DTIC FILE COPY

ARI Research Note 90-84

AD-A226 947

Stress, Babble, and the Utilization of Leader Intellectual Abilities

Frederick W. Gibson, Fred E. Fiedler, and Kelley M. Daniels

University of Washington

for

Contracting Officer's Representative
Michael Drillings

DTIC
ELECTE
SEP 27 1990
S B D

Basic Research
Michael Kaplan, Director

July 1990

United States Army
Research Institute for the Behavioral and Social Sciences

Approved for public release; distribution is unlimited

90 09 25 018

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

JON W. BLADES
COL, IN
Commanding

Research accomplished under contract for
the Department of the Army

University of Washington

Technical review by

Michael Drillings

NOTICES

DISTRIBUTION: This report has been cleared for release to the Defense Technical Information Center (DTIC) to comply with regulatory requirements. It has been given no primary distribution other than to DTIC and will be available only through DTIC or the National Technical Information Service (NTIS).

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The views, opinions, and findings in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other authorized documents.

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS --
2a. SECURITY CLASSIFICATION AUTHORITY --	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE --	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) --	5. MONITORING ORGANIZATION REPORT NUMBER(S) ARI Research Note 90-84
6a. NAME OF PERFORMING ORGANIZATION University of Washington Organizational Research 6b. OFFICE SYMBOL (If applicable) --	7a. NAME OF MONITORING ORGANIZATION U.S. Army Research Institute
6c. ADDRESS (City, State, and ZIP Code) Seattle, WA 98195	7b. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Research Institute for the Behavioral and Social Sciences 8b. OFFICE SYMBOL (If applicable) PERI-BR	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER MDA903-86-C-0300
8c. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO.: 61102B PROJECT NO.: 74F TASK NO.: N/A WORK UNIT ACCESSION NO.: N/A

11. TITLE (Include Security Classification)

Stress, Babble, and the Utilization of Leader Intellectual Abilities

12. PERSONAL AUTHOR(S)

Gibson, Frederick W.; Fiedler, Fred E.; and Daniels, Kelley M. (University of Washington)

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Interim	FROM 86/09 TO 88/09	1990, July	30

16. SUPPLEMENTARY NOTATION

Contracting Officer's Representative, Michael Drillings

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Leadership, Intelligence, Creativity Groups, Stress

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Research has demonstrated that, under stress, leader abilities are often unrelated to or are detrimental to group performance. This study seeks to identify group process variables that account for such counter-intuitive findings. Researchers conducted a content analysis on written transcripts of group problem-solving sessions. Moderated multiple regression analyses indicated that, under stress, more intelligent or creative leaders suppressed the contribution of members by limiting member talking and idea generation. Idea suppression in particular led to "babbling" (suggesting few ideas per unit of talk) on the part of members with more creative leaders. Stepwise multiple regression analyses subsequently revealed that member babbling significantly predicted group performance; groups whose members babbled less performed best.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Michael Drillings	22b. TELEPHONE (Include Area Code) (202) 274-8722 22c. OFFICE SYMBOL PERI-BR

DD Form 1473, JUN 86 Previous editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

ACKNOWLEDGMENTS

This research was funded with support of a grant from the U.S. Army Research Institute.

We would like to thank Lani McCormick and Uzi Raab for their invaluable work in reading and coding the group transcripts.

The first author is a fully funded graduate student under the Air Force Institute of Technology program, and wishes to acknowledge the indirect support of AFIT of this research.

The authors would like to thank Dr. Earl Hunt for his insightful comments on an earlier version of this report.

DTIC COPY INSPECTED

Accession For
NTIS GRA&I ☑
DTIC TAB ☐
Unannounced ☐
Justification
By
Distribution/
Availability Codes
Dist | Avail and/or Special
A-1

STRESS, BABBLE, AND THE UTILIZATION OF LEADER INTELLECTUAL ABILITIES

One of the more curious findings in leadership research is that such leader intellectual abilities as intelligence or creativity are weakly related to group performance (e.g., Bass, 1981; Ghiselli, 1963; Mann, 1959; Stogdill, 1948). This is surprising since leadership requires intellectual effort: leaders have to recognize and anticipate problems, analyze information, make plans and decisions, and evaluate outcomes. Low correlations between leader intelligence and performance thus fly in the face of common sense and institutional wisdom.

Cognitive Resource Theory

This study seeks to identify the group process variables which account for such counter-intuitive findings. It is one in a series of investigations on "Cognitive Resource Theory" (Fiedler, 1984: Fiedler & Garcia, 1987) which attempts to identify the specific role of leader abilities, technical competence and job-relevant knowledge in organizational performance.

At the core of Cognitive Resource Theory is a causal chain proposed by Blades (1976). A simplified version of Blades' thesis is illustrated in Figure 1. Blades suggested that a high positive correlation between leader abilities and group performance depends upon the existence of an unbroken chain of events. Specifically, for leader abilities to translate into group performance, three processes must take place uninterrupted: (a) the leader must devote intellectual effort to making decisions, plans and action strategies related to the task; (b) the leader must communicate these decisions, plans and action strategies to the group members in the form of directions, instructions or guidance; and (c) supportive and motivated group members must implement the leader's plans, decisions, and action strategies. Disruption of any of these processes will attenuate the relationship between the leader's cognitive abilities and group performance.

- - - - - - - - - - - - - -
Insert Figure 1 About Here
- - - - - - - - - - - - - -

Stress. A primary source of disruption appears to be stress. As various investigators (e.g., Lazarus (1966); Sarason (1984); and Spielberger and Katzenmeyer (1959)) have demonstrated, stress can divert an individual's attention from the task. The ability to concentrate on the task appears to be most strongly affected by a stressful relationship with important others such as the immediate supervisor (Borden, 1980; Barnes, Potter & Fiedler, 1983).

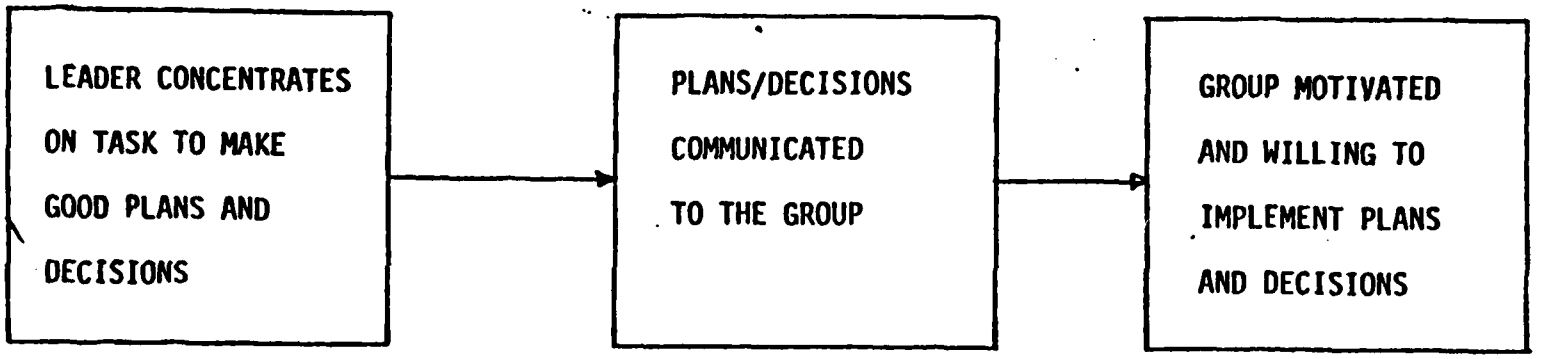


Figure 1. A basic process in Cognitive Resource Theory (from Blades, 1976).

One of the major propositions of Cognitive Resource Theory, in fact, states that stress, especially stress with superiors, creates evaluation anxiety or conflict that distracts the leader from focusing on the task. Therefore leader intelligence and creativity should be more weakly correlated with group performance when the leader reports relatively high interpersonal stress. This effect was demonstrated in a study of coast guard cadets by Barnes, Potter and Fiedler (1983). Barnes et al. showed that correlations between cadets' Scholastic Aptitude Test (SAT) mathematics subscores and their cumulative grade point averages were quite high for cadets who perceived little stress with their superiors ($r=.819$, $n=12$), but were low and non-significant for cadets who reported relatively high stress with superiors ($r=.05$, $n=10$). On the other hand, task and other non-boss stresses such as the stress of the academic program, or with parents and instructors, did not affect the correlations between SAT and grade point average.

In contrast, job stress, which is generated by a difficult task, short deadlines, or the like, tends to focus the individual's attention on the task. More intelligent or creative leaders will tend to be more effective than less intelligent or creative leaders in the presence of job stress, since their abilities are brought to bear on the task requirements.

While we can easily understand that interpersonal stress, by distracting leaders from attending to the task, will attenuate the relationship between leader abilities and performance, it is difficult to understand why correlations between leader abilities and task performance under stress are so frequently <u>negative</u>. Borden (1980), for example, correlated intelligence scores of military personnel in various job categories with their performance ratings. Performance ratings and reported stress with superiors were uncorrelated. The samples were subdivided into those who reported low, moderate, or high stress with their boss. In the low and moderate stress groups, correlations were positive across all job categories; conversely, the correlations were negative in four of the five job categories when reported stress with boss was high.

A second example comes from a study of coast guard personnel (Potter & Fiedler, 1981). The correlation between intelligence scores and rated performance was .16 ($n=60$) when stress was low, but negative ($r=-.27$, $n=51$, $p<.05$) when stress with the superior was high. (Performance and reported stress with superior were again uncorrelated; $r=-.07$, n.s., $n=130$). Similar findings were reported by Fiedler, Potter, Zais, and Knowlton (1979).

The question is not why we obtain positive correlations between leader cognitive abilities and group performance when leader-felt stress is low, but why leader abilities fail to contribute or even become detrimental to group performance when leader-felt stress is high. What mediating processes account for these global findings? A number of hypotheses may be offered:

1. More intelligent or more creative people are better at foreseeing or imagining the consequences of failure and are therefore more anxious;
2. More intelligent or more creative people have higher expectations of their ability to cope with intellectually demanding tasks. For this reason such leaders may:
   a) talk more because of a felt obligation as a gifted group member to control the group discussion, or because giftedness creates such tendencies as a dominant response under stress;
   b) strain for exotic or elegant solutions, perhaps to the exclusion of more pedestrian but equally valuable ones, thereby suppressing the generation of ideas during task sessions;
   c) produce fewer ideas per unit of time spent talking. This is a joint function of more time spent talking and the simultaneous suppression of idea generation.
3. Gifted leaders may also, by talking more or by communicating higher standards for ideas or solutions, inhibit group members from contributing to task performance. This phenomenon may be manifested in the form of a) less talk by the group members, b) generation of fewer task-related ideas by group members, or c) fewer ideas per unit of time spent talking.

Hypotheses 2a, 2c and 3 above obtained support from an earlier study of group creativity (Fiedler, Meuwese & Oonk, 1961). The study suggested that, under stress, more intelligent leaders and their group members talked more but produced fewer substantive ideas than did less intelligent leaders or their group members.

Method

The Fiedler et al. findings were formally tested on data from a subsequent study conducted by Meuwese and Fiedler (1965, cited in Fiedler & Garcia, 1987). This experiment studied 54 teams of ROTC cadets as they performed a 20-minute group problem solving task which involved inventing a fable for elementary school children. Following

the completion of the group tasks, each group member also completed the 16-item version of the Leader Behavior Description Questionnaire, or LBDQ (Stogdill, 1965), which asked them to rate their leader along several behavioral dimensions.

Five judges evaluated the group products. Perceived stress was measured by subjective ratings, using the Alexander and Husek (1962) state anxiety scale, and was treated as a between-subjects factor. The Multi-Aptitude Test (Note 1) measured intelligence, while creativity was assessed using the Guilford-Christensen Plot Titles and Alternative Uses tests (Guilford, Berger, and Christensen, 1954).

As in Borden (1980) and Potter and Fiedler (1981), the correlations between leader abilities and performance were low in groups in which leaders reported high stress ($r=.05$) but relatively strong when leaders reported low stress ($r=.42$). A similar pattern was noted for leader creativity; here, the correlation with performance dropped from .30 under low leader stress to -.19 under high stress conditions.

For purposes of the present study, typed transcripts of each session were content analyzed by three judges. This analysis was preceded by rater training in which definitions and operationalizations of the rated variables were discussed. A brief description of the variables is presented here:

Talking: The number of printed lines in the transcript associated with comments by the leader ("leader lines") or the other group members ("member lines").

Ideas: Any substantive task-relevant comment by the leader ("leader ideas") or group members ("member ideas") as contrasted, for example, by comments about the weather, jokes, or asides.

Interrater agreement was assessed by computing the Pearson correlations between all possible pairings of the three raters separately for each of the four variables. Overall interrater agreement was .87. Test-retest reliability was estimated by requiring two raters to complete duplicate transcript analyses after an average time lag of five weeks. The average reliability using this method was .97. Both indices demonstrate substantial stability of the ratings across the dimensions assessed.

Results

Table 1 lists the means, standard deviations, and intercorrelations of the major variables. Leader creativity and performance were essentially unrelated (r=.09, n.s.), and leader intelligence and performance weakly so (r=.22, p=.11). Performance and ratings of stress were also unrelated (r=-.05. n.s.), indicating that stress by itself did not influence performance. In short, the lack of strong correlations between leader cognitive abilities and group performance on the one hand, and our adoption of Blades' (1976) proposed causal chain on the other, imply that meaningful relationships between leader cognitive abilities and performance, or between stress and performance, will be best explained by moderator and/or mediator action.

- - - - - - - - - - - - - -

Insert Table 1 About Here

- - - - - - - - - - - - - -

Hypothesis 1, that more intelligent or creative leaders perceive greater stress than less intelligent or creative leaders, was not supported. Pearson correlations between leader intelligence and creativity with stress of .22 (p=.11, n=53) and .07 (n.s., n=53), respectively, suggested that neither leader attribute reliably determined the level of stress experienced by the leader, although leader intelligence was weakly related to greater felt stress.

Stress-by-ability interactions: To determine whether leader ability interacted with level of leader-felt stress to affect leader or group member behaviors, we conducted several moderated regression analyses. In these analyses, the dependent variable was one of the four rated behaviors (leader lines, member lines, leader ideas, member ideas). "Babble" was measured by dividing the number of ideas by the number of lines of talk, and was computed separately for leaders and group members; thus the variables "leader babble" and "member babble" were added to the dependent variable set.

The predictor variables in these analyses were leader creativity (or intelligence), leader rated stress, and the product of these two variables representing the interaction. The incremental change in R^2 due to the interaction term was then tested for significance (Pedhazur, 1982).

Intelligence. Analyses using intelligence as the leader ability of interest are presented in Table 2 (top). In this subset, leader intelligence and leader-felt stress jointly predicted several behaviors, as evidenced by significant increments in R^2 due to the stress-by-intelligence term. In particular, leader intelligence-

Table 1

Means, Standard Deviations and

Intercorrelations of Major Variables[a,b,c]

	1	2	3	4	5	6	7	8	9
1. Anxiety	54.13 9.65	22.41 3.95	38.98 12.23	104.15 22.33	3.20 1.48	16.59 6.96	113.12 35.04	30.98 11.87	177.90 52.60
2. Ldr IQ	.22 p=.11								
3. Ldr Creativity	.07 n.s.	.23 p=.10							
4. Fable	-.05 n.s.	.22 p=.11	.09 n.s.						
5. LBDQ7[b]	-.05 n.s.	-.05 n.s.	-.15 n.s.	-.27 p=.05					
6. Ldr Ideas	.10 n.s.	.37 p=.01	.34 p=.01	.25 p=.07	.01 n.s.				
7. Mbr Ideas	.05 n.s.	.27 p=.05	.03 n.s.	.32 p=.01	.18 n.s.	.28 p=.03			
8. Ldr Lines of Talk	.14 n.s.	-.03 n.s.	.32 p=.02	-.05 n.s.	-.13 n.s.	.41 p=.00	-.34 p=.04		
9. Mbr Lines of Talk	-.16 n.s.	-.11 n.s.	-.26 p=.06	-.21 p=.12	.18 n.s.	-.32 p=.02	.28 p=.04	-.25 p=.07	

[a] Top row lists means and standard deviations. Lower triangle lists intercorrelations

[b] n=53

[c] two-tailed test

leader-felt stress interactions significantly predicted member lines of talk ($\hat{R}^2$=.08, F(1,49)=4.77, p=.03, beta=.30) and member ideas per unit of talk ($\hat{R}^2$=.07, F(1,49)=3.96, p=.05, beta=-.27).

- - - - - - - - - - - - - - -

Insert Table 2 About Here

- - - - - - - - - - - - - - -

Creativity. The creativity subset yielded significant results in three of the six analyses (see Table 2, bottom). Specifically, leader creativity-felt stress interactions produced significant incremental changes in R^2 when predicting member ideas per unit of talk ($\hat{R}^2$=.09, F(1,49)=5.34, p=.03, beta=-.30), leader ideas ($\hat{R}^2$=.05, F(1,49)=3.13, p=.08, beta=-.23), and leader ideas per unit of talk ($\hat{R}^2$=.06, F(1,49)=3.06, p=09, beta=-.24). Weak effects were noted for member lines of talk ($\hat{R}^2$=.04, F(1,49)=2.21, p=.14, beta=.20) and member ideas ($\hat{R}^2$=.04, F(1,49)=2.18, p=.15, beta=-.21).

To visualize the ability-by-stress interactions, cell means corresponding to high and low leader-felt stress and high and low leader creativity or intelligence (by taking top and bottom third groups after trichotomizing on each variable) were plotted. Figure 2 contains plotted cell means associated with the intelligence analyses. Figure 3 contains similar plots for the creativity analyses.

- - - - - - - - - - - - - - -

Insert Figure 2 About Here

- - - - - - - - - - - - - - -

As Figure 2(A) demonstrates, members with more intelligent leaders talked less than members with less intelligent leaders when leaders felt low stress. This relationship was reversed under high leader-felt stress; here, members with more intelligent leaders talked less than did members with less intelligent leaders. (This phenomenon is a mirror image of the statistically nonsignificant finding for leader lines of talk. As Figure 2(B) indicates, there was little difference in amount of talking between the more and less intelligent leaders who reported low stress, although the latter group talked more. Under high leader-perceived stress, however, the more intelligent leaders talked more than did the less intelligent leaders.)

Figure 2(C) illustrates that members with less intelligent leaders suggested fewer ideas per unit of talk (i.e., babbled more) when leader-perceived stress was low, but this difference was much smaller in groups in which

Table 2

Results of Moderated Regression Analyses

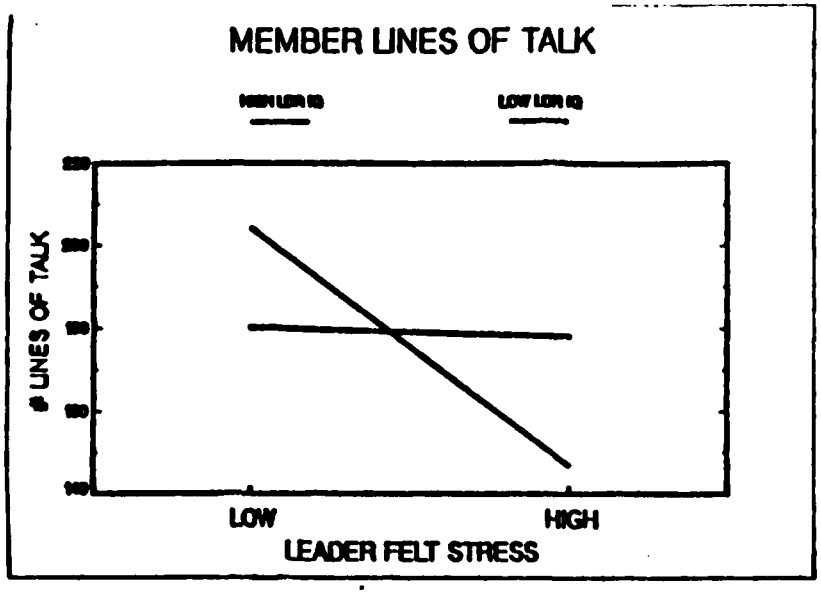
Stress by Intelligence Interactions

DV	Contribution of Interaction Term			
	$\Delta R^{2\$}$	F^{*}	beta	p
Leader lines of talk	.02	1.33	-.16	.25
Leader ideas	.01	.63	-.11	.43
Member lines of talk	.08	4.77	.30	.03
Member ideas	.02	.89	-.13	.35
Leader ideas per unit of talk	.002	.17	-.06	.68
Member ideas per unit of talk	.07	3.96	-.27	.05

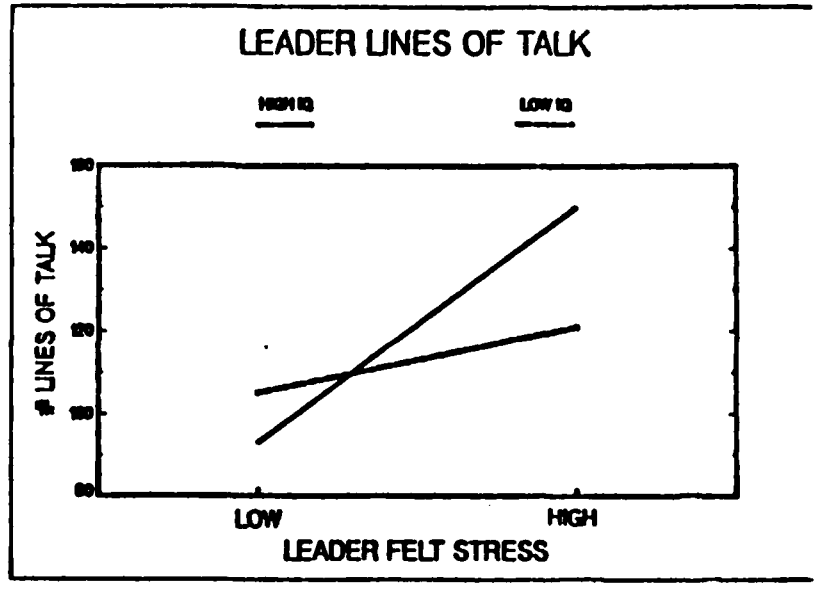
Stress by Creativity Interactions

DV	Contribution of Interaction Term			
	ΔR^{2}	F^{*}	beta	p
Leader lines of talk	.00	.02	-.02	.89
Leader ideas	.05	3.13	-.23	.08
Member lines of talk	.04	2.21	.20	.14
Member ideas	.04	2.18	-.21	.15
Leader ideas per unit of talk	.06	3.06	-.24	.09
Member ideas per unit of talk	.09	5.34	-.30	.03

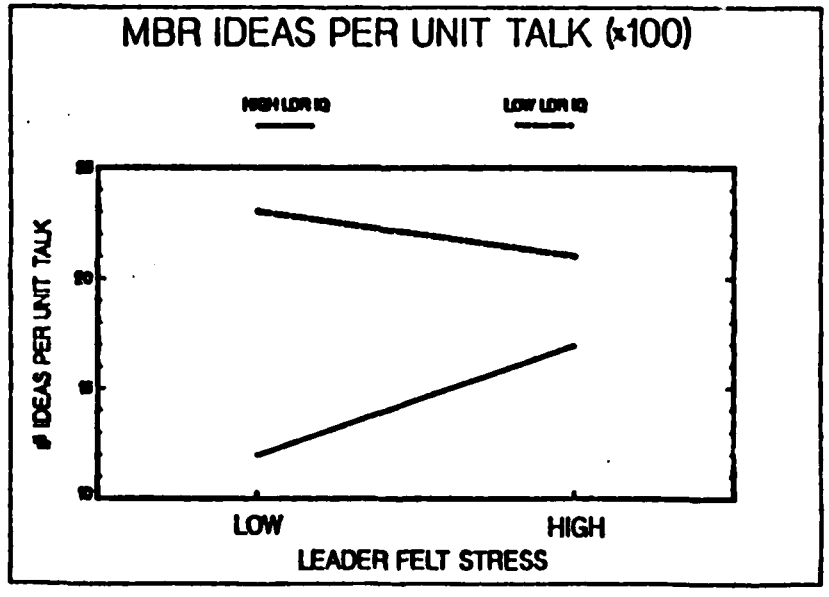
*df (1,49)
$contribution of interaction term over and above main effects



A



B



C.

Figure 2. Selected leader-intelligence-by-stress interaction effects. (Note: In Figure 2C, lower numbers indicate greater babbling.)

leaders felt high stress. This latter finding is consistent with the fact that under high stress the correlation between intelligence and performance approached zero (r=.05). In other words, under high leader-felt stress, the amount of member babbling converged for groups with more and less intelligent leaders. This reflected the overall finding that under high leader-perceived stress the correlation between leader intelligence and group performance approached zero. However, the direction of the differences was unexpected: the more intelligent leaders' groups performed better when their leaders perceived low stress, but members in these groups suggested fewer ideas per unit of talk (i.e., babbled more).

The graphs for the creativity analyses revealed a different pattern (see Figure 3). Unexpectedly, more creative leaders offered fewer ideas under stress than did their less creative counterparts (Figure 3(A)). This situation was reversed under low stress. On the other hand, there was no difference in the number of member ideas between the two groups under low leader-perceived stress; under high leader-felt stress, members with more creative leaders offered fewer ideas than did members with less creative leaders (Figure 3(B)). Finally, under low leader-felt stress members with more creative leaders talked less than did members with more creative leaders (Figure 3(C)). Under high leader-felt stress, however, members in both groups talked equally.

- - - - - - - - - - - - - -

Insert Figure 3 About Here

- - - - - - - - - - - - - -

Figure 4(A) demonstrates that under low leader-felt stress, more creative leaders babbled less (offered more ideas per unit of talk) than did less creative leaders. This relationship was reversed under high leader-perceived stress; here, more creative leaders babbled more than less creative leaders. Member babbling followed similar patterns (Figure 4(B)). This turned out to be a critical finding with respect to group performance.

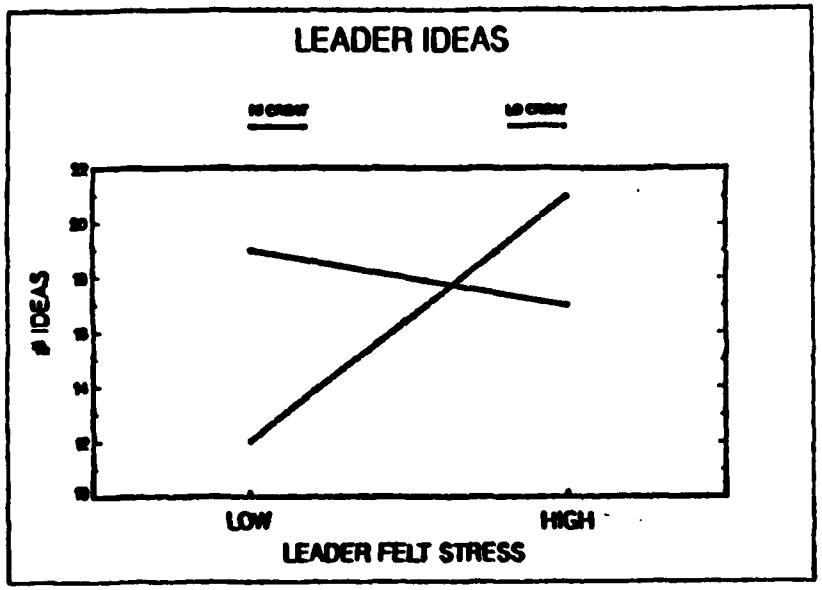
- - - - - - - - - - - - - -

Insert Figure 4 About Here

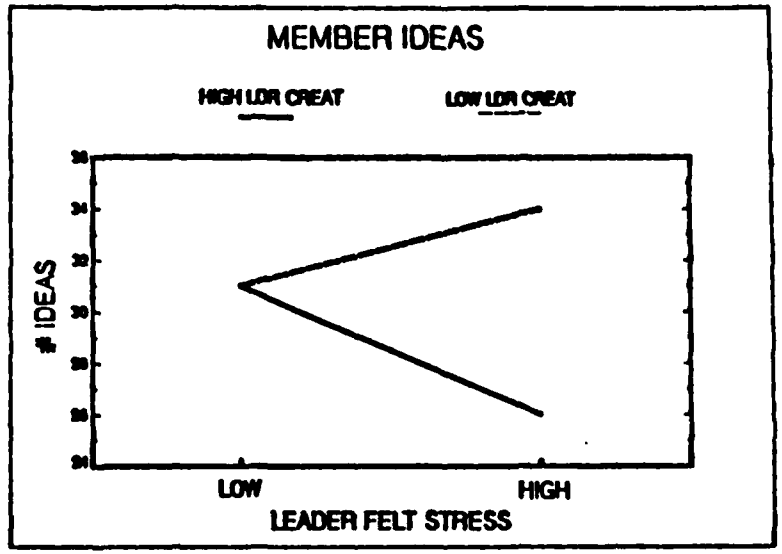
- - - - - - - - - - - - - -

Summary of Findings

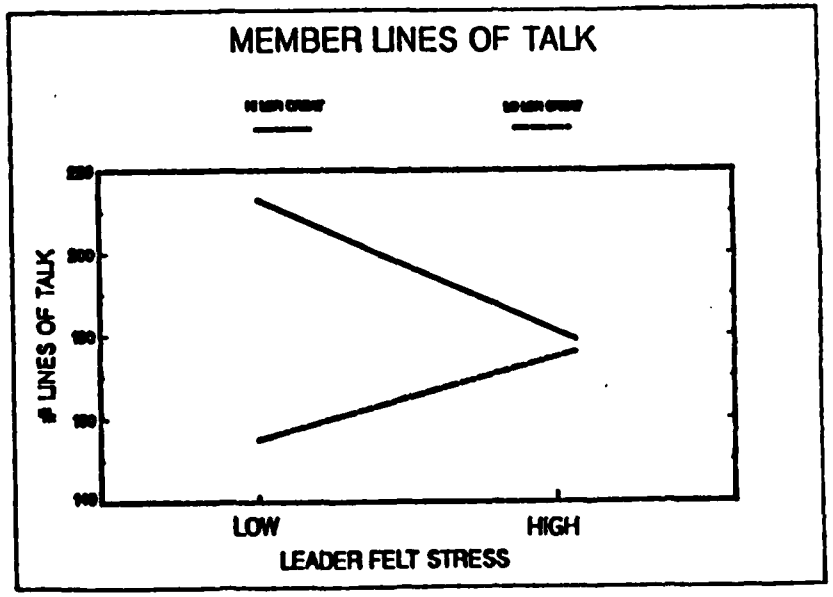
Leader-felt stress was associated with less talking on the part of group members with more intelligent leaders. This may have been a function of the limited time available



A

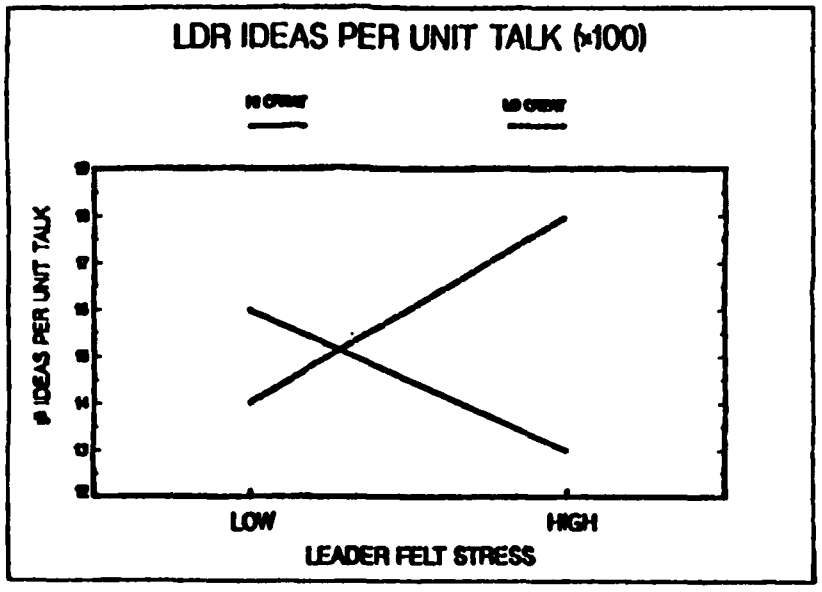


B

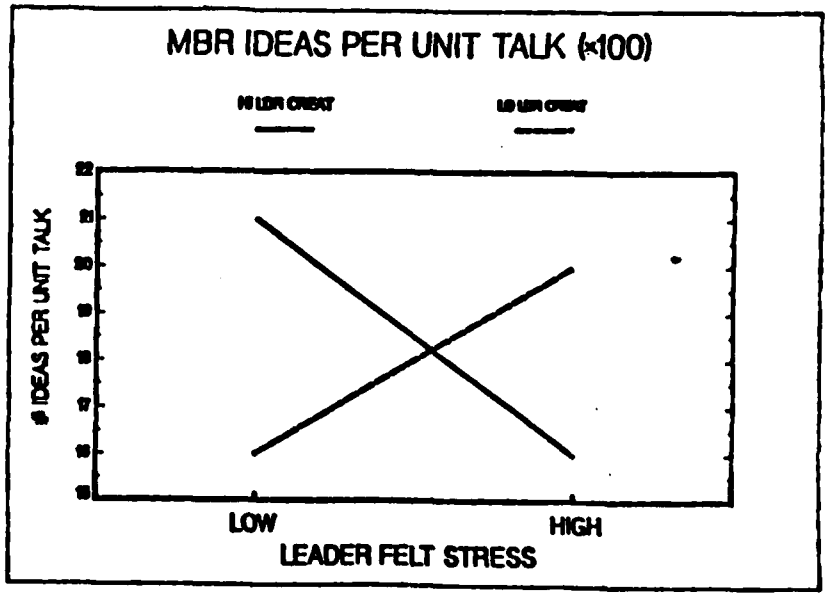


C

Figure 3. Selected leader-creativity-by-stress interaction effects.



A



B

Figure 4. Selected leader-creativity by stress interaction effects, continued. (Note: Lower numbers indicate greater babbling.)

to the group for talking, since more intelligent leaders tended to talk more under high stress, although this latter effect was not statistically significant. In fact, leader talking and member talking were correlated -.25 ($p=.07$, $n=53$).

More creative leaders, as well as their members, produced fewer ideas under high leader-felt stress than did less creative leaders or their group members.

Member babbling was most strongly predicted from the stress-by-leader ability interactions, and this variable seemed to integrate the findings. Under low leader-felt stress, members with more intelligent leaders babbled more than those with less intelligent leaders; under high stress the difference was reduced. This trend reflected the finding that leader intelligence did not correlate with performance in this condition. On the other hand, members with creative leaders babbled less under low leader-felt stress and more under high stress, as did the more creative leaders. Again, this pattern paralleled relationships between leader creativity and performance.

Predicting task performance

The data provide strong evidence that leader abilities and leader-perceived stress are jointly related to leader and member behaviors. To more fully explain the performance deficits noted at the outset of this paper, however, we must demonstrate that one or more of these affected behaviors predicted performance on the group task.

To determine which variables were important in predicting group performance, we conducted exploratory multiple regression analyses, using the fable score as the criterion. Because of the large number of variables in the original data set (>160), we initially used blockwise selection (Pedhazur, 1982) with stepwise entry; each block contained approximately 20 potential predictors. At the completion of each block analysis, survivor variables and variables that were not entered into the equation but whose t-values approached statistical significance were retained for further analysis. At the completion of the block analyses, all retained variables were entered in a stepwise regression analysis to produce the final equation. The results of this final analysis are listed in Table 3, top.

- - - - - - - - - - - - - -

Insert Table 3 About Here

- - - - - - - - - - - - - -

Table 3

Regression Analyses Predicting Performance on Fable Task

Model I (Using All Available Variables):

Predictor	b	se b	beta	t	p(t)
Member ideas per unit of talk	143.08	33.55	.49	4.26	.00
LBDQ7[a]	-4.35	1.74	-.29	-2.50	.02

Model I Summary:

Mult R	R^2	F(2,51)	p
.56	.32	11.86	.00

Model II (Excluding member babble):

Predictor	b	se b	beta	t	p(t)
Member ideas	.86	.24	.46	3.67	.00
LBDQ7[a]	-4.58	1.84	-.31	-2.50	.02
Member lines of talk	-.1215	.05	-.29	-2.29	.03

Model II Summary:

Mult R	R^2	F(3,50)	p
.54	.29	6.88	.00

[a]"He interrupted others when they were speaking"

Several observations in this analysis are noteworthy. First, fable performance was explained by a surprisingly parsimonious model. With only two predictors (member ideas per unit of talk and ratings of how much the leader interrupted others [LBDQ7]), the model produced an R^2 of .56 ($F(2,51)=11.86$, $p=.00$).

Second, the strongest predictor of fable performance was member babble ($b=143.08$, $beta=.49$, $t=4.26$, $p=.00$). This is especially noteworthy since member babble was most strongly predicted from the stress-by-ability interactions.

Third, with but one exception no leader behaviors were included in the final model (or in any of the block analyses). The exception was the item "He interrupted others when they were speaking", from the LBDQ ($b= -4.35$, $beta= -.29$, $t=-2.50$, $p=.02$). In other words, the only leader behavior that predicted group performance was the extent to which the leader allowed group members to talk. This was consistent with the finding that a member behavior was the strongest performance predictor.

To assess which specific member behaviors predicted performance, the regression procedure was repeated, withholding member babble from the variable set. The results are shown in the lower portion of Table 3. Perhaps not surprisingly, two of the three variables in the resulting model were components of the member babble variable, member ideas and member lines of talk; the third variable was the same LBDQ item. This indicates that the number of member ideas, rather than the amount of member talking, was the most important component predicting performance. The negative weight assigned to member lines of talk ($b= -.12$, $beta= -.29$, $t= -2.30$, $p=.03$), coupled with a positive weight for member ideas ($b=.86$, $beta=.46$, $t=3.67$, $p=.00$), indicates again that groups whose members babbled most did least well on the task.

Since babbling most strongly predicted performance, we also examined ratings of clarity of "speech" to determine whether such ratings were related to leader stress and ability. Raters rated leaders and members in each group on clarity of communication using a 3-item scale constructed for this purpose (alpha=.81 for member scale and .87 for leader scale). These clarity ratings were correlated with leader intelligence or creativity scores. Groups were trichotomized on the basis of leader-felt stress, leader intelligence, and leader creativity, and correlations were computed for the low and high stress groups (see Table 4).

Insert Table 4 About Here

- - - - - - - - - - - - - -

Table 4 displays moderate to low correlations, for all cases, between leader intelligence and clarity of leader speech or member speech (r=.29, p=.04, n= 53; and r=.19, p=.17, n=53, respectively). However, stress moderated the leader intelligence-to-speech clarity relationships, as evidenced by significant differences in the correlations from the low to the high stress groups. The correlation between leader intelligence and leader clarity ratings dropped from .58 (p=.02, n=19) in the low stress group to .06 (n.s., n=17) in the high stress group (p(diff)=.03). For group members, the correlation dropped from .43 (p=.09, n=19) to .01 (n.s., n=17; p(diff=.06). These relationships are graphically displayed in Figure 5A.

- - - - - - - - - - - - - -

Insert Figure 5 About Here

- - - - - - - - - - - - - -

Similar patterns held for leader creativity. For all cases, correlations between leader creativity and rated clarity were low for leaders and for members (r=.18, p=.21, n=53; and r=-.17, p=.24, n=53, respectively). Leader-felt stress strongly moderated the creativity-to-clarity relationship for leaders; correlations between leader creativity and rated leader clarity dropped from .60 for the low stress group (p=.01, n=19) to -.23 in the high stress group (n.s., n=17, p(diff)=.00). Correlations with member clarity of speech were unaffected (.01 (n.s.) to -.08 (n.s.)). These relationships are pictured in Figure 5B.

While clarity ratings did not predict group performance, it seems instructive to note that under low leader-felt stress both intelligent and creative leaders tended to talk more clearly than their less gifted counterparts, while under high stress this advantage disappeared.

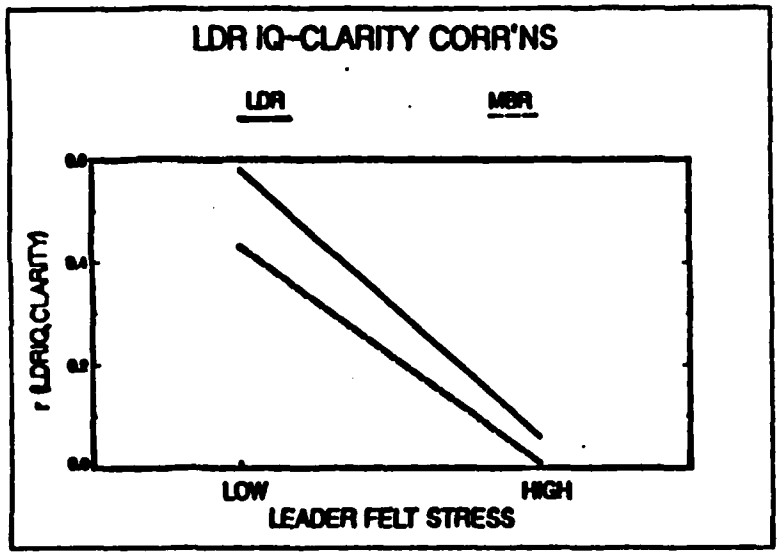
Table 4

Correlations Between Leader Intelligence, Leader Creativity and Ratings of Clarity of Speech

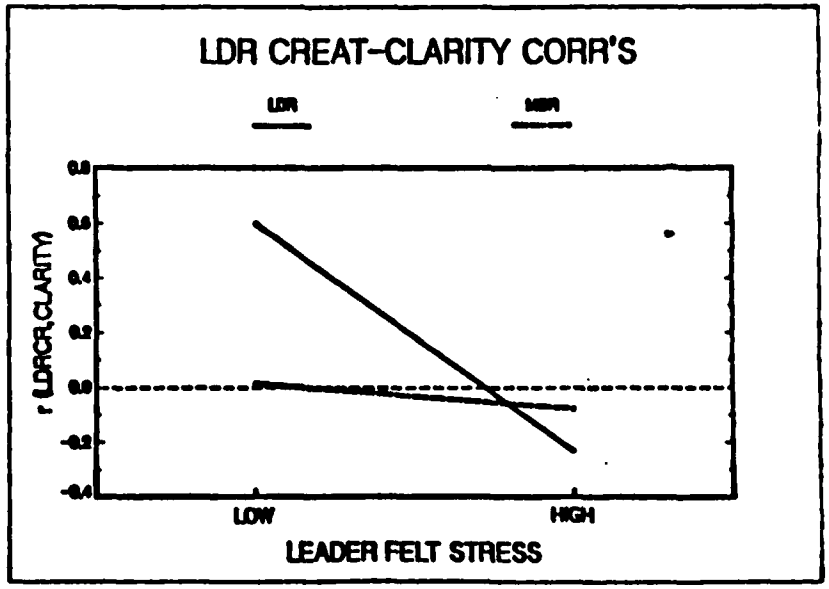
Intelligence	All Cases[a]	Low Stress[b]	High Stress[c]	p(diff)[d]
Leader Clarity	.29 (p=.04)	.58 (p=.02)	.06 n.s.	.03
Member Clarity	.19 (p=.17)	.43 (p=.09)	.01 n.s.	.06

Creativity	All Cases	Low Stress	High Stress	p(diff)
Leader Clarity	.18 (p=.21)	.60 (p=.01)	-.23 n.s.	.003
Member Clarity	-.17 (p=.24)	.01 n.s.	-.08 n.s.	n.s.

[a]n=53
[b]n=19
[c]n=17
[d]Difference between correlations across low and high stress



A



B

Figure 5. Correlations between leader ability and clarity of communication ratings.

Discussion

This study sought to explain why leaders with more intelligence or creativity fail to perform as well as, or perform worse than, their less gifted counterparts under stress - a basic issue addressed in CRT. A simple behavioral explanation seems to be a powerful one. In general, under stress, more intelligent or more creative leaders inhibit group members from contributing to the group process. Group members with more intelligent leaders talked less than members with less intelligent leaders when the leaders felt stress. This may have been a function of the fact that more intelligent leaders talked more under stress, although this latter effect was a weak one. Moreover, more creative leaders and their members offered fewer ideas when the leaders felt stress than did less creative leaders or their members. Group members with more creative leaders babbled more when leaders felt stress than did members with less creative leaders. More creative leaders exhibited a similar trend.

Subsequently, we discovered that member ideas was the strongest predictor of group performance. Such a finding is consistent with recommendations of brainstorming as a group problem solving technique, since the number of member ideas alone predicted group performance. The only leader behavior to predict performance was the LBDQ item "He interrupted others when they were speaking", an indication that leaders who let group members contribute to the group process enjoyed better performing groups.

It is important to note that performance was well explained by a small set (2) of predictors, one of which was arguably a restatement of the other. In other words, a parsimonious set of behavioral measures was effective in predicting scores on a criterion task. Moreover, member behaviors better predicted performance than did leader behaviors.

These findings reflect the different roles leaders and members play when groups function effectively. Leader behaviors are not direct predictors of group performance because leaders do not generally perform the actual work in most groups. If group tasks could be accomplished by the leader alone, such tasks would not be handled by groups in the first place! The leader performs the functions that help the group reach its goals. The specific functions vary depending on one's view of leadership, but the fact remains that, ideally, leaders provide the leadership and the group gets the job done.

This simple content analysis provides a tentative, yet coherent picture. In particular, more creative and more intelligent leaders fail to perform as well as expected under stress because they suppress contributions to the task on the part of their group members. More intelligent leaders seemingly inhibit performance by talking more and reducing members' opportunities to talk during the group process. The intelligent leaders' increased talking may be the result of felt pressure to excel or to control the group process.

Creative leaders suppress contributions by being overly critical of their own ideas and those of their group members. We suggest that more creative leaders under stress are motivated to "hit home runs" - to reach for that elegant, highly original idea that will solve the problem This tendency may create such high expectations for each idea that few are deemed worthy of mention. These expectations may be communicated to the group, which also subsequently offers fewer ideas.

Cognitive Resource Theory proposes that the leader must concentrate on the task to make good plans and decisions, and that these plans and decisions must be communicated to a motivated group willing to implement them. This was the crux of the contribution Blades (1976) made. Two points with regard to this causal chain seem necessary. The finding that member behaviors were the strongest predictors of group performance lends support to the assertion that member behaviors are causally closer to task performance than are leader behaviors. Our discussion above details the logic of this statement.

Second, in viewing effective performance in terms of this performance chain, our data imply that under stress, gifted leaders and their members behave in such a way as to break the chain in several places. Behaviors affected by leader creativity disrupt the planning (idea generation) stage, whereas behaviors affected by leader intelligence affect the elaboration (via talking) of ideas. The importance of the hybrid ideas/talking variable may lie in its ability to capture both forms of disruption.

The problem addressed here is of practical as well as theoretical importance. We tend to turn to the most intellectually able individuals for assistance and advice in times of stress or uncertainty. Our data suggest that these are exactly the conditions, where leaders experience interpersonal stress, under which the most intelligent or able individuals perform least well.

Limitations. By their nature, experimentally assembled groups typically have no history and no future. Hence, the commitment of members to the group and its tasks is questionable. However, there are many groups which meet for very limited times and which disband after one or two meetings. According to Siegal and Lane (1987), mid-level managers spend up to 35 percent of their work time in such meetings; top-management individuals spend up to 50 percent of their time in this way.

On the other hand, the tasks these latter groups perform have real consequences; the tasks performed by most experimental groups are often inconsequential. Nevertheless, the generalizability of these findings remains an empirical issue. We will not enter the generalizability debate other than to argue that, as Berkowitz and Donnerstein (1982) explained, demonstrating the existence of a phenomenon is often the first priority of laboratory studies; we can determine external validity later.

Statements about what happens to leaders under low and high stress must be interpreted cautiously, since in the original study stress was a between-subjects factor. Further research should address within-subject changes to make stronger statements concerning the phenomena we identified.

We also we cannot strictly interpret these findings as indicative of the effects of interpersonal stress. Due to a weak manipulation effect on interpersonal stress in the original study, we relied in this paper on reported stress by the leader regardless of the experimental assigned. Consequently, while such a measure may in part reflect interpersonal stress, we are not justified in asserting that it is definitely so.

In a related issue, the current analyses were correlational, using measures of leader-felt stress. To make stronger causal statements concerning these phenomena, future work might incorporate true experimental designs or more rigorous correlational analyses such as structural equation modeling. Analysis of these causal structures might be more fruitful since our results imply tentative models for testing.

Such model-driven analyses might clear up causal ambiguities that have so far concerned us. It is not yet clear, for example, whether intelligent leaders under stress talk more of their own accord and thus suppress the contribution of their members, or perceive their members becoming reticent and respond to a felt need to maintain the progress of a flagging group session.

These disclaimers aside, the present findings suggest a simple yet powerful explanation for the intriguing, counter-intuitive finding that intelligence and/or creativity can be counterproductive. The present findings are not isolated results, as the Fiedler, Meuwese and Oonk (1961) study reminds us. Further work to replicate these phenomena and to map out the causal structure underlying them should provide interesting theoretical grist to help understand the nature of creativity, intelligence, and group processes. Perhaps more important, it should strengthen our ability to construct interventions and training programs to ensure that vital cognitive resources are not wasted.

References

Alexander, S. & Husek, T. R. (1962). The anxiety differential: Initial steps in the development of measures of situational anxiety. Educational and Psychological Measurement, 22, 325-348.

Barnes, V., Potter, E. H. III, & Fiedler, F. E. (1983). Effect of interpersonal stress on the prediction of academic performance. Journal of Applied Psychology, 68 (4), 686-697.

Bass, B. M. (1981). Stogdill's Handbook of Leadership. New York: Free Press.

Berkowitz, L., & Donnerstein, E. (1982). External validity is more than skin deep. American Psychologist, 13 (4), 245-257.

Blades, J. W. (1976). The influence of intelligence, task ability, and motivation on group performance. Unpublished doctoral dissertation, University of Washington, Seattle.

Borden, D. F. (1980). Leader-boss stress, personality, job satisfaction and performance: Another look at the interrelationship of some old constructs in the modern large bureaucracy. Unpublished doctoral dissertation, University of Washington, Seattle.

Fiedler, F. E. (1984). The contribution of cognitive resources and behavior to leadership performance. (Organizational Research Tech. Rep. No. 84-3). Seattle: University of Washington.

Fiedler, F. E., & Garcia, J. E. (1987). New approaches to effective leadership: Cognitive resources and performance. New York: John Wiley & Sons.

Fiedler, F. E., Meuwese, W. A. T., & Oonk, S. (1961). An exploratory study of group creativity in laboratory tasks. Acta Psychologica, 18, 100-119.

Fiedler, F. E., Potter, E. H. III, Zais M. M., & Knowlton W. A., Jr. (1979). Organizational stress and the use and misuse of managerial intelligence and experience. Journal of Applied Psychology, 64, 635-647.

Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. Journal of Health and Social Behavior, 21, 219-239.

Ghiselli, E. E. (1963). Intelligence and managerial success. Psychological Reports, 12, 898.

Guilford, J. P., Berger, R. M., & Christensen, A. (1954). A factor analytic study of planning: Vol. 1. Hypothesis and description of tests. University of Southern California, Psychological Laboratory, Los Angeles, CA.

Lazarus, R. S. (1966). Psychological stress and the coping process. New York: McGraw-Hill.

Mann, R. D. (1959). A review of the relationship between personality and performance in small groups. Psychological Bulletin, 56, 241-270.

Meuwese, W. A. T., & Fiedler, F. E. (1965). Leadership and group creativity under varying conditions of stress (Tech. Rep.). Urbana: University of Illinois, Group Effectiveness Research Laboratory.

Pedhazur, E. J. (1982). Multiple regression in behavioral research, 2nd ed. New York: Holt, Rinehart, Winston.

Potter, E. H., & Fiedler, F. E. (1981). The utilization of staff member intelligence and experience under high and low stress. Academy of Management Journal, 24 (2), 361-376.

Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reactions to tests. Journal of Personality and Social Psychology, 46, 929-938.

Siegel, L., & Lane, I. M. (1987). Personnel and Organizational Psychology, 2nd ed. Homewood, IL. Irwin.

Spielberger, C. D., & Katzenmeyer, W. G. (1959). Manifest anxiety, intelligence, and college grades. Journal of Consulting Psychology, 22, 278.

Stogdill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. Journal of Psychology, 25, 35-71.

Stogdill, R. M. (1965). Manual for job description and job expectation questionnaire-Form XII. Columbus: Ohio State University, Bureau of Business Research.

Notes

[1] From the Multi-Aptitude Test, Form B, (1965). New York: Psychological Corporation.