A COMPARISON OF VOLUNTEERS TO NON-VOLUNTEERS
IN TERMS OF COOPERATION IN A
PSYCHOLOGICAL STUDY

THESIS

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By

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In planning the design for a psychological study, the problem of where to recruit desirable subjects nearly always arises. If the researcher is fortunate enough to be affiliated with one of the larger universities, this problem may be somewhat less critical, since most larger universities make a subject pool available to professors and graduate researchers. Such a pool typically consists of psychology undergraduates who are required to participate a given number of hours as experimental subjects. If the researcher is not so fortunate as to have such a pool at his disposal, he must rely on whatever means he can devise to entice would-be-subjects into his testing room. Many times the experimenter must simply go into the classroom and utilize all his powers of persuasion and knowledge of psychology to make a plea for volunteers to assist him.

At this point it may be readily seen that the two methods for obtaining subjects are at somewhat different ends of the spectrum. Since there is such a vast difference between these two methods, it is important to know whether the subjects themselves show different characteristics. If
there are differences, it is important to discover whether they are of such a nature as to bias experimental data. There is at present a profusion of literature dealing with the personality differences between volunteers and non-volunteers (review by Rosenthal and Rosnow, 1969). To avoid the ambiguities of dealing with diverse personality variables, this study is limited to the differences in performance between volunteers and non-volunteers.

This study seeks primarily to determine how the differences between volunteers and non-volunteers are manifested. Questions such as this have been of recent concern to researchers in the field of human behavior. It has been suggested that results thought to be attributable to an experimental manipulation are in fact artifacts caused by the demand characteristics of the experimental situation, resulting from the nature of the interaction between subject and experimenter (Orne, 1962; Orne & Scheibe, 1964; Riecken, 1962; Rosenberg, 1965). One of the major factors contributing to these artifacts can be termed simply "subject cooperation." Orne (1962) suggested that "at some level he (the subject) sees it as his task to ascertain the true purpose of the experiment and respond in a manner which will support the hypothesis being tested p.[779]." It would seem that experimental artifacts arise from the subjects' concern for the utility of their performances. But it is important to ascertain whether some subjects are more
concerned than others about being useful and whether this concern could, in turn, be a function of the way in which they were brought into the experimental situation.

The theory of cognitive dissonance (Festinger, 1957) would hold that, if the subjects in a psychological experiment were made aware of the hypothesis, those who were volunteers would tend to bias their responses in the direction of the hypothesis. The reasoning is as follows: when a subject makes a personal commitment—for whatever reason—to some task, only to find that it is tedious and boring, he will try to justify his original commitment in some way. He will try to relieve the state of dissonance generated by his willfully volunteering to subject himself to drudgery and boredom. As Brehm (1960) stated,

According to the theory, when a person is induced to engage in some behavior that he ordinarily would avoid, he experiences dissonance. He then tries to reduce the dissonance, and, ... one way he may do so is by changing his attitude toward the behavior (or some aspect of it) in such a way as to reduce the reasons for avoiding it [p. 386].

The subject-pool subject might justify his decision to participate in a menial task by saying that he was impelled to participate as a course requirement or that he was getting credit for it anyway. The volunteer subject, on the other hand, does not have this handy justification. He, after all, was not required to participate, nor was he receiving academic credit for it. Therefore, he must find another outlet to
relieve the dissonance. One such outlet was suggested by Bell (1967), who found that, after making the decision to help in an unpleasant task for minimal reward, subjects tended to convince themselves either that they were very helpful persons or that the helping behavior had a high social value. Either change in attitude was assumed to lead to increased subsequent helping. Thus volunteer subjects might justify their decision to help by perceiving their participation as being instrumental in the experimenter's achievement of his goal. Another way of stating this is to say that volunteers tend to be overly cooperative to the point of biasing their responses in favor of the perceived hypothesis.

Festinger and Carlsmith (1959) found that, when subjects were paid to express a counterattitudinal argument, they changed their attitude to a much lesser degree than those paid a much smaller sum. They concluded that, the larger the reward used to elicit the counterattitudinal behavior, the weaker would be the tendency to change opinion. In terms of the cooperation of volunteer and non-volunteer subjects, it would appear that, since academic credit could be considered a tangible reward, non-volunteers should change their attitude concerning the interest or scientific value of an experiment far less than volunteer subjects. And, since it could be argued that any change in attitude would have an effect upon subject cooperation, it follows that non-volunteer subjects should tend to cooperate less.
Cohen and Brehm (1962) attempted to produce dissonance by creating variations in volition. They had subjects sign up for a long, boring task under conditions of high coercion and low coercion. They found that both volition and perceived threat were higher under high coercion than under low coercion. Viewing the role of volition in the arousal of dissonance, they felt that dissonance would be relatively low as the result of a person's being forced to choose between alternatives of almost equal appeal. More generally, the magnitude of dissonance resulting from a choice is directly proportional to the degree of volition in making the choice. They concluded that postchoice dissonance and consequent revaluation of alternatives decrease as pressure to make a choice increases. In light of this, if it can be assumed that volunteer subjects are under relatively little pressure to make the choice to participate in an experiment, then it follows that they should experience a higher degree of dissonance than non-volunteer subjects. To relieve this dissonance, they must make their choice to participate seem more desirable (Brehm, 1956). They may do this by believing that the experience was interesting, enjoyable, or of some value to either them or the experimenter. In this sense they must cooperate in order to relieve dissonance. Failure to do so would be regenerating the dissonance by denying that their participation was either pleasurable or helpful.
Aside from the studies on cognitive dissonance theory, other research studies have found differences in performance between volunteer and non-volunteer subjects. In studying differences between volunteers and non-volunteers on tasks involving recall, Green (1963) demonstrated that task involvement and ego involvement result from orientation instructions. He found that volunteers could recall tasks more readily, whether task-oriented or ego-oriented, than non-volunteers. Green claimed that task orientation led to task involvement and ego orientation led to ego involvement, which in turn led to the differences found in recall. The differences in recall among volunteer and non-volunteer groups were explained using the same argument. If, as seems reasonable, volunteers are more likely to be interested in the task and less likely to be afraid of experimental and test situations than non-volunteers, then volunteers should respond more readily to task orientation and less readily to ego orientation than non-volunteers. He concluded that differences in recall between volunteers and non-volunteers could be attributed to differences in degree of task involvement and ego involvement.

In a series of studies by Rosenthal and Rosnow (1970), the reactions of undergraduates who volunteered for a psychological experiment were compared with the reactions of non-volunteers in certain experimental tasks. The volunteers appeared to be more sensitive and accommodating to the implicit experimental demands than the non-volunteers. These
experimenters also found that volunteers particularly tended to be more compliant when the experimental cues were rather simple and straightforward. In order to play the "good subject" in a psychological experiment, it is necessary to know what is considered useful to the experimenter.

The implication that volunteers are more easily influenced is consistent with other data. For example, Crowne and Marlowe (1964) showed that the need for approval and the ability to be influenced may be directly related. Since volunteers often score higher when need for social approval is measured than do non-volunteers, it follows that the former may be more easily influenced.

Horowitz (1969) studied the difference in persuadability between volunteers and non-volunteers. He randomly assigned college undergraduates to two groups—one in which a high level of fear was aroused and one in which there was a low level of fear. The high-level fear group read pamphlets on the abuse and effects of drugs and watched two films on the dangers of LSD and other hallucinogens and the effects of amphetamines and barbituates. The low-level fear group also read the pamphlets on drug abuse and their effects but did not observe the films. Horowitz found that the volunteers in the high-fear group were more persuadable than those in the low-fear group but that the non-volunteers were more persuadable in the low-fear group than in the high-fear group. Apparently volunteers complied more with the demands of the
experiment, whereas non-volunteers, having less need for approval, were more resistant to demands.

A somewhat different light was shed on the question of subject cooperation by Rosenberg (1965). As was pointed out previously, Orne (1962) felt that the subject's chief concern was to be a "good subject" and that this desire was satisfied by his cooperation with the experimenter. But Rosenberg believed that subjects were not so directly concerned with cooperating. He said that a subject, confronted by a psychologist in an experimental situation, suffered from what he termed "evaluative apprehension" which he defined as "an active, anxiety-toned concern that he (the subject) win a positive evaluation, or at least that he provide no grounds for a negative one [p. 29]."

Sigall, Aronson, & Van Hoose (1970) conducted a study to examine the nature of subject cooperation. They took Rosenberg's notion of evaluative apprehension and compared it with the stance taken by Riecken (1962) and later by Orne (1962) who stated that "subjects are concerned about their performance in terms of reinforcing their self-image; nonetheless, they seem even more concerned with the utility of their performances [p. 778]." In their study Sigall et al. pointed out that there was no conflict between Orne and Rosenberg if the evaluative apprehension experienced by the subjects concerned an evaluation of their cooperativeness. If, however, evaluative apprehension referred to an evaluation of the
subject's performance—his ability or personality characteristics for example—then the two positions were in conflict. In effect, the "good" or cooperative subject strives to emit "good" responses (to cooperate), not because he feels some need to help the experimenter, but rather because he wants to appear psychologically "good." If the cooperative subject does happen to give useful responses, it may simply be because these do not interfere with his appearance of being psychologically effective. It was on this point that Sigall et al. based their investigation. They asked the question:

If, in fact, a subject alters his "natural" behavior due to the nature of the experimental situation, is it because he is trying to please the experimenter, and therefore opts to cooperate with him in an effort to confirm his hypothesis, or is it because he is trying to appear in a good light—intelligent, attractive, efficient, etc.—regardless of what the experimenter's hypothesis may be [p. 3]? 

The study by Sigall et al. (1970) was unique in design in that it pitted the good- and the apprehensive-subject response against one another and thus allowed for only one interpretation. First, subjects were told that a high number was expected; in a second condition, subjects were told that a low number was expected; and in the third condition, subjects were told that, since a low number was expected, to copy many numbers would be an indication of an obsessive-compulsive personality. Subjects in the first and third conditions confirmed the hypothesis. But in the second condition, where confirming the hypothesis conflicted with individual competency,
subjects preferred to copy many numbers. The experimenters' hypothesis was confirmed—subjects would rather look good than cooperate with the experimenter.

It was previously stated that, according to the theory of cognitive dissonance, volunteers would be more cooperative in confirming an experimental hypothesis than their counterparts from the subject pool. In light of the Sigall et al. (1970) study, however, it seems justified to say that there should be no difference between volunteers and non-volunteers. For it follows that volunteers should be no more apprehensive about their evaluation than subjects drawn from a subject pool. This, in fact, is the hypothesis of the present investigation. Employing the same basic design as that used by Sigall et al. (1970), this study attempts to show that there is no significant difference in performance between volunteers and non-volunteers in terms of cooperation in a psychological experiment.

Method

Subjects. There were two major groups of Ss used in this study, differentiated by the manner in which they were recruited for participation. All Ss were undergraduates at North Texas State University, and all were enrolled in introductory psychology courses. The first group consisted of 40 Ss, male and female, who participated in order to fulfill a requirement for their introductory course. The second group was made up of 40 Ss from the same psychology classes who were solicited by a request for volunteers to participate in an
experiment dealing with industrial psychology. In order to insure that the Ss in this group were true volunteers, it was stressed that no academic credit could be given for participation. Experimental treatments were exactly the same for both volunteer and non-volunteer groups.

**Design.** In order to measure subject cooperation, it was first of all necessary to allow Ss the opportunity to cooperate with E. For this reason E provided S with a hypothesis. In this experiment two general situations were assumed: in the first both E and S would profit from S's cooperation, and in the second cooperation would benefit E but not S, while lack of cooperation would satisfy S's needs at the expense of E's. It was necessary to eliminate a direct "achievement" alternative. Therefore, the first situation mentioned above took on two forms: one in which both E and S would gain by an increase in output and the other in which a decrease in output would fulfill the goals of both. A control condition was also employed in order to provide a baseline with which to compare the experimental conditions.

**Procedure.** The experimenter greeted S and explained that the experiment was one which possibly might have implications for industrial psychology. He told Ss that their task would consist of copying a list of telephone numbers. He then made some acknowledgement that this was a somewhat tedious task but that it was selected because it had been shown to be
related to several industrial-type tasks and at the same time to be independent of intelligence and related abilities. Subjects were provided with blank sheets of paper and a long strip of telephone numbers; a timer was set to ring after seven minutes. The subjects were informed that they would be given the opportunity for one "practice" trial. They were instructed to work at their normal rates until the timer sounded. At this point they should stop and wait for E to return and collect the "practice" trial paper. The experimenter then asked Ss to rest for a few minutes while he left to get the forms for the "real" trial.

Up to this point Ss were given very little information and were not yet assigned to an experimental condition in order to reduce the possibility of experimenter bias during the presentation of initial instructions. Blank paper and an extremely long list of telephone numbers were used rather than ruled paper and numbers as they appear in a telephone book to minimize the possibility of Ss being aware of the extent of their output.

When E left to get the "real" trial forms, he totaled the numbers copied. Then he drew a card, randomly assigning S to one of four conditions. The experimenter then returned to the room with the "real" trial forms which were merely sheets of paper made up with a series of lines, each of which provided space for one telephone number. Each line was pre-
ceded by a number so that S would be aware of how many telephone numbers he had copied at any given time.

In the Control condition E merely said, "Here are the forms for the real trial." He then provided S with a second list of telephone numbers, reset the timer, told S to begin, and left.

In the Increased-Output condition, E added twenty to the total amount copied during "practice," rounded that number to the nearest five, and said to S, "Before we begin, let me tell you a little more about what we're doing. We have a theory relating the amount of illumination in a room such as this to a person's performance." Pointing out that only half the available illumination was turned on, he continued, "With this amount of light and a trivial, boring task and given this time limit of seven minutes, we feel that, if you don't rush, you'll do about X numbers, or about X/7 per minute."

"X" is equal to the amount done in practice (unknown to S) plus twenty and rounded off to the nearest five, and "X/7" is that amount divided by seven. The experimenter then said, "You may look at the clock from time to time to see how you're doing." Again E left, returning after seven minutes to collect the data and to explain thoroughly the true purpose of the experiment to S.

The Decreased-Output condition was identical to the Increased-Output condition in every way except that the quantity of telephone numbers given in the experimental
hypothesis was derived by subtracting rather than adding twenty from the practice total and rounding off this number.

The fourth condition was the Decreased-Output-Obsessive-Compulsive condition. Here E, after subtracting twenty from the "practice" trial and rounding that total to the nearest five, said, "Before we begin, let me tell you a little more about what we're doing. There is a personality type called obsessive-compulsive. People who possess this characteristic are overly meticulous and overly concerned with detail. We have a theory that this task is a good indicator of the obsessive-compulsive type because people who feel compelled to rush at a trivial, boring task (like the copying of phone numbers) tend to be obsessive-compulsives. Given this time limit of seven minutes, we expect that you will do about X numbers or about X/7 per minute. You may look at the clock from time to time to see how you're doing." As before, after collecting the numbers on the "real" trial, E thoroughly debriefed Ss as to the true nature of the experiment.

To summarize the three experimental conditions, in the Increased-Output condition E hypothesized increased production. Since high output would also satisfy the achievement needs of Ss, it can be inferred that cooperation on the part of Ss would be rewarding to both. In the Decreased-Output-Obsessive-Compulsive condition, E hypothesized decreased output. Here, too, if it is assumed that Ss do not want to be classified as obsessive-compulsive, cooperation would
benefit both S and E. However, in the Decreased-Output condition, E hypothesized a decrease, while S could demonstrate competence by increasing output. Thus, in the latter situation, cooperation with E would hinder S from satisfying his own aims, while satisfying his own aims would prevent him from aiding E.

Results

It was felt that, since no attempt was made to match subjects in the four treatment conditions in terms of their "practice" trial scores, an analysis of covariance was the most logical statistic to employ in testing the differences between the condition and the group means. Therefore, by necessity, the "real" trial scores were the criterion variable with the "practice" trial scores being the covariable.

Table 1

Analysis of Covariance Summary Table
For Output on the "Real" Trial

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>61.04</td>
<td>1</td>
<td>61.04</td>
<td>1.16</td>
</tr>
<tr>
<td>Between Conditions</td>
<td>596.77</td>
<td>3</td>
<td>198.92</td>
<td>3.77*</td>
</tr>
<tr>
<td>Groups X Conditions</td>
<td>218.29</td>
<td>3</td>
<td>72.76</td>
<td>1.38</td>
</tr>
<tr>
<td>Within</td>
<td>3750.11</td>
<td>71</td>
<td>52.82</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4626.20</td>
<td>78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p .01
Table 1 shows that the analysis of covariance indicated no significant difference \((F=1.16, \text{ df.}=1/71, p>0.05)\) between the volunteer and non-volunteer groups. Likewise, there was no significant interaction \((F=1.38, \text{ df.}=1/71, p>0.05)\) between the treatment conditions and the groups. There was, however, a significant difference \((F=3.77, \text{ df.}=1/71, p<0.01)\) between the treatment conditions themselves.

Since the data indicated that the only significant differences were between the treatment conditions, it seemed appropriate to ascertain which of these conditions was most effective in terms of producing the most output. Table 2, which gives comparison of the adjusted total output on the "real" trial among the four treatment conditions, indicated once again that the Increased-Output treatment condition produced the greatest output followed in order by the Decreased-Output condition, the Control condition, and the Obsessive-Compulsive condition.

**Table 2**  
*Adjusted Total Output on the "Real" Trial For the Four Treatment Conditions*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased-Output</td>
<td>1639.69</td>
</tr>
<tr>
<td>Decreased-Output</td>
<td>1526.34</td>
</tr>
<tr>
<td>Decreased-Output-Obsessive-Compulsive</td>
<td>1419.52</td>
</tr>
<tr>
<td>Control</td>
<td>1452.45</td>
</tr>
</tbody>
</table>
A Newman-Keuls test was run on these treatment totals in order to pinpoint where the significant differences occurred. Table 3 shows that significant differences were found between the Increased-Output and the Decreased-Output conditions, between the Increased-Output and the Decreased-Output-Obsessive-Compulsive conditions, and between the Increased-Output and the Control conditions. No significant differences in total output were found between the Decreased-Output and the Decreased-Output-Obsessive-Compulsive conditions, between the Decreased-Output and the Control conditions, nor between the Decreased-Output-Obsessive-Compulsive and the Control conditions.

Table 3

Newman-Keuls Test of Differences Between Adjusted Treatment Totals

<table>
<thead>
<tr>
<th>Treatment Conditions</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased-Output and Decreased-Output</td>
<td>113.35**</td>
</tr>
<tr>
<td>Increased-Output and Obsessive-Compulsive</td>
<td>220.17**</td>
</tr>
<tr>
<td>Increased-Output and Control</td>
<td>187.24*</td>
</tr>
<tr>
<td>Decreased-Output and Obsessive-Compulsive</td>
<td>106.82</td>
</tr>
<tr>
<td>Decreased-Output and Control</td>
<td>73.89</td>
</tr>
<tr>
<td>Obsessive-Compulsive and Control</td>
<td>32.93</td>
</tr>
</tbody>
</table>

*p .05  
**p .01

Discussion

The analysis of covariance confirmed this study's hypothesis that there is no significant difference in cooperation between
volunteers and non-volunteers drawn from a subject pool. The a priori reasoning for this was that subjects from both groups would be equally apprehensive about the evaluation of their performance. Although the findings of this study indicate a cognitive-dissonance explanation for the behavioral differences between volunteers and non-volunteers can be ruled out, it does not, however, conversely establish the evaluative-apprehension theory as an appropriate model in this particular situation. As was pointed out earlier, Sigall et al. (1970), in using the evaluative-apprehension model to support their hypothesis, concluded that subjects would rather look "good" than cooperate. On the other hand, the data from the present study do not support this conclusion. It could be stated somewhat weakly, that subjects tend to look good and yet appear to cooperate.

A closer examination of the data might serve to clarify this conclusion. In looking at the total output in the four treatment conditions (See Table 2.), it appears that both groups, taken as a whole, tend to be influenced by what the subjects believe the experimental hypothesis to be. The Increased-Output condition was the most effective in producing a high output with the adjusted total output for this group being significantly higher than for the Control condition and the other two experimental conditions (See Table 3.). This indicates little, however, since it will be recalled that this was the condition whereby the subject could look "good" and
cooperate with the experimenter simultaneously. The second 
most effective condition was the Decreased-Output condition. 
Here the subject could either look "good" or cooperate but 
not do both simultaneously. Since the adjusted total output 
for this condition was greater than that of the Control con-
dition (See Table 2.), subjects tended to look "good" by 
increasing their output over what was hypothesized. However, 
since this total was not significantly greater (See Table 3.), 
it would appear that subjects on the whole chose to cooperate; 
in other words, they chose to decrease their output to con-
form to the hypothesis. Subjects lean more toward cooperating 
than toward looking good.

Several hypotheses may be ventured in explanation of the 
present findings. One is that there is some type of personality 
variable at work in the evaluative-apprehension phenomenon 
such as need for approval, as suggested by Crowne and Marlowe 
(1964), or persuadability, as put forth by Horowitz (1969). 
If such a variable is a factor, it must be concluded from the 
present study that its frequency of occurrence in volunteers 
does not differ significantly from its occurrence in non-
volunteers.

Another hypothesis which might explain the results of 
the present study is that Sigall et al. (1970) were over-
reaching, somewhat, in their interpretation of evaluative 
apprehension. For example, they indicated that a subject's 
apprehension concerns his physical abilities or personality
characteristics. The question is, how threatening can a task such as copying telephone numbers be to a subject's physical ability and how much can it tell about his personality? Subjects--particularly college students--perceive this and at the same time realize that they are not being given the entire picture in the experimental setup. It is likely that some subjects choose to cooperate, while others, possibly doubting the experimenter's pseudo-hypothesis, choose some alternate mode of responding. Riecken (1962) made the point that the subject in an experiment realizes that he is being evaluated. But this evaluation is being made according to two different dimensions--performance and cooperation. In the present study the subject's apprehension concerning how he was going to be evaluated on the cooperation dimension appeared to be slightly greater than his apprehension of performing well.

One concrete finding which was brought out in this study is that subjects do tend to bias their responses in terms of the hypothesis they are given. However, since this does not appear to occur any more frequently in volunteer than in non-volunteer subjects, it would behoove the experimenter, when planning a research design, to concern himself more with experimenter-subject bias than with the manner in which he recruits his subjects.
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