert ability as the leader on the task: | _____ | _____ |
| b) Your ability to lead : | _____ | _____ |
| c) The difficulty of the task : | _____ | _____ |
| d) Luck : | _____ | _____ |
| e) Hard work on your part : | _____ | _____ |
| f) The cooperation of the members : | _____ | _____ |

14) How well do you expect to lead on the next task?

Not at all well	:_____	Extremely well
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15) How much would you like to work as leader with this group again?

Not at all	:_____	Very much
---------------	--------	--------------

16) Sometimes the person who is appointed as the group leader is not the "real" leader of the group. Who was the real leader of your group?

Circle the group member who was the real leader of your group. You may circle your own letter if you felt you were the leader.

Member A Member B Member C Member D

17) Do you feel that the time you spent working on this study was worthwhile, or a waste of time?

Waste of time	:_____	Worthwhile
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Post-Task II
Questionnaire Booklet

Follower

Group Identification Code _____

Member A _____ (Check one)

Member B _____

Member C _____

Member D _____

This booklet contains a series of questions regarding your reaction to the task you have just completed. There are no right or wrong answers to any of these questions. We are interested only in your opinions.

Your answers to these questions will be treated in strict confidence; only the research staff will see your answers. Reports of the study will be based on statistical analyses of aggregated data; no individual responses will ever be reported.

Please answer all questions as honestly and accurately as you can.

Questionnaire A

Please describe the atmosphere of your group during the task you just completed by placing an "X" in the appropriate space on the following scales.

- Friendly : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Unfriendly
- Accepting : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Rejecting
- Frustrating : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Satisfying
- Enthusiastic : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Unenthusiastic
- Nonproductive : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Productive
- Cold : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Warm
- Cooperative : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Uncooperative
- Hostile : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Supportive
- Boring : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Interesting
- Unsuccessful : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Successful

1) To what extent was each member of your group responsible for productive action on the task you just completed? That is, what percentage of the group's total productivity was a result of the effort of each member of the group? Note that the total must equal 100%.

Member A: ___ % of the group's productive action was the result of member A's contribution.

Member B: ___ % of the group's productive action was the result of member B's contribution.

Member C: ___ % of the group's productive action was the result of member C's contribution.

Member D: ___ % of the group's productive action was the result of member D's contribution.

2) Compared to all the other groups participating in this study, how successful do you think your group was on this task?

Far worse than most : ___ : ___ : ___ : ___ : ___ : ___ : ___ : Far better than most

average

3) In your opinion, what were the 2 or 3 major determinants of your group's performance? That is, why did the group perform as well (or poorly) as it did on this task? Be brief, a few words for each determinant will do.

4) Indicate below the extent to which each of the following factors contributed to the performance of your group:

	Not at all	To a great extent
a) Motivation of group members	: _ : _ : _ : _ : _ : _ : _ : _ :	
b) Intelligence of leader	: _ : _ : _ : _ : _ : _ : _ : _ :	
c) Leadership ability of the leader	: _ : _ : _ : _ : _ : _ : _ : _ :	
d) Ability of members to be effective followers	: _ : _ : _ : _ : _ : _ : _ : _ :	
e) Luck	: _ : _ : _ : _ : _ : _ : _ : _ :	
f) Intelligence of followers	: _ : _ : _ : _ : _ : _ : _ : _ :	
g) Motivation of leader	: _ : _ : _ : _ : _ : _ : _ : _ :	

5) How important was it for the group to have a leader while working on this task?

Not at all important	: _ : _ : _ : _ : _ : _ : _ : _ :	Very important
-------------------------	-----------------------------------	-------------------

6) With which goal was the leader generally more concerned; with seeing that the group members got along well with each other, or seeing that the group performed well on the task?

Relatively more concerned with group relations	: _ : _ : _ : _ : _ : _ : _ : _ :	Relatively more concerned with task performance
--	-----------------------------------	---

Questionnaire B

Listed below are a number of statements which may describe the behavior of the leader of your group during the task you just completed. Indicate how well each item describes the behavior of your leader by putting an "X" in the appropriate space.

We are interested in your first impression on each item. The best procedure is to read each item carefully and then record your initial response. Work carefully, but quickly.

Please do not omit any items, and mark each item only once.

- 1) The leader decided how the group should do the task and assigned specific duties to each group member.

: _____ : _____ : _____ : _____ : _____ :
Very true of Generally true Generally not true Not at all true
the leader of the leader of the leader of the leader

- 2) The leader treated other group members politely and with courtesy.

: _____ : _____ : _____ : _____ : _____ :
Very true of Generally true Generally not true Not at all true
the leader of the leader of the leader of the leader

- 3) The leader's actions were considerate and indicated a genuine concern for the feelings of the other group members.

: _____ : _____ : _____ : _____ : _____ :
Very true of Generally true Generally not true Not at all true
the leader of the leader of the leader of the leader

- 4) The leader made sure that the group followed the instructions and completed the task on time.

: _____ : _____ : _____ : _____ : _____ :
Very true of Generally true Generally not true Not at all true
the leader of the leader of the leader of the leader

- 5) The leader clarified the goals of the group and determined how the group would set about accomplishing those goals.

: _____ : _____ : _____ : _____ : _____ :
Very true of Generally true Generally not true Not at all true
the leader of the leader of the leader of the leader

13) Indicate below the extent to which each of the following factors contributed to the leader's performance as a leader:

- | | Not at
all | To a great
extent |
|---|---|----------------------|
| a) The expert ability of the leader on the task | : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ : | |
| b) The ability to lead | : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ : | |
| c) The difficulty of the task | : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ : | |
| d) Luck | : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ : | |
| e) Hard work on the part of the leader | : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ : | |
| f) The cooperation of the members | : ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ : | |

14) How well do you expect your leader to lead on the next task?

Not at all well	: ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ :	Extremely well
--------------------	---	-------------------

15) How successful would you be as the leader on this task?

Not at all successful	: ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ :	Very successful
--------------------------	---	--------------------

16) How much would you like to work under the direction of this leader again?

Not at all	: ___ : ___ : ___ : ___ : ___ : ___ : ___ : ___ :	Very much
---------------	---	--------------

17) Sometimes the person who is appointed as the group leader is not the "real" leader of the group. Who was the real leader of your group?

Circle the group member who was the real leader of your group. You may circle your own letter if you felt you were the leader.

Member A Member B Member C Member D

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 1 USA Armament Cmd, Rock Island, ATTN: AMSAR-TDC
 1 FAA-NAFEC, Atlantic City, ATTN: Library
 1 FAA-NAFEC, Atlantic City, ATTN: Human Engr Br
 1 FAA Aeronautical Ctr, Oklahoma City, ATTN: AAC-44D
 2 USA Fld Arty Sch, Ft Sill, ATTN: Library
 1 USA Armor Sch, Ft Knox, ATTN: Library
 1 USA Armor Sch, Ft Knox, ATTN: ATSB-DI-E
 1 USA Armor Sch, Ft Knox, ATTN: ATSB-DT TP
 1 USA Armor Sch, Ft Knox, ATTN: ATSB-CD-AD
 2 HOUSACDEC, Ft Ord, ATTN: Library
 1 HOUSACDEC, Ft Ord, ATTN: ATEC-EX-E-Hum Factors
 2 USAEEC, Ft Benjamin Harrison, ATTN: Library
 1 USAPACDC, Ft Benjamin Harrison, ATTN: ATCP-HR
 1 USA Comm-Elect Sch, Ft Monmouth, ATTN: ATSN-EA
 1 USAEC, Ft Monmouth, ATTN: AMSEL-CT-HDP
 1 USAEC, Ft Monmouth, ATTN: AMSEL-PA-P
 1 USAEC, Ft Monmouth, ATTN: AMSEL-SI-CB
 1 USAEC, Ft Monmouth, ATTN: C, Fac Dev Br
 1 USA Materials Sys Anal Agcy, Aberdeen, ATTN: AMXSY-P
 1 Edgewood Arsenal, Aberdeen, ATTN: SAREA-BL-H
 1 USA Ord Ctr & Sch, Aberdeen, ATTN: ATSL-TEM-C
 2 USA Hum Engr Lab, Aberdeen, ATTN: Library/Dir
 1 USA Combat Arms Tng Bd, Ft Benning, ATTN: Ad Supervisor
 1 USA Infantry Hum Rsch Unit, Ft Benning, ATTN: Chief
 1 USA Infantry Bd, Ft Benning, ATTN: STEBC-TE-T
 1 USASMA, Ft Bliss, ATTN: ATSS-LRC
 1 USA Air Def Sch, Ft Bliss, ATTN: ATSA-CTD-ME
 1 USA Air Def Sch, Ft Bliss, ATTN: Tech Lib
 1 USA Air Def Bd, Ft Bliss, ATTN: FILES
 1 USA Air Def Bd, Ft Bliss, ATTN: STEBD-PO
 1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Lib
 1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: ATSW-SE-L
 1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Ed Advisor
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: DepCdr
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: CCS
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCASA
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACO-E
 1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACO-CI
 1 USAECOM, Night Vision Lab, Ft Belvoir, ATTN: AMSEL-NV-SD
 3 USA Computer Sys Cmd, Ft Belvoir, ATTN: Tech Library
 1 USAMERDC, Ft Belvoir, ATTN: STSFB-DO
 1 USA Eng Sch, Ft Belvoir, ATTN: Library
 1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-TD-S
 1 USA Topographic Lab, Ft Belvoir, ATTN: STINFO Center
 1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-GSL
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: CTD-MS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-MS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TE
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEX-GS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTS-OR
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-DT
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-CS
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: DAS/SRD
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEM
 1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: Library
 1 CDR, HQ Ft Huachuca, ATTN: Tech Ref Div
 2 CDR, USA Electronic Prvg Grd, ATTN: STEEP-MT-S
 1 HQ, TCATA, ATTN: Tech Library
 1 HQ, TCATA, ATTN: ATCAT-OP-O, Ft Hood
 1 USA Recruiting Cmd, Ft Sheridan, ATTN: USARCPM-P
 1 Senior Army Adv., USAFAGOD/TAC, Elgin AF Aux Fld No. 9
 1 HQ, USARPAC, DCSPER, APO SF 96558, ATTN: GPPE-SE
 1 Stimson Lib, Academy of Health Sciences, Ft Sam Houston
 1 Marine Corps Inst., ATTN: Dean-MCI
 1 HQ, USMC, Commandant, ATTN: Code MTMT
 1 HQ, USMC, Commandant, ATTN: Code MPI-20-28
 2 USCG Academy, New London, ATTN: Admission
 2 USCG Academy, New London, ATTN: Library
 1 USCG Training Ctr, NY, ATTN: CO
 1 USCG Training Ctr, NY, ATTN: Educ Svc Ofc
 1 USCG, Psychol Res Br, DC, ATTN: GP 1/62
 1 HQ Mid-Range Br, MC Det, Quantico, ATTN: P&S Div

- 1 US Marine Corps Liaison Ofc, AMC, Alexandria, ATTN: AMCGS-F
1 USATRADOCC, Ft Monroe, ATTN: ATRO-ED
6 USATRADOCC, Ft Monroe, ATTN: ATPR-AD
1 USATRADOCC, Ft Monroe, ATTN: ATTS-EA
1 USA Forces Cmd, Ft McPherson, ATTN: Library
2 USA Aviation Test Bd, Ft Rucker, ATTN: STEBG-PO
1 USA Agcy for Aviation Safety, Ft Rucker, ATTN: Library
1 USA Agcy for Aviation Safety, Ft Rucker, ATTN: Educ Advisor
1 USA Aviation Sch, Ft Rucker, ATTN: PO Drawer O
1 HQUSA Aviation Sys Cmd, St Louis, ATTN: AMSAV-ZDR
2 USA Aviation Sys Test Act., Edwards AFB, ATTN: SAVTE--T
1 USA Air Def Sch, Ft Bliss, ATTN: ATSA TEM
1 USA Air Mobility Rsch & Dev Lab, Moffett Fld, ATTN: SAVDL -AS
1 USA Aviation Sch, Res Trng Mgt, Ft Rucker, ATTN: ATST-T-RTM
1 USA Aviation Sch, CO, Ft Rucker, ATTN: ATST-D-A
1 HQ, DARCOM, Alexandria, ATTN: AMXCD-TL
1 HQ, DARCOM, Alexandria, ATTN: CDR
1 US Military Academy, West Point, ATTN: Serials Unit
1 US Military Academy, West Point, ATTN: Ofc of Milt Ldrshp
1 US Military Academy, West Point, ATTN: MAOR
1 USA Standardization Gp, UK, FPO NY, ATTN: MASE-GC
1 Ofc of Naval Rsch, Arlington, ATTN: Code 452
3 Ofc of Naval Rsch, Arlington, ATTN: Code 458
1 Ofc of Naval Rsch, Arlington, ATTN: Code 450
1 Ofc of Naval Rsch, Arlington, ATTN: Code 441
1 Naval Aerosp Med Res Lab, Pensacola, ATTN: Acous Sch Div
1 Naval Aerosp Med Res Lab, Pensacola, ATTN: Code L51
1 Naval Aerosp Med Res Lab, Pensacola, ATTN: Code L5
1 Chief of NavPers, ATTN: Pers-OR
1 NAVAIRSTA, Norfolk, ATTN: Safety Ctr
1 Nav Oceanographic, DC, ATTN: Code 6251, Charts & Tech
1 Center of Naval Anal, ATTN: Doc Ctr
1 NavAirSysCom, ATTN: AIR-5313C
1 Nav BuMed, ATTN: 713
1 NavHelicopterSubSqua 2, FPO SF 96601
1 AFHRL (FT) Williams AFB
1 AFHRL (TT) Lowry AFB
1 AFHRL (AS) WPAFB, OH
2 AFHRL (DOJZ) Brooks AFB
1 AFHRL (DOJN) Lackland AFB
1 HQUSAF (INYSO)
1 HQUSAF (DPXXA)
1 AFVTG (RD) Randolph AFB
3 AMRL (HE) WPAFB, OH
2 AF Inst of Tech, WPAFB, OH, ATTN: ENE/SL
1 ATC (XPTD) Randolph AFB
1 USAF AeroMed Lib, Brooks AFB (SUL-4), ATTN: DOC SEC
1 AFOSR (NL), Arlington
1 AF Log Cmd, McClellan AFB, ATTN: ALC/DPCR
1 Air Force Academy, CO, ATTN: Dept of Bel Scn
5 NavPers & Dev Ctr, San Diego
2 Navy Med Neuropsychiatric Rsch Unit, San Diego
1 Nav Electronic Lab, San Diego, ATTN: Res Lab
1 Nav TrngCen, San Diego, ATTN: Code 9000-Lib
1 NavPostGraSch, Monterey, ATTN: Code 55Aa
1 NavPostGraSch, Monterey, ATTN: Code 2124
1 NavTrngEquipCtr, Orlando, ATTN: Tech Lib
1 US Dept of Labor, DC, ATTN: Manpower Admin
1 US Dept of Justice, DC, ATTN: Drug Enforce Admin
1 Nat Bur of Standards, DC, ATTN: Computer Info Section
1 Nat Clearing House for MH-Info, Rockville
1 Denver Federal Ctr, Lakewood, ATTN: BLM
12 Defense Documentation Center
4 Dir Psych, Army Hq, Russell Ofcs, Canberra
1 Scientific Advsr, Mil Bd, Army Hq, Russell Ofcs, Canberra
1 Mil and Air Attache, Austrian Embassy
1 Centre de Recherche Des Facteurs, Humaine de la Defense Nationale, Brussels
2 Canadian Joint Staff Washington
1 C/Air Staff, Royal Canadian AF, ATTN: Pers Std Anal Br
3 Chief, Canadian Def Rsch Staff, ATTN: C/CRDS(W)
4 British Def Staff, British Embassy, Washington
1 Def & Civil Inst of Enviro Medicine, Canada
1 AIR CRESS, Kensington, ATTN: Info Sys Br
1 Militaerpsykologisk Tjeneste, Copenhagen
1 Military Attache, French Embassy, ATTN: Doc Sec
1 Medecin Chef, C.E.R.P.A.,-Arsenal, Toulon/Naval France
1 Prin Scientific Off, Appl Hum Engr Rsch Div, Ministry of Defense, New Delhi
1 Pers Rsch Ofc Library, AKA, Israel Defense Forces
1 Ministeris van Defensie, DOOP/KL Afd Sociaal Psychologische Zaken, The Hague, Netherlands