THE EFFECTS OF BRAINSTORMING INSTRUCTIONS AND COHESIVENESS ON GROUP PROBLEM SOLVING

Thesis for the Degree of M. A.

MICHIGAN STATE UNIVERSITY
ROBERT ALLEN RUH

1967

ABSTRACT

THE EFFECTS OF BRAINSTORMING INSTRUCTIONS AND COHESIVENESS ON GROUP PROBLEM SOLVING

By Robert Allen Ruh

The effects of brainstorming instructions, cohesiveness, and their interaction on the quality of group problem solving were investigated. One hundred and twenty-eight male students at Michigan State University were divided into thirty-two four-man groups, each of which solved five problems requiring productive, or divergent thinking. In a 2 x 2 factorial design, one-half of the groups had brainstorming instructions, one-half had nonbrainstorming instructions, one-half were high cohesive and one-half were low cohesive.

It was hypothesized that the brainstorming groups would produce significantly more superior solutions than the nonbrainstorming groups, and that this difference would be greater for the high cohesive groups than for the low cohesive groups. The results, however, did not confirm these hypotheses. Although both brainstorming instructions and cohesiveness produced large and significant quantitative differences to all the problems, the brainstorming groups produced significantly more superior solutions than the nonbrainstorming groups to

only one of the five problems, and the high cohesive groups produced more superior solutions than the low cohesive groups to two of the five problems. There were no significant interactions for the number of superior solutions to any of the problems.

These results cast considerable doubt on the assertion that brainstorming, at least under the conditions employed and for the subject population tested, increases originality in group problem solving and suggest that cohesiveness may be a more powerful variable in this respect.

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Date: 16 Nov 1967

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Psychology

1967

648178
2-21-64

ACKNOWLEDGEMENTS

Acknowledging everyone who has made a significant contribution to this thesis would require a complete autobiography, but I would like to express my gratitude to a few of the salient contributors without whose assistance my modest attempts at research would have proven even more floundering. The suggestions and guidance of my adviser, Dr. Wakeley, and committee members, Dr. Jacobson and Dr. Johnson, have been invaluable. Dr. Jacobson actually deserves credit for the original idea behind this research, and I have drawn heavily from the recent work of Dr. Johnson in elaborating on that idea. I would like to especially thank Mr. George Parrott and Mr. Paul Stratton for their time and patience in training me to use the solution rating scales.

Primary credit, of course, goes to my wife, Pam, without whose unfailing inspiration and constant emotional support, as well as innumerable "minor" contributions, I could not have even attempted this project.

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INTRODUCTION

For the past twenty years psychologists have been devoting increasing research to the subject of creativity and the conditions affecting creativity. Within this framework they have devoted considerable effort to the investigation of brainstorming, a technique asserted to promote creative problem solving. Alex Osborn, an advertising executive, originated brainstorming, which subsequently received widespread popular acclaim. Since its initiation on Madison Avenue, and largely as a result of Osborn's persistent propagandizing, brainstorming has been used as a problem solving technique in a myriad of varied situations. Fields of endeavor in which brainstorming has been used include social service, traffic problems, civic affairs, military affairs, education, broadcasting, retailing, marketing, promotion, product design, packaging, personnel problems, safety, transportation, accounting, engineering, and journalism (Osborn, 1963). Considering its tremendous popularity and widespread use, it would seem to be of great practical value to have a thorough understanding of the effectiveness of brainstorming. Irrespective of its practical value, and of greater long range importance, of course, such an understanding should also contribute to our scientific knowledge of the conditions affecting creativity. As mentioned

above, considerable research has already been directed to this end, and after a brief description of the brainstorming method, this research will be presented.

The "guiding principle" underlying the brainstorming method is the temporal separation of the production and judgment, or evaluation, of possible solutions to problems (Parnes, 1963). In Osborn's own words, "Judgment and imagination can help each other if kept apart when they should be kept apart. In creative effort we have to be a Jekyl and Hyde. From time to time, we must turn off our judicial mind and light up our creative mind. And we must wait long enough before turning up our judicial mind again. Otherwise we may douse our creative flames, and even wash away ideas already generated." (Osborn, 1963, p. 141.) The reason production and judgment should be separated, then, is that judgment inhibits the production of a large amount of possible solutions, and for creative problem solving quanity of ideas is the sine qua non.

Osborn (1957) originally advocated brainstorming as a method of group problem solving because he thought that a group of individuals working together could be more creative than the same individuals working separately. The main reason for the supposed superiority of the group setting is the opportunity which it alone provides for "inter individual association of ideas," a sort of chain reaction in which the ideas of one individual stimulate ideas from others, as well as from himself (Osborn, 1963). On the basis of the above

reasoning, Osborn devised the following guidelines which constitute the brainstorming method:

1. Criticism is ruled out. All evaluation of ideas is postponed to a later time.

2. Free wheeling is welcomed. The wilder the ideas the better; it is easier to tame down than to think up.

3. Quantity is wanted. The greater the number of ideas, the more the likelihood of useful ideas.

4. Combination and improvement are sought. In addition to contributing ideas of their own, participants should suggest how ideas of others can be turned into better ideas, or how two or more ideas can be joined into still another idea (1963, p. 156).

Osborn's metaphorical, but testable, formulations, therefore, clearly concern groups of individuals working together on common problems. Most of the investigations of the effectiveness of brainstorming, however, have employed the performance of individuals working alone as the dependent variable. In an early study, for example, Meadow, Parnes and Reese (1959) compared the performance of subjects working separately on the Hanger and the Broom problems (list all the different uses of an ordinary coat hanger and broom) from the AC Test of Creative Ability under brainstorming instructions with the performance of the same individuals under instructions not to use brainstorming. All the subjects were in the final two weeks of a semester course in creative problem solving at the University of Buffalo.

An analysis of variance revealed that significantly more good solutions were produced under brainstorming instructions than under nonbrainstorming instructions, and that significantly more good solutions were produced under brainstorming instructions when they were given first than when they followed the nonbrainstorming instructions.

Another relevant experiment (Meadow and Parnes, 1959) evaluated the effectiveness of the creative problem solving course mentioned above. The course provides instruction and practice in the procedures of brainstorming. The specific hypotheses were that the course would produce a significant increment in the quantity and quality of ideas and certain personality variables thought to be associated with creativity. In order to test these hypotheses, quantitative and qualitative creativity measures were obtained at the beginning and at the end of a school term for three groups of subjects, only one of which had completed the creative problem solving course during the term. The groups were matched for age, sex, and WAIS vocabulary scores. The subjects who had taken the course demonstrated a significantly greater increment than their matched controls in the number of responses to the AC Other Uses test and the Guilford Plot Titles test, in responses rated high in quality to the AC Other Uses test and the Guilford Apparatus, and in Dominance as measured by the C.P.I. There were no significant differences in mean changes of quality of responses to the Guilford Plot Titles or the TAT scored for originality.

Likewise there were no significantly different changes in need for achievement measured by the TAT or self control measured by the C.P.I.

These results need not, however, be attributed to the brainstorming technique per se since mere practice in giving original responses was later shown to increase creativity scores on Guilford's Unusual Uses tests (Maltsman, et. al., 1960), and the course in creative problem solving provided such practice. In addition, since the course was an elective, there is the possibility that the groups were biased despite the attempted matching.

In a subsequent experiment investigating the effects of brainstorming instructions on trained and untrained subjects (Parnes and Meadow, 1959), both brainstorming instructions and training in the brainstorming method produced significantly more good quality solutions to the Hanger and Broom Problems.

When taken together, these studies seem to support the contention that brainstorming improves performance on "creative problems." One trouble with all of these studies, however, involves the problems that have been used. Thinking of as many uses as possible for a broom or coat hanger has the appearance of a very superficial task, and it is not certain how far performance on such problems may be generalized to performance on other problems. In addition, none of the problems employed have any proven predictive validity as measures of creativity.

An experiment by Gerlach (1964) also cautions against overgeneralizing from the previous studies. By randomly administering six different forms of the hanger problem, each with different instructions, Gerlach found that when the test instructions provide "appropriate cues," the superiority of brainstorming in improving the quality of responses disappears. Thus, instructions to give creative and original responses produced as many high quality responses as brainstorming instructions did.

An experiment by Johnson, et. al. (1967a) provides a possible explanation for the results of these studies. Johnson found that instructions to produce as many solutions as possible to a wide variety of problems produced a significantly greater number of good solutions (as well as poor solutions) than instructions to produce just one solution. A more detailed analysis of the data revealed that these results were probably due to the fact that there is a wide variability in the quality of a subject's responses. The significance of these findings is that any procedure which increases the quantity of solutions to problems requiring productive thinking will also more than likely increase the number of good solutions. Further support for this assertion is provided by the fact that in the Parnes and Meadow (1959) study the quantity and quality of ideas were positively correlated. These findings, of course, in no way detract from the principles underlying brainstorming, but they do suggest that, at least for individuals working alone,

brainstorming is not the only nor necessarily the best way to produce more original responses. If deferment of judgment is the only way to increase the quantity and quality of responses, at least with the tasks and situations tested, it seems that merely telling subjects to produce as many solutions as they can or to produce creative and original responses is as effective in eliciting this behavior as brainstorming instructions are.

In a sense, all of these studies have been somewhat tangential to Osborn's basic thesis concerning brainstorming. As mentioned above, he originally advocated brainstorming as a method to increase the creativity of individuals solving problems in a group setting. All of the research cited above, however, used the performance of individuals working alone as the dependent variable. Osborn did, of course, also assert that brainstorming would increase the creativity of individuals working alone, but the evidence that there are simpler ways of accomplishing this goal cannot be taken as evidence against his contention that brainstorming is an efficient method for increasing the originality of groups of individuals working together on a common problem. In effect, there is no solid evidence for or against this assertion.

Several studies do test a related hypothesis, however. As mentioned above, it was asserted that individuals using brainstorming would be more creative in a group setting than when working alone (Osborn, 1963).

This hypothesis was first tested in a classical experiment by Taylor (1958). In this study one-half of 96 juniors and seniors at Yale University were randomly assigned to groups of four, and the other half worked individually. All the subjects were instructed in the brainstorming method and then asked to solve the Tourist problem (how can we entice more Europeans to spend their vacations in the United States), the Thumbs problem (What practical benefits and/or difficulties would arise if everyone were born with an extra thumb), and the Education problem (How can we recruit more college graduates to meet the increasing shortage of teachers). When the subjects who worked individually were randomly assigned to "nominal" groups, the number of original and qualitatively superior ideas, as well as the mean number of ideas, produced by the "nominal" groups was significantly greater than those produced by the real face-to-face groups for all three problems. Taylor interpreted these results, which directly contradict the assertions of Osborn, as suggesting that a group of individuals working together is more likely to adopt the same set or approach to a problem than is the same group of individuals working separately and thus inhibit the flow of ideas.

Similar results were obtained in an experiment comparing the performance of the same individuals working alone and in groups (Dunnette, 1963). In a counterbalanced design, 48 research scientists and 48 advertising personnel solved the problems used by Taylor plus a similar problem by

themselves and as members of 4-man teams. The results were analyzed in terms of nominal and real groups, and the nominal groups again produced significantly more solutions without sacrificing quality.

Both of these studies demonstrate that, at least for the problems employed, groups tend to have certain inhibitory influences on problem solving even when employing brainstorming, a method devised to overcome such influences. It is, of course, theoretically possible that such influences could be overcome. A study was run by Cohen (1960) to test the relevance of certain variables for overcoming these obstacles in 2-man teams. In this experiment group cohesiveness, training in brainstorming, and their interaction did not produce significant differences in the number of solutions for two of Taylor's problems, but significant differences were obtained for an "ego-involving" problem, and "Discharge Problem." The cohesive, trained groups produced significantly more solutions than all the other groups. Furthermore, training was significantly related to more unique solutions in cohesive and in nominal groups. The uncohesive, untrained groups performed worst of all. This study, therefore, confirmed the relevance of cohesiveness, training, and the type of task for the effectiveness of brainstorming, and suggests that, at least of pairs of adults, brainstorming will produce more unique solutions when the individuals are trained in the method, like to brainstorm together, and are working on "ego-involving" problems.

Again, these studies, although interesting in their own right, do not directly test the effectiveness of brainstorming as a method for increasing originality in group problem solving. There is still no direct evidence indicating whether or not an interacting group employing the brainstorming method will be more original than an interacting group not employing that method.

The present experiment is designed to answer that question and to further investigate the relationship between cohesiveness and originality found in the Cohen (1960) study.

In a sense the above relationship seems contrary to the previous research on cohesiveness. Most of that research has shown cohesiveness to produce greater conformity rather than originality. The reason for this discrepancy, it seems to me, lies in the differences in tasks and dependent variables employed in these studies. The research which has shown cohesiveness to be related to conformity has typically used adherence to or deviation from group norms concerning attitudes and behavior considered relevant to group functioning as dependent variables. Studies have shown, for example, that there is greater conformity to perceived norms for productivity in high as opposed to low cohesive groups in industrial and laboratory situations (Schachter et. al., 1951, Berkowitz, 1954, & Seashore, 1954). Attitudinal conformity has also been shown to be greater in cohesive groups than in noncohesive groups when such conformity is seen as relevant to group functioning (Walker & Heynes, 1964).

The theory used to explain these studies (Cartwright and Zander, 1960) describes cohesiveness as the power of a group over its members, or the ability of a group to enforce its norms. When cohesiveness is looked at in this light, the results of the Cohen study seem quite consistent with the previous research within the "group dynamics" framework. If we assume that the brainstorming method does increase the originality of problem solving groups, an assumption yet to be directly tested, then Cohen's cohesive groups were more conforming than the noncohesive groups, but they were more conforming to group norms which produced original problem solving. The idea of conformity to originality may seem superficially inconsistent, but it is not an entirely novel or radical one and has been mentioned in the literature. "Insofar as a group's norms are powerful and restrictive, they are likely to interfere with the making of original and creative contributions--for conformity is invariably the enemy of creativity. It is equally possible, however, though perhaps less frequent, that a group's norms may prescribe freedom to make unconventional, deviant, and unpopular kinds of contributions, and may even provide rewards for making them" (Newcomb, et. al., 1965).

Although the above interpretation seems theoretically consistent and plausible, there is no experimental evidence, aside from the Cohen study (which was not interpreted in this manner) that it is possible to have conformity to group norms which call for original behavior. There is

also no evidence for the assertion that brainstorming is an effective method for increasing the originality of problem solving groups. The present experiment was designed to provide such evidence.

Two specific hypotheses were made. On the basis of the previous brainstorming research and the research of Johnson (1967a) it was hypothesized that the brainstorming groups would produce more solutions and more solutions of superior quality to several problems requiring productive thinking than nonbrainstorming groups. Furthermore, on the basis of the previous research on cohesiveness and the theoretical analysis presented above it was hypothesized that there would be an interaction between brainstorming and cohesiveness, such that the high cohesive brainstorming groups would produce more solutions and more superior solutions than the low cohesive brainstorming groups. No hypothesis was offered concerning an overall cohesiveness effect.

Undoubtedly the biggest problem involved with research on creativity has been the lack of adequate criteria (Taylor, 1964). The present author in no way claims to have overcome that problem. The criteria employed in this study were explicitly spelled out and made as objective as possible, but no claim is made that these criteria "capture the essence of the creative process." The general approach was to consider the quality, rated by a trained judge, of solutions to problems requiring productive, or divergent (Guilford, 1959), thinking

measures of originality. The method is presented in detail in the next section. After the method section the results are reported and discussed in terms of the theoretical analysis presented above.

METHOD

Subjects

One hundred and twenty-eight male students at Michigan State University served as subjects for this experiment. Sixty-four subjects were recruited from four social fraternities and sixty-four were recruited from undergraduate psychology classes. The subjects recruited from fraternities were randomly assigned to four-man groups, the members of which were all from the same fraternity, and the psychology students were assigned to four-man groups on as random a basis as scheduling would permit. The groups homogeneous in fraternity membership were considered more cohesive than the groups composed on a "completely random" basis. A questionnaire was also administered after the experiment to determine if the manipulation was successful. Since all the subjects in the high cohesive condition, and few of the subjects in the low cohesive condition, were fraternity members, certain biographical measures were taken to assess the possibility of confounding variables.

Apparatus and Problems

A tape recorder recorded the problem solving sessions. The problems employed were Chart Conclusions, for which the subjects were presented with a histogram from the Statistical

Abstracts of the United States from which they were to draw conclusions; Sentence Construction, for which the subjects were to compose sentences containing the words happy, horse, expensive and lake; Plot Titles, for which the subjects were to compose titles for a brief plot or story given them; the Student Problem, for which the subjects were to predict all the practical benefits and/or difficulties which would arise if the university administration were to abolish all rules concerning student behavior; and Cartoon Captions, for which the subjects were to compose quotes for the final frame of a cartoon strip.

Procedure

The subjects in the low cohesive groups were introduced before the experiment began. They were then seated around a small rectangular table on which a tape recorder was located. Half of the groups were given brainstorming instructions, and the other half were merely told to solve the problems. The instructions follow:

Brainstorming Instructions:

> You will be given several problems to solve as a group. You are to try to be as original and creative as possible in solving these problems. You are to present all the ideas which come to your mind without judging them in any way. Forget about the quality of ideas entirely. We will count only quantity on this task. As you go along you may combine or modify any of the ideas which you or any other member has presented in order to produce additional ideas. Remember that quantity and freedom of expression without evaluation are the key points; do not in any way judge or evaluate your own ideas or those of the other members of the group. Do not be afraid to offer "silly" or "wild" solutions.

Please do not write in this booklet. Present your solutions orally, as you would in a committee or conference, and they will be recorded by the tape recorder.

Nonbrainstorming Instructions:

You will be given several problems to solve as a group. These problems have no single "correct" solution. Rather they have many possible solutions of varying degrees of quality. You should try to present the best solutions possible.

Please do not write in this booklet. Present your solutions orally, as you would in a committee or conference, and they will be recorded by the tape recorder.

All groups were given ten minutes for each of the five problems. The experimenter remained in the room but did not answer any questions after the sessions began. A likert-type questionnaire containing the following items was administered after the sessions ended.

(1) How much did you like your group?

very much much average little very little

(2) If you were taking part in another experiment how much would you like to work with these same guys?

very much much average little very little

(3) Compared to similar groups, how well did the members of your group get along together?

very well well average poorly very poorly

The following question was included as an attempt to assess the success of the brainstorming instructions in producing group norms for creativity and originality:

How much did the members of your group value creative and original as opposed to stereotyped solutions?

very much much average little very little

Measures of each S's grade point average, age, and father's income were also included in the questionnaires, which were completed anonymously.

The problem solving sessions were transcribed from the tape recorder, and the solutions were typed on separate three by five inch index cards. The solutions were then coded on the back of the cards, and rated "blind" by the experimenter. Two expert judges who had considerable experience rating solutions to all the problems employed except the Student Problem instructed the experimenter in the use of a seven point rating scale which they had devised to judge the quality of solutions to these problems. These judges had achieved independent inter-judge reliability coefficients ranging from .56 to .92 employing this scale, and at the time of the present experiment they had just completed a project attempting to increase the accuracy of naive subjects using the scale to judge their own solutions (Johnson, et. al., 1967b). The basic rating scale for each problem (Johnson, et. al., 1967b) is presented in the appendix.

The criteria by which the solutions were judged were made as explicit and objective as possible. All the solutions for each problem were grouped together and rated in the following order: Chart Conclusions, Sentence Construction, Student Problem, Plot Titles, and Cartoon Captions. After the solutions were all rated, a stratified sample of fifty

from each problem was judged by one of the experts, and correlation coefficients were computed to give an indication of inter-judge agreement. A complete report of the data analysis and results is given in the next section.

RESULTS

Table 1 presents the Pearson product moment correlations coefficients computed as an estimate of inter-judge agreements for the solution ratings. The coefficients range from .71 to .93 and are all highly significant.

A summary of the biographical data collected for the high and low cohesive groups is given in Table 2. The mean differences in age, grade point average and father's income were all small and not statistically significant.

Tables 3 and 4 summarize the analysis of variance for the cohesiveness items and the perceived creativity norms. The alternatives for the cohesiveness items were weighted 1--5, with 1 representing high cohesiveness and 5 representing low cohesiveness. Each S's scores were summed for the three items, and the sum of the scores of the four group members then represented the group's score. The analysis of variance was then computed for the group scores. The same procedure was followed for the perceived creativity question.

Table 1. Inter-judge Agreement for solution ratings.

Problem	Number of Solutions	r
Chart Conclusions	50	.91
Sentence Construction	50	.93
Plot Titles	50	.82
Student Problem	50	.71
Cartoon Captions	50	.79

Table 2. Summary of t-tests for grade point average, age and father's income for high and low cohesive groups.

		G.P.A.	Age	Father's Income
$\bar{X}$	High Cohesive	2.76	20.28	17.1
	Low Cohesive	2.58	19.15	15.5
s	High Cohesive	.49	1.05	19.8
	Low Cohesive	.51	5.80	9.8
$\bar{X}_1 - \bar{X}_2$		.14	1.13	1.6
t		1.75	.50	.41
df	(number of subjects)	126	126	126
p.		n.s.	n.s.	n.s.

Table 3. Summary of analysis of variance and means for group cohesiveness.

Source	SS	df	MS	F	P
Cohesiveness	694	1	694	37.11	.01
Instructions	4	1	4	.21	n.s.
C X I	2	1	2	.106	n.s.
Error	524	28	18.7		
Total	1224	31			

N = 32 = Number of groups

	Means		
	Brainstorming	Nonbrainstorming	Combined
High Cohesive	18.88	20.00	19.94
Low Cohesive	28.62	29.88	29.55
Combined	24.25	24.94	

Table 4. Summary of means and analysis of variance for perceived norms for creativity.

Source	SS	df	MS	F	P
Cohesiveness	18	1	18	4.00	n.s.
Instructions	2	1	2	.44	n.s.
C X I	1	1	1	.22	n.s.
Error	126	28	4.50		
Total	147	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	9.5	8.62	9.06
Low Cohesive	10.6	10.05	10.56
Combined	10.06	9.56	

The mean difference in cohesiveness between the high and low cohesive groups was quite large (9.37) and in the expected direction; the high cohesive groups were significantly more cohesive than the low cohesive groups ($F=37.11$, $df= 1$ and 28, $p.<.01$). The brainstorming effect was small and not significant ($F=.21$, $df= 1$ and 28, n.s.), and there was no significant interaction between brainstorming and cohesiveness ($F=.106$, $df= 1$ and 28, n.s.). There were no significant differences in perceived norms for creativity for cohesiveness, brainstorming, or their interaction (cohesiveness, $F=4.00$, $df= 1$ and 28, n.s.; brainstorming, $F=.44$, $df= 1$ and 28, n.s.; interaction, $F=.22$, $df= 1$ and 28, n.s.).

Three different analyses were computed for each problem, the average number of solutions produced, the average number of superior solutions (solutions rated 5-7) produced, and the average quality per solution.

Number of Solutions

Tables 5--9, summarize the means and analysis of variance for the total number of solutions produced for each of the five problems. For each problem the high cohesive groups produced significantly more solutions than the low cohesive groups (Chart Conclusions, $F=4.30$, $df= 1$ and 28, $p.<.05$; Sentence Construction, $F=17.88$, $df= 1$ and 28, $p.<.01$; Plot Titles, $F=6.82$, $df= 1$ and 28, $p.<.025$; Student Problem, $F=4.83$, $df= 1$ and 28, $p.<.05$; Cartoon

Table 5. Summary of means and analysis of variance for number of solutions produced to Chart Conclusions Problem.

Source	SS	df	MS	F	P
Cohesiveness	19.5	1	19.5	4.30	.05
Instructions	38.3	1	38.3	8.45	.01
C X I	52.6	1	52.6	11.61	.01
Error	127.1	28	4.53		
Total	237.5	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	10.3	5.6	7.95
Low Cohesive	6.25	6.62	6.44
Combined	8.3	6.1	

Table 6. Summary of means and analysis of variance for number of solutions produced to Sentence Construction Problem.

Source	SS	df	MS	F	P
Cohesiveness	1176.1	1	1176.1	17.88	.01
Instructions	1326.1	1	1326.1	20.16	.01
C X I	242.1	1	242.1	3.68	n.s.
Error	1841.2	28	65.75		
Total	4585.5	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	45.6	27.25	36.4
Low Cohesive	28.0	20.60	24.3
Combined	36.8	23.9	

Table 7. Summary of means and analysis of variance for number of solutions to Plot Titles Problem.

Source	SS	df	MS	F	P
Cohesiveness	1288	1	1288	6.82	.025
Instructions	1611	1	1611	8.83	.01
C X I	16	1	16	.08	n.s.
Error	5286	28	188.78		
Total	8201	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	55.00	39.37	47.18
Low Cohesive	40.87	28.12	34.5
Combined	47.94	33.75	

Table 8. Summary of means and anlysis of variance for number of solutions to Student Problem.

Source	SS	df	MS	F	P
Cohesiveness	101.5	1	101.5	4.83	.05
Instructions	101.5	1	101.5	4.83	.05
C X I	.9	1	.9	.04	n.s.
Error	589.1	28	21.04		
Total	793	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	12.37	9.12	10.75
Low Cohesive	9.12	5.25	7.19
Combined	10.75	7.19	

Table 9. Summary of means and analysis of variance for number of solutions to Cartoon Captions Problem.

Source	SS	df	MS	F	P
Cohesiveness	1682	1	1682	10.36	.01
Instructions	820.1	1	820.1	5.05	.05
C X I	45.2	1	45.2	.29	n.s.
Error	4542.2	28	162.22		
Total	7089.5	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	47.62	35.12	41.87
Low Cohesive	30.75	23.00	26.87
Combined	39.19	29.06	

Captions, F=10.36, df= 1 and 28, p.<.01), and the brainstorming groups produced significantly more solutions than the nonbrainstorming groups (Chart Conclusions, F=8.45, df= 1 and 28, p.<.01; Sentence Construction, F=20.16, df= 1 and 28, p.<.01; Plot Titles, F=8.83, df= 1 and 28, p.<.01; Student Problem, F=4.83, df= 1 and 28, p.<.05; Cartoon Captions, F=5.05, df= 1 and 28, p.<.05). The only significant interaction was for the Chart Conclusions Problem (F=11.61, df= 1 and 28, p.<.01), and inspection of the means in Table 5 reveals the reason for this interaction. The brainstorming-nonbrainstorming difference was larger for the high cohesive condition than for the low cohesive condition (4.7 versus 0.63), and the high cohesive-low cohesive difference was greater for the brainstorming groups than for the nonbrainstorming groups (4.05 versus 1.02). The interactions for the other four problems are neither significant nor consistent. The brainstorming-nonbrainstorming difference is larger for the high cohesive groups for the Sentence and Plot Titles Problems (18.35 versus 8.6 and 15.63 versus 12.75), but the opposite is true for the Student and Cartoon Captions Problems (3.25 versus 3.77 and 12.50 versus 17.75). Likewise the high cohesive-low cohesive difference is greater for the brainstorming groups than for the nonbrainstorming groups for the Sentence Construction, Plot Titles, and Cartoon Captions Problems (17.6 versus 6.65, 14.13 versus 11.25, and 16.87 versus 12.12), but the opposite is true for the Student Problem (3.25 versus 3.77).

Number of Superior Solutions

Tables 10--14 summarize the means and analysis of variance for the number of superior solutions produced to each of the five problems. The high cohesive groups produced significantly more superior solutions to the Sentence Construction Problem ($F=7.1$, $df= 1$ and 28, $p.<.025$) and the Plot Titles Problem ($F=14.6$, $df= 1$ and 28, $p.<.01$). The high cohesive groups also produced more superior solutions to the Chart Conclusions, Student, and Cartoon Captions Problems, but these differences were small and not statistically significant.

The brainstorming groups produced more superior solutions than the nonbrainstorming groups to all of the problems, but the Plot Titles was the only problem for which the difference was significant ($F=8.4$, $df= 1$ and 28, $p.<.01$). The other differences were all small and not statistically significant. (Chart Conclusions, $F=1.45$, $df= 1$ and 28, n.s.; Sentence Construction, $F=2.56$, $df= 1$ and 28, n.s.; Student Problem $F=2.80$, $df= 1$ and 28, n.s.; Cartoon Captions, $F=3.51$, $df= 1$ and 28, n.s.)

The interactions between cohesiveness and brainstorming for the number of superior solutions produced were all small, not significant and inconsistent.

Table 10. Summary of means and analysis of variance for number of superior solutions to Chart Conclusions Problem.

Source	SS	df	MS	F	P
Cohesiveness	.34	1	.34	.395	n.s.
Instructions	1.34	1	1.34	1.45	n.s.
C X I	.26	1	.26	.30	n.s.
Error	24.25	28	.86		
Total	26.19	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	1.37	.62	1.0
Low Cohesive	.75	.88	.81
Combined	1.06	.75	

Table 11. Summary of means and analysis of variance for number of superior solutions to Sentence Construction Problem.

Source	SS	df	MS	F	P
Cohesiveness	63.3	1	63.3	7.1	.025
Instructions	22.83	1	22.83	2.56	n.s.
C X I	.90	1	.90	.10	n.s.
Error	248.6	28	8.87		
Total	355.5	31			

N = 32 = Number of groups

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	5.88	4.50	5.19
Low Cohesive	3.38	1.38	2.38
Combined	4.62	2.92	

Table 12. Summary of means and analysis of variance for the number of superior solutions to Plot Titles Problem.

Source	SS	df	MS	F	P
Cohesiveness	52.6	1	52.6	14.6	.01
Instructions	30.1	1	30.1	8.4	.01
C X I	8.9	1	8.9	2.47	n.s.
Error	100.9	28	3.6		
Total	192.5	31			

N = number of groups = 32

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	6.5	3.5	5.0
Low Cohesive	2.9	2.0	2.4
Combined	4.7	2.8	

Table 13. Summary of means and analysis of variance for the number of superior solutions to the Student Problem.

Source	SS	df	MS	F	P
Cohesiveness	1.53	1	1.53	1.13	n.s.
Instructions	3.78	1	3.78	2.80	n.s.
C X I	.76	1	.76	.56	n.s.
Error	38.88	28	1.35		
Total	44.97	31			

N = number of groups = 32

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	1.38	1.0	1.19
Low Cohesive	1.25	.25	.75
Combined	1.31	.62	

Table 14. Summary of means and analysis of variance for the number of superior solutions to the Cartoon Captions Problem.

Source	SS	df	MS	F	P
Cohesiveness	.8	1	.8	.17	n.s.
Instructions	16.6	1	16.6	3.51	n.s.
C X I	3.7	1	3.7	.78	n.s.
Error	132.4	28	4.73		
Total	153.5	31			

N = number of groups = 32

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	4.0	1.9	2.93
Low Cohesive	3.0	2.25	2.625
Combined	3.5	2.06	

Average Solution Quality

Tables 15--19 summarize the means and analysis of variance for unequal cell frequencies (Winer, 1962) for the average solution quality for each of the five problems. The high cohesive groups produced solutions with a significantly higher average quality than the low cohesive groups to the Sentence Construction Problem ($F=22.46$, $df= 1$ and 890, $p.<.01$), and the Plot Titles Problem ($F=6.23$, $df= 1$ and 1262, $p.<.025$), but the low cohesive groups produced a higher average solution quality for the Cartoon Captions Problem ($F=4.197$, $df= 1$ and 1060, $p.<.05$). There were no significant differences for the Chart Conclusions Problem ($F=.11$, $df= 1$ and 192, n.s.) or for the Student Problem ($F=2.89$, $df= 1$ and 283, n.s.).

The average solution quality was significantly higher for the brainstorming groups than for the nonbrainstorming groups for the Plot Titles Problem ($F=8.31$, $df= 1$ and 1262, $p.<.01$), but the average solution quality was higher for the nonbrainstorming groups for the Sentence Construction Problem ($F=6.42$, $df= 1$ and 890, $p.<.025$). There were no significant differences in mean solution quality between the brainstorming and nonbrainstorming groups for the Chart Conclusions Problem ($F=.22$, $df= 1$ and 192, n.s.), the Student Problem ($F=.09$, $df= 1$ and 283, n.s.), or the Cartoon Captions Problem ($F=.37$, $df= 1$ and 1060, n.s.).

Table 15. Summary of means and analysis of variance for the average solution quality to the Chart Conclusions Problem.

Source	SS	df	MS	F	P
Cohesiveness	.44	1	.44	.11	n.s.
Instructions	.88	1	.88	.22	n.s.
C X I	5.17	1	5.17	1.30	n.s.
Error	760.90	192	3.96		
Total	767.39	195			

N = number of solutions = 196

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	2.04	2.54	2.29
Low Cohesive	2.49	2.26	2.375
Combined	2.26	2.40	

Table 16. Summary of means and analysis of variance for the average solution quality to the Sentence Construction Problem.

Source	SS	df	MS	F	P
Cohesiveness	22.1	1	.1	22.46	.01
Instructions	6.32	1	6.32	6.42	.025
C X I	1.05	1	1.05	1.07	n.s.
Error	875.9	890	.984		
Total	905.37	893			

N = 894 = Number of solutions

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	3.12	3.38	3.25
Low Cohesive	2.88	2.97	2.925
Combined	3.00	3.175	

Table 17. Summary of means and analysis of variance for the average solution quality to the Plot Titles Problem.

Source	SS	df	MS	F	P
Cohesiveness	8.66	1	8.66	6.23	.025
Instructions	11.55	1	11.55	8.31	.01
C X I	2.86	1	2.86	2.06	n.s.
Error	1753.3	1262	1.39		
Total	1776.37	1265			

N = 1266 = Number of solutions

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	2.86	2.60	2.73
Low Cohesive	2.63	2.47	2.55
Combined	2.745	2.53	

Table 18. Summary of means and analysis of variance for the average solution quality to the Student Problem.

Source	SS	df	MS	F	P
Cohesiveness	4.39	1	4.39	2.89	n.s.
Instructions	.13	1	.13	.09	n.s.
C X I	.85	1	.85	.56	n.s.
Error	430.96	283	1.52		
Total	436.33	286			

N = 287 = Number of solutions

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	2.88	3.06	2.97
Low Cohesive	3.26	3.19	3.225
Combined	3.07	3.125	

Table 19. Summary of means and analysis of variance for the average solution quality to the Cartoon Captions Problem.

Source	SS	df	MS	F	P
Cohesiveness	5.75	1	5.75	4.197	.05
Instructions	.50	1	.50	.37	n.s.
C X I	4.75	1	4.75	3.518	n.s.
Error	1451.69	1060	1.35		
Total	1462.69	1063			

N = 1064 = Number of solutions

Means

	Brainstorming	Nonbrainstorming	Combined
High Cohesive	2.94	2.93	2.935
Low Cohesive	3.11	3.06	3.085
Combined	3.025	2.995	

The interactions between brainstorming and cohesiveness for all five problems were again small and not significant.

Table 20 summarizes all the significance tests reported in this section, and a discussion and interpretation of the results is presented in the next section.

Table 20. Summary of results of significance tests.

Dependent Variables	Independent Variables: Cohesiveness	Brainstorming	Interaction
G.P.A.	n.s.*		
Age	n.s.		
Income	n.s.		
Cohesiveness	.01	n.s.	n.s.
Perceived creativity norms	n.s.	n.s.	n.s.
Number of Solutions			
Chart Conclusions	.05	.01	.01
Sentence Construction	.01	.01	n.s.
Plot Titles	.025	.01	n.s.
Student Problem	.05	.05	n.s.
Cartoon Captions	.01	.05	n.s.
Number of Superior Solutions			
Chart Conclusions	n.s.	n.s.	n.s.
Sentence Construction	.025	n.s.	n.s.
Plot Titles	.01	.01	n.s.
Student Problem	n.s.	n.s.	n.s.
Cartoon Captions	n.s.	n.s.	n.s.
Average Solution Quality			
Chart Conclusions	n.s.	n.s.	n.s.
Sentence Construction	.01	.025	n.s.
Plot Titles	.025	.01	n.s.
Student Problem	n.s.	n.s.	n.s.
Cartoon Captions	.05	n.s.	n.s.

* n.s. = not significant

DISCUSSION

The results of the questionnaire revealed that the procedure used to assign subjects to the groups did produce significant differences in group cohesiveness. This procedure, however, also introduced problems for the interpretation of the results. All of the subjects in the high cohesive condition, but few of the subjects in the low cohesive condition, were fraternity members. The question of confounding variables, therefore, arises immediately. As a partial check for such confounding, measures of the subjects' ages, grade point averages, and fathers' incomes were taken, and no significant differences were found. The groups might, of course, differ on other variables. The justification for the variables selected is that they represented the most likely ones for which differences might be detected and/or which might be related to problem solving performance.

Another, more theoretical, issue raised by the procedure employed is the basis for the cohesiveness. As Cartwright and Zander (1960) have pointed out, the attractiveness of a group to its members may be due to its instrumentality in satisfying any or all of the member's needs, as well as the intrinsic attractiveness of the activity provided by group membership, and there is little empirical

evidence that cohesiveness has the same relationship to dependent variables regardless of its basis. Back (1951) has demonstrated that for two person discussion groups increased cohesiveness does result in greater mutual influence regardless of the basis for the cohesiveness. Since the present experimental situation is not exactly comparable to that employed in the Back study, however, it would be wise to generalize the results of the present study only to cohesiveness based on the interpersonal attraction of the group members for each other.

Generally the hypothese presented were not confirmed by the results. It was hypothesized that the brainstorming groups would produce a larger number of superior solutions than the nonbrainstorming groups. This hypothesis was advanced on the basis of the previous brainstorming research (Meadow & Parnes, 1959, Meadow, Parnes, & Reese, 1959, and Parnes & Meadow, 1959) and the research of Johnson (1967). These studies had demonstrated that increasing the number of solutions to problems requiring productive thinking increased the number of superior solutions and that brainstorming instructions seemed to be an effective method of achieving this result for individuals working alone. According to the present results, however, this principle does not seem to apply to problem solving groups. Although the brainstorming instructions resulted in large and significant quantitative differences for all of the problems, there were no significant

differences in the number of superior solutions to four of the five problems or in the average solution quality to three of the five problems. If these results contribute little else to our understanding of human behavior, they dramatically emphasize the hazards involved in directly extrapolating from individual to group phenomena.

Another finding relevant in this respect involves the relationship between the number of superior solutions and the average solution quality. Johnson (1967a) found that instructions to produce as many solutions as possible resulted in significantly more superior solutions, but significantly lower average solution quality than instructions to produce just one solution. In the present study, however, the groups which produced significantly more superior solutions also produced solutions of a significantly higher average quality.

It was hypothesized that the brainstorming instructions would be more effective in producing a greater number of superior solutions for the high cohesive groups than for the low cohesive groups because it was reasoned that the norms for creativity and originality provided by the brainstorming instructions would be more strongly adhered to in these groups. The results, however, did not confirm this hypothesis. There were no significant interactions for the number of superior solutions or average solution quality for any of the problems. These negative results, however, do not necessitate the rejection of the theory underlying the

hypothesis. It could be very reasonably argued that the brainstorming instructions simply did not constitute valid group norms. Merely telling groups to value originality and creativity does not insure that they, in fact, will do so. The lack of interaction between cohesiveness and brainstorming instructions could, therefore, be due to the fact that there were no group norms for creativity and originality in the brainstorming groups for the members to more strongly adhere to. The failure of the brainstorming instructions to produce significant differences in either perceived norms for creativity or the number of superior solutions supports this explanation.

Unexpectedly, group cohesiveness was the most effective variable in producing higher solution quality. No hypothesis was advanced concerning an overall cohesiveness effect because it wasn't clear theoretically what the overall effect would be, and there were no empirical data to extrapolate from. As mentioned above, the typical dependent variables in most of the research on cohesiveness have been attitudes (Walker & Heynes, 1962) or productivity in "industrial-type" situations (Berkowitz, 1954, Seashore, 1954, and Schachter, et. al., 1951). There has been little research on the relationship between cohesiveness and group problem solving quality. The main exception to this is the study by Cohen (1960) in which cohesiveness was also related to the quality of solutions to one of the three problems employed.

It would seem then, that a consistent, if somewhat weak, relationship between cohesiveness and problem solving quality was established. It would be desirable in this respect if the differences across problems could be explained, but unfortunately at this time it seems impossible to place the different problems employed on any meaningful dimension or even qualitatively differentiate them in any explicit manner. Cohen (1960) described the problem for which he found the relationship as ego-involving. Unfortunately, the problem included in the present study which was considered more ego-involving on an a priori, intuitive basis, the Student Problem, did not produce any significant results. It seems that the best that can be said at this time is that cohesiveness results in superior solution quality to some problems but not to others.

The distinction between the different bases of cohesiveness is particularly relevant in this respect. The most plausible explanation for the relationship between cohesiveness and solution quality is that participants in a group are less defensive and less afraid of rejection or ridicule for contributing unconventional or original solutions when the group is composed of relatively close friends whose acceptance is reasonably insured. There is no particular reason, however, to expect high group cohesiveness to result in higher solution quality when the group is attractive to its members because it satisfies status needs or the like. In fact, the opposite relationship seems more plausible in

such cases. (Cohen operationalized cohesiveness by composing his groups of sociometrically chosen and "not chosen" members.)

The present discussion, as well as the above comments on the previous research in this area, have largely ignored the relevance of the tasks employed to the general topic of creativity. As mentioned above, the author makes no claims to have "captured the essence of the creative process" with the problems employed. The problems were chosen because they seemed much more "substantial" than the listing of different uses for a broom or hanger, the type of problems typically used in much creativity research, and because relatively explicit and objective criteria for the judgment of the solutions existed. Any relevance to the general topic of creativity may have been lost in the process, but it seemed to be wiser to employ the most explicit and objective criteria possible, than to rely on completely nebulous and subjective ratings of creativity. It is strongly contended, however, that the criteria employed are no less valid measures of creativity than those typically employed in research in this area.

On the basis of this study, therefore, the following four conclusions can confidently be asserted: (1) Brainstorming instructions produced a higher average solution quality to one of the problems employed and a lower average solution quality to one of the problems. (2) Brainstorming instructions produced a greater number of superior solutions

than nonbrainstorming instructions to one of the problems employed. (3) High cohesiveness produced a higher average solution quality than low cohesiveness to two of the problems employed and a lower average solution quality to one of the problems. (4) High cohesiveness produced a greater number of superior solutions than low cohesiveness for two of the problems employed.

Generalizing beyond the operations employed, it would also seem that the results of the present study cast considerable doubt on the assertion that brainstorming increases the creativity of problem solving groups and suggest that group cohesiveness may be a slightly more powerful variable in accomplishing this end.

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Appendix A. Frequency Distributions for Main Effects

Table 21. Main effect frequency distribution for Chart Conclusions Problem.

SQ	B	NB	HC	LC
7	4	1	1	4
6	5	4	6	3
5	7	7	8	6
4	9	2	5	6
3	5	10	5	10
2	26	30	23	33
1	59	27	50	36

Table 22. Main effect frequency distribution for Sentence Construction Problem.

SQ	B	NB	HC	LC
7	2	2	4	0
6	8	4	12	0
5	51	31	58	24
4	69	83	115	37
3	248	172	230	190
2	120	53	91	82
1	32	19	36	15

SQ=solution quality, B=brainstorming, NB=nonbrainstorming, HC=high cohesive, LC=low cohesive. These symbols will be used throughout Appendix A.

Table 23. Main effect frequency distribution for Plot Titles Problem.

SQ	B	NB	HC	LC
7	1	0	0	1
6	7	8	12	3
5	68	35	68	35
4	94	54	83	75
3	209	140	255	94
2	252	205	254	203
1	97	88	100	83

Table 24. Main effect frequency distribution for Student Problem.

SQ	B	NB	HC	LC
7	2	0	1	1
6	4	2	3	3
5	16	8	15	9
4	29	27	30	26
3	68	81	62	47
2	34	19	37	16
1	20	17	22	15

Table 25. Main effect frequency distribution for Cartoon Captions Problem.

SQ	B	NB	HC	LC
7	4	3	6	1
6	20	9	9	20
5	44	26	36	34
4	117	77	118	76
3	237	164	217	184
2	177	104	180	101
1	49	33	49	33

Appendix B. Frequency Distributions for Interactions

Table 26. Interaction frequency distribution for Chart Conclusions Problem.

SQ	BHC	BLC	NBHC	NBLC
7	1	3	0	1
6	3	2	3	1
5	6	1	2	5
4	4	5	1	1
3	2	3	3	7
2	12	14	11	19
1	42	17	8	19

Table 27. Interaction frequency distribution for Sentence Construction Problem.

SQ	BHC	BLC	NBHC	NBLC
7	2	0	2	0
6	8	0	4	0
5	33	18	25	6
4	61	8	54	29
3	144	104	86	86
2	68	52	23	30
1	25	7	11	8

SQ=solution quality, BHC=brainstorming high cohesive, BLC=brainstorming low cohesive, NBHC=nonbrainstorming high cohesive, NBLC=nonbrainstorming low cohesive. These symbols will be used throughout Appendix B.

Table 28. Interaction frequency distribution for Plot Titles Problem.

SQ	BHC	BLC	NBHC	NBLC
7	0	1	0	0
6	5	2	7	1
5	47	21	21	14
4	56	48	27	27
3	133	76	122	18
2	127	125	127	78
1	48	47	52	36

Table 29. Interaction frequency distribution for Student Problem.

SQ	BHC	BLC	NBHC	NBLC
7	1	1	0	0
6	1	3	2	0
5	9	7	6	2
4	11	18	19	8
3	41	27	21	20
2	24	10	13	6
1	12	8	10	7

Table 30. Interaction frequency distribution for Cartoon Captions Problem.

SQ	BHC	BLC	NBHC	NBLC
7	4	0	2	1
6	8	12	1	8
5	24	20	12	14
4	74	43	44	33
3	125	112	92	72
2	121	56	59	45
1	32	17	17	16

Appendix C. Problems:

Chart Conclusions

Sentence Construction

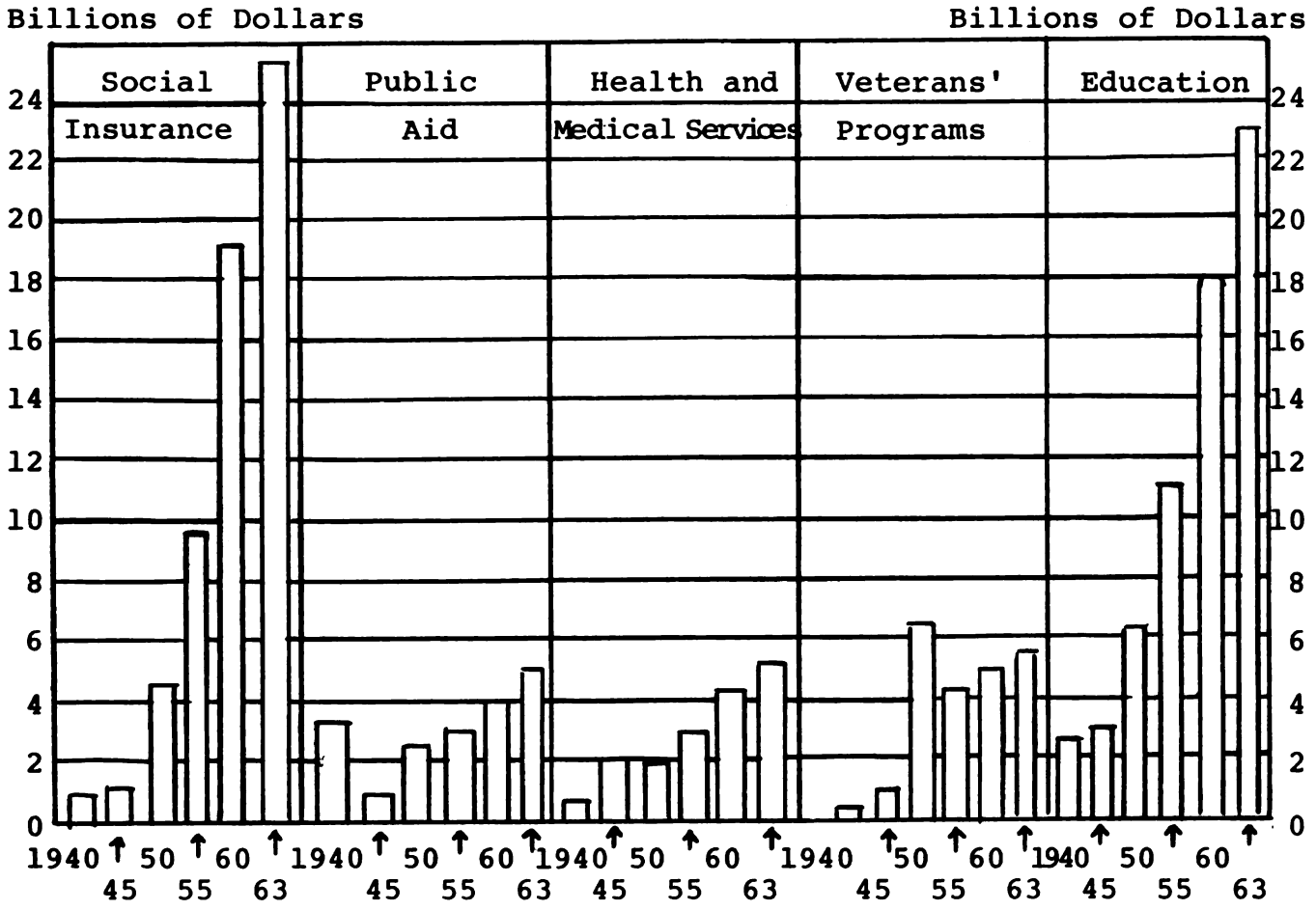
Plot Titles

Student

Cartoon Captions

The following chart is taken from the Statistical Abstracts of the United States, 1964. Your task is to draw conclusions from this chart.

SOCIAL WELFARE EXPENDITURES UNDER SELECTED PUBLIC PROGRAMS: 1940 to 1963



Do not write on this paper. Present your answers orally, and they will be recorded by the tape recorder. You have 10 minutes for this problem.

Sentence Construction

Your task for this problem is to compose sentences using these four words. Each sentence must contain all four words.

happy expensive horse lake

Do not write on this paper. Present your answers orally, and they will be recorded by the tape recorder. You have 10 minutes for this problem.

Plot Titles

Below is a plot for a novel or play or movie. Your task is to think of a title for it. Read the plot, then compose titles you think would be appropriate.

> Before the Gilsons moved to the little Connecticut town of Woodbridge, Stanley Gilson had lived a fast life, but his quiet competent wife, Kay, had gradually toned him down and had achieved a degree of respectability for their family. When one of Stanley's old flames appeared in the Gilson house one afternoon and threatened to expose him, Kay quietly poisoned her and saved the family reputation.

Do not write on this sheet. Present your solutions orally and they will be recorded by the tape recorder on the desk. You have 10 minutes for this problem.

Student

For this problem you are to think of all the practical benefits and/or difficulties which might arise if the administration were to abolish all regulations concerning student behavior. That is, what would happen if students were given complete freedom to regulate their own behavior?

Again, do not write in this booklet. Present your solutions orally, and they will be recorded by the tape recorder. You have 10 minutes for this problem.

Cartoon Captions

The cartoon above needs an ending. Your task is to furnish an ending by composing quotes for the last frame.

Appendix D. Solution Rating Scale

Chart Conclusions: Basic criteria--valid integrative conclusion based on information given in chart.

Rating Scale:

1--invalid, not a conclusion, opinion, etc.

2--conclusion based on one or two programs over one year.

3--conclusions based on all years for one program or all programs for one year.

4--conclusions based on all years for two programs or all programs for two years.

5--conclusions based on all years for three or four programs or all programs for three or four years.

6--valid, integrating conclusion covering all years but stated poorly.

7--valid, integrating conclusion stated concisely and explicitly.

Examples:

1--Social insurance benefits have increased per person.

2--Public aid decreased during World War II.

3--Health and medical services increased steadily in increments of one billion dollars.

4--Public aid is the only program that decreased during World War II.

5--There was a general increase from 1940 to 1950, except for public aid and since 1950 there was an even larger increase.

6--Health and medical services have shown a gradual rise while the other programs have had changes in their rates of increase.

7--Public aid is the only program in which the 1940 expenditures were even one-half of the 1963 expenditures.

Sentence Construction: Basic criteria--use all words; words fit smoothly and unobtrusively into a reasonable, i.e. believable, sentence.

Rating Scale:

1--not all words used.

2--list of the words.

3-5--use all the words in a well constructed sentence.

4-7--words used in a different context, eg. Happy Horse Lake.

6-7--unusually good sentence without a different context usage.

Complex sentences are rated above compound; sentences are rated up if adjectives modify words other than horse or lake.

Examples:

1--Happiness is taking an expensive horse ride around the lake.

2--A happy horse is an expensive horse on the lake.

3--A horse doesn't have to be happy to live by an expensive lake.

4--It would make me very happy to have an expensive, luxurious house on the beautiful lake with a horse.

5--He was not exactly happy when, dressed in his expensive suit, he fell off his horse into the lake.

6--The owner was very happy because the winnings from his expensive horse permitted him to buy a lake.

7--The expensive products derived from the lake made the man very happy because now he can afford the horse he wants.

Plot Titles: Basic criteria--clever and appropriate.

Rating Scale:

1--inappropriate.

2-3--names of people or family.

3-5--"how to. . ."

3-5--used the idea of the "old flame."

3-5--cliches, higher if unusually good.

4--"murder. . .," higher if unusually good.

4-6--judgments, rationalizations, conclusions.

7--any of the above which is superlative.

Examples:

1--The sewage plant in Woodbridge burned up Monday.

2--The return of the skull and crossbones.

3--How to save your family reputation in 10 easy lessons.

4--The past is not forgotten.

5--An old flame extinguished.

6--How to decloset a skeleton.

7--Fireproofing your marriage.

Student Problem: Basic criteria--reasonable, remote, subtle.

Rating Scale:

1--obviously false.

2--extremely naive, trite.

3-5--accurate but obvious, the more remote the higher the rating.

6-7--subtle and insightful.

Examples:

1--Buildings would be blown up.

2--United Students and SDS would disband.

3--There'd be an increase in drinking.

4--Students would set up their own regulations.

5--The demand for off campus apartments would decease.

6--There would be a lack of continuity--different rules on different parts of campus.

7--Breaking regulations would no longer be a source of attention and recognition--recognition would have to be gained from constructive behavior.

Cartoon Captions: Basic criteria--clever, appropriate.

Rating Scale:

a rationalization or humorous action rated 4 or above, and an action which is not humorous 4 or below.

1--an inappropriate or incomprehensible response, "sigh."

2--good grief.

2-3--"snoopy-type" cliche.

6-7--facetious profundity.

Examples:

1--Sigh, Grrrr.

2--Good Grief.

3--I could just take it lying down.

4--I think I'll go see my analyst.

5--I wonder if Lassie has these problems.

6--Life in modern society is too complicated for a simple beagle.

7--Just think of the low peer-group rating I would get.