THE BEGINNING-OF-TERM WILLING SUBJECT VERSUS

THE END-OF-TERM RELUCTANT PARTICIPANT

GEORGE STEPHEN BEDNARCZYK

A thesis submitted to the Faculty of Graduate Studies
in partial fulfillment of the requirements
for the degree of

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GRADUATE PROGRAMME IN PSYCHOLOGY
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TABLE OF CONTENTS

LIST OF TABLES

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ABSTRACT

The hypothesis that subjects signing up for compulsory experimental participation earlier in the academic year resembled the "volunteer subject" (Rosenthal & Rosnow, 1975) to a greater extent than those participating late in the year was tested. It was also hypothesized that more early-term subjects would volunteer for extra experimental work and that volunteers in this study would resemble the "volunteer subject" in terms of personal characteristics. Identical experimental treatments were applied to samples of introductory psychology students obtained in October, January and March. Dependent measures taken included paired-associate learning, intelligence, need for approval, attitudes to psychology, state and trait anxiety, and a "willingness to volunteer" questionaire. Hypotheses concerning volunteering behaviour were not supported, no relationship being evident between when a subject signed up for experiments and whether or not he/she volunteered for extra research. Comparisons of personal characteristic differences between subjects willing or unwilling to volunteer for extra research only approached significance. Inadequate questionaire design was discussed as a possible confounding factor for the volunteerism analysis. March subjects were significantly lower in need for approval than October and/or January subjects. It was concluded that time of sampling was relevant in terms of the possibility of confounding experimental results. An alternative and less bias-prone subject-sampling procedure was suggested.

Introduction

Until relatively recently, the human subject in psychological research was considered a "tabula rasa", an organism upon which operations were performed. Early in its development, the field of psychology, borrowing a rigorous experimental methodology from the physical sciences, reacted to the classical introspection approach of Wundt and Titchener by largely disregarding considerations of consciousness and intent on the part of the human subject. Consequently, the subject was placed in a world in which his behaviour was defined, controlled, evaluated, manipulated and reported to a degree that Argyris (1970) compared to the lot of workers in the most mechanized assembly line conditions.

Critiques of rigorous research methodologists by Orne (1962) and Rosenthal (1966) emphasized not only the necessity of studying observable behaviours but also the importance of the cognitive concomitants of observable behavioural elements. As research on subjects and experimenters, including work on demand characteristics (Orne, 1962) experimenter effects (Rosenthal, 1969) and evaluation apprehension (Rosenberg, 1965) began to accumulate, the human subject began to be conceived of as an aware, thinking entity rather than "a stimulus-response machine...," (Bart, 1962). Humphrey (Marcuse, 1977) wrote that for Titchener it was unfortunate that the organism moved! Thus, experimental manipulations began to be seen as being performed not upon static organisms but upon individuals representing all points on continua of attitudes, feelings, motivations and behavioural intentions. Of particular concern here is the question of who we are studying when.

Three decades have elapsed since McNemar (1946) described psychology as "the science of the behaviour of sophomores" yet, more recent investigations (Schultz, 1969, Smart, 1966, Carlson, 1971, Jung, 1969) indicate that McNemar's criticism maintains its validity. Carlson surveyed two major psychology journals (Journal of Personality, 1968 and Journal of Personality and Social Psychology, 1968). She

found that 71% of the 226 articles contained in the two volumes used college students as subjects, the majority of whom were first year students of psychology. Shultz's survey of The Journal of Experimental Psychology (1966-1967) and The Journal of Abnormal and Social Psychology (1966-1967) showed 80% of all studies using college students as subjects as did Smart's survey of the Journal of Experimental Psychology (1963-1964) and The Journal of Abnormal and Social Psychology (1963-1964). Jung surveyed the 60 graduate departments which had produced the largest number of doctorates with regard to the composition of their subject pools and the procedures they used in the recruitment of subjects. He found an even larger proportion of first year psychology students actually serving as subjects (79%) than did Smart, Shultz and Carlson in their reviews of published journal articles! The generalizability of a body of data so heavily dependent upon the introductory psychology student to the college population as a whole (Sternberg, 1969), and to the overall population, is questionable and it could almost be said that psychology as we know it in 1977 is largely dependent upon freshmen and possibly rats!

In addition to the limits imposed upon generalizability by the composition of a research sample, varying methods of recruiting subjects can be examined for their potential biasing effects. Jung's (1969) survey showed five methods of subject recruitment, three involving some form of course requirement and two involving "voluntary" participation. The strongest incentive for participation in research makes participation a part of the course requirement. Half of the surveyed departments used this technique. Thirty percent of the universities surveyed offered extra course credit for research participation, and 32% offered an "option" of either experimental participation or extra term work. The non-compulsory methods included entirely gratis participation, (48%) and payment for services, (43%). Non-compulsory recruitment methods accounted for 7% of the total number of subjects serving in research projects. Thus, the largest proportion of subjects, 93%,are "coerced" to some degree to participate in research. (At the University of Manitoba, for example, introductory psychology

students are offered the "option" of serving as subjects or doing extra term work for 7% of their final grade. Virtually all students opt for experimental participation.)

There is no dearth of research examining differences between voluntary and non-voluntary experimental subjects. Some of these findings warrant examination in some detail.

Survey research provides considerable evidence that individuals who are included in the researcher's volunteer data are better educated than those who are not. Although this phenomenon cannot be practicably demonstrated within college student samples, most of which are drawn from high school educated introductory psychology courses, the virtually unequivocal nature of the conclusion has often been demonstrated (Gannon et al, 1971, Kirby and Davis, 1972). Not surprisingly, the variable of social class is related to volunteering in much the same way as level of education. Rosenthal and Rosnow (1975) listed 46 studies which presented evidence on the relationship of social class to volunteering. Thirty-two of these studies indicated that individuals defined as higher in social class are significantly more likely to participate in behavioural research.

More equivocal are the results of studies examining the relationship between sociability and volunteer status. While several researchers have found volunteers for psychological experiments to be more sociable (MacDonald, 1972, Martin and Marcuse, 1958 a, Poor, 1967) exceptions are reported. For example, Martin and Marcuse (1958 b) found no differences in sociability between volunteers and non-volunteers when sex research is involved and only among males when hypnosis research is involved. Examination of Rosenthal and Rosnow's (1975) list of studies indicating findings both positive and negative in nature does show, however, that a majority of the evidence indicates a positive relationship. It seems relatively safe to conclude that volunteers for both behavioural and survey research are more sociable than non-volunteers.

The relationship of intelligence to volunteering behaviour has most often been examined using either IQ scores on a variety of standardized tests or school grades as criterion measures. Although

a good deal of evidence indicates that individuals who volunteer for research are more intelligent (Rosenthal and Rosnow, 1975, Myers et al, 1966) the relationship is complicated by the nature of the experimental task. Whereas volunteers for relatively typical or unspecified types of studies tend to be more intelligent (Ebert, 1973, Frey, 1973) volunteers for more unusual experiments such as hypnosis (Martin and Marcuse, 1958) or sensory deprivation (Myers et al, 1966) do not show higher levels of intelligence. Studies using related measures of intelligence tend also to show volunteers exhibiting better performance. For example, Brower (1948) found that volunteers performed better at difficult visual motor tasks than did non-volunteers and Wolfgang (1967) showed that male volunteers performed better than non-volunteers at a concept learning task.

A final dimension along which volunteers and non-volunteers seem to differ relatively consistently is that of need approval. Although this relationship is not as clear as the relationships between volunteering and intelligence, education, social class and sociability, a majority of studies indicate a positive linear relationship (Rosenthal and Rosnow, 1975, pp 40-44). As with the variable of intelligence, there is some evidence that the nature of the experimental task serves to alter the linear relationship. Efran and Boylin (1967) obtained male volunteers from undergraduate psychology classes and examined whether high and low need approval subjects volunteered differentially to serve as discussants in groups. It was found that low need approval subjects were more likely to participate in the group task, presumably because the high need approval subjects felt they were likely to be evaluated in a negative way.

The nature of the experimental task volunteered for seems to interact with likelihood of volunteering in much the same way with the variable of anxiety. Studies showing volunteers to be more anxious than non-volunteers usually are those which have recruited student subjects for a relatively standard experimental task (Barefoot, 1969, Jaeger et al in Rosenthal and Rosnow, 1975). This relationship does not seem to hold for non-student samples (Cohler et al, 1968). Martin and Marcuse (1958 b) found male volunteers for hypnosis to be less anxious,

as did Scheier (1959) when he solicited male and female subjects for a study described as somewhat threatening. Studies requesting subjects for more unusual kinds of research seem to attract less anxious subjects. In the same way that subjects high in need for approval may feel they are likely to be evaluated in a negative way in a potentially stressful situation, high anxious subjects may be reticent about participating in more unusual kinds of research. (Much, however, might depend on just how anxiety was measured, i.e. its operational definition.)

With considerable confidence, volunteers for general research have also been shown to be more arousal-seeking, more often female, less authoritarian, more likely to be Jewish and less conforming than non-volunteers. With some confidence, volunteers can be considered more often from smaller towns, more interested in religion, more altruistic, more self-disclosing, more maladjusted and younger than non-volunteers (Rosenthal & Rosnow, 1975).

Although personal differences among volunteers and non-volunteers have been explored in some detail, relatively few attempts have been made to examine the possible artifactual effect of this variable on inferred causal relationships. Rosnow and Rosenthal (1966) present some evidence that volunteers are affected more by persuasive communications than non-volunteers. Although these observed differences were by and large in the expected direction, the relationship was by no means unequivocal.

Rosnow and Suls (1970) addressed themselves to the question of whether pretest measures differentially affect volunteers and non-volunteers in terms of their compliance with demand characteristics (Orne, 1962) of attitude change communications. While the majority of investigations of the effects of pretest sensitization have found either no systematic effects (Lana, 1959) or a moderate dampening effect (Brooks, 1966) the volunteer variable was not considered. The Rosnow and Suls study indicated that the direction of the effect of pretesting could largely be predicted on the basis of subjects' willingness to participate in research. Pretested volunteers conformed more to experimental communications whereas pretested non-volunteers

responded in a reactive manner. Rosnow and Suls stated that previous research did not show pretest effects because samples consisted of both willing and unwilling subjects. Differences between volunteers and non-volunteers thus cancelled experimental effects.

More evidence concerning the artifactual effect of the volunteerism variable was presented by Goldstein et al (1972). Subjects were willing and unwilling undergraduate women enrolled in psychology courses. The standard Taffel (1955) procedure was administered, i.e. subjects were reinforced by a verbal "good" from the experimenter when "I-We" pronouns were utilized. It was found that volunteers who were "aware" of the reinforcement contingency did condition significantly better in terms of both number of critical responses and rate of increase in critical responses than non-volunteers. Similar findings were reported for both volunteer and non-volunteer groups of unaware subjects.

Three differing views of the motivation of experimental subjects have been advanced. Orne (1962) maintained that subjects view themselves as serving the aims of science and contributing to human welfare in general. Another view regards subjects as being passive, obedient followers of experimental instructions. "Subjects are obedient in the sense that if they are instructed to do something, they fulfill that request" (Sigall, Aronson and Van Hoose, 1970, p. 9). Yet another hypothesis is that the typical experimental subject may enter the experiment "...with a preliminary expectation that the psychologist may undertake to evaluate his, the subject's, emotional adequacy, his mental health or lack of it" (Rosenberg, 1965, p. 270). Aiken and Rosnow (in Rosenthal & Rosnow, 1975) undertook to determine which role expectation best typifies the subject for standard experimental research and whether role expectations of volunteer subjects differ from non-volunteers. Introductory psychology students, not surprisingly, served as subjects. Volunteers were identified by their affirmative response to a request for research subjects. The experimental task consisted of subjects' rating pairs of situations along a 15 point scale as to how similar their expectations were about them. The comparison stimuli were designed such

that they represented the altruism hypothesis, (e.g., giving anonymously to charity), the obedience to authority hypothesis, (e.g., not arguing with the professor), the evaluation hypothesis, (e.g., taking a final exam), a positive control, (spending the evening with a good friend), and a negative control, (having to work on a weekend or holiday). The list of 11 stimulus situations contained the single target situation of "being a subject in a psychology experiment".

It was found that among both volunteers and non-volunteers, no one formulation of subjects' role expectations was exclusively valid or invalid. Most subjects responded as Orne's altruism hypothesis predicted while a smaller proportion of subjects responded according to Rosenberg's evaluation-apprehension hypothesis. Of most importance here was the finding that non-volunteers rated participation in psychological research significantly more similar to work-oriented stimuli, (having to work on a weekend or holiday), than did volunteers.

Along the same lines, Kennedy and Cormier (1971) administered measures of favourableness to behavioural research and experimental participation to paid volunteers, volunteers, and subjects who were required to serve. It was found that both paid and unpaid volunteers had more favourable attitudes to research and experimental participation than did coerced subjects. Rosen (1951) also reported volunteers to be more favourably disposed to psychological experiments, as did Ora (in Rosenthan & Rosnow, 1975).

Numerous researchers (Orne, 1962, Jourard, 1968, Argyris, 1968, Masling, 1966) have spoken to the question of the effect on subject motivation of voluntary versus compulsory research participation. Orne's attempt to find an experimental task which subjects would refuse to perform emphasized the extent to which volunteers will cooperate with the experimenter. Orne had subjects repeatedly destroy sheets of laborious calculations. It was thought that once subjects became aware that they would be repeatedly told to tear up their work, they would realize the task was meaningless and refuse to continue. The contrary was found. Subjects continued for hours, and Orne eventually gave up. Post-experimental discussions revealed that subjects perceived the task as a test of endurance not unlike early

tests which asked one to close a door as slowly as possible (Marcuse, 1977).

The term "demand characteristics" was coined by Orne (1962) to describe the remarkable cooperative behaviour he had observed. Cues in the experiment not only guided behaviour but demanded certain behaviours of subjects who were strongly motivated to cooperate. The force of the demand characteristics are felt, according to Orne, because subjects have a high regard for the aims of science and "...behave in the experimental context in a manner designed to play the role of the 'good subject' or, in other words, to validate the experimental hypothesis" (Orne, 1962, p.778). Subjects were not unconcerned with their own self-image as reflected in their performance, but were more concerned with validating the hypothesis. Although Orne recognized negative motivations, he viewed behaviour contrary to the experimenter's hypothesis not so much as a function of uncooperative motivations as of subjects' misperceptions of demand characteristics.

Compulsory subject pools, set up in part to circumvent self-selection biases inherent to the use of volunteer subjects (Rosenthal and Rosnow, 1969) are no doubt composed partially of "good subjects", i.e. subjects who would replicate Orne's (1962) findings. However, the compulsory nature of the experimental requirement has been observed to have the opposite effect. Masling (1966) observed what he termed a "screw you" attitude on the part of some subjects, an actual desire to ruin research results. Jourard (1968) noted what subjects had told him about their laboratory experiences. He couched his observations in the form of an imaginary letter from a subject to an experimenter:

> "It's getting so I find it difficult to trust you. I'm beginning to see you as a trickster, a minipulator... I lie to you a lot of the time...When I don't lie, I will sometimes just answer at random, anything to get through with the hour and back to my own affairs...Did you ever stop to think that your articles and the textbooks you write, the theories you spin - all based on your data, (my disclosures to you), - may actually be a tissue of lies and half-truths, (my lies and half-truths), or a joke I've played on you because I don't like you or trust you?

That should give you cause for some concern." (pp 9, 11).[1]

Gustav (1962) surveyed 251 experimental subjects who participated in projects on a non-voluntary basis. Forty percent expressed unfavourable attitudes including annoyance, irritation, fear and apprehension. Thirty-seven percent of subjects indicated that they would not have participated voluntarily. On the other hand, 23% of Gustav's sample were interested, enthusiastic, eager and curious about their experimental experiences. Other researchers (Cox, 1971, Black, 1972, Jourard, 1968) have obtained similar distributions of attitudes toward required experimental participation.

It is recognized that attempts to categorize all human subjects as being either highly cooperative or as adopting a "screw you" attitude are oversimplifications of the diverse nature of subject samples. However, parallels can be drawn between the cooperative subject and the volunteer and the uncooperative subject and the non-volunteer.

Adair and Fenton (1971) presented evidence indicating that differing attitudes to psychology interact with experimental manipulations in much the same way as does the volunteer-non-volunteer variable. Adair and Fenton developed the Psychological Research Survey, (PRS), a five choice, 52 item Likert-type scale. It was found that subjects showing positive attitudes to psychological research on the PRS conformed more in an attitude change study than did low PRS scorers. This finding parallels closely the results of the Rosnow and Suls (1970) study which showed volunteers to be consistently more accomodating to attitude manipulation than non-volunteers. A verbal conditioning study by Adair (1970 b) again showed a parallel between attitudes to psychology and the volunteer-non-volunteer dichotomy. It was reported that once subjects were assured of the scientific

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(1) It reminds one of the earlier observation of Elissa Goode in her book The Rising Wind when she, a Black and a linguist spoke to a Black tribal chieftan who, in his tongue, told her of a white anthropologist who, through an interpreter, asked many "foolish" questions to which the chieftan gave many foolish answers!

nature of the study, those with more positive attitudes to psychology conditioned more easily than those with negative attitudes. (It should be noted that Adair (1970 a) previously found a boomerang effect, higher PRS scorers conditioning with more difficulty than low PRS scorers. High PRS subjects were thought to be unwilling to cooperate with what they thought to be a "nonscientific" experiment. The follow up study (Adair, 1970 b) obviated this effect by informing subjects of the serious nature of the experiment). Again, attitudes to experimental participation seem to be related to performance in much the same way as the attitudes of volunteers differ from the attitudes of non-volunteers. Further support for this contention is provided by Adair's (1970 b) finding that individuals who exhibit positive attitudes to psychology are more likely to volunteer for experiments than those who are more negatively disposed.

The evidence concerning differences in characteristics and performance has been presented in order to demonstrate the relatively pervasive nature of the volunteer variable and its relationship to experimental findings. Parallels have been drawn to indicate that volunteer effects may occur within non-voluntary subject pools. Given truly random representation of volunteers and non-volunteers in research samples, any biasing effects can be assumed balanced. However, over-representation of either end of this continuum may affect experimental findings in much the same way as is the case when volunteers and non-volunteers are clearly differentiated.

There is some evidence that sampling procedures currently in use at major psychology departments may "naturally select" volunteers and non-volunteers in a non-random fashion. Jung (1969) has shown that 90% of all experimental subjects are allowed to select times for the fulfillment of their experimental requirement. Assuming that any given subject pool is comprised of both volunteers and non-volunteers, the question of whether the proportion of volunteers to non-volunteers remains constant over the academic term becomes relevant. Carlson's (1971) observation that 78% of the studies she surveyed were single session experiments, no doubt completed quickly at different times in the year, emphasizes the importance of investigating the interaction

of time factors with characteristics of experimental subjects.

Again, appealing to the literature on volunteers, Mulry and Dunbar (in Rosenthal & Rosnow, 1975) examined differences between subjects who volunteered early in a semester and those who volunteered later. Early term volunteers were found to score substantially higher on the Marlowe-Crowne Scale of social desirability than their late term counterparts. Early term volunteers were also found to spend more time answering questionnaire items, earned higher grades in their psychology courses and arrived earlier for their experimental appointments. Abeles et al, (1954-55), also found that early term volunteers earned higher academic grades.

Working within the subject pool at the University of Manitoba, Adair (1970 b) found that subjects who signed up earlier for their required research participation scored higher on the PRS than those who put off experimental participation until later in the year. This finding, together with the previously cited literature on early versus late term volunteers (Abeles et at, 1954-1955, Mulry and Dunbar, in Rosenthal & Rosnow, 1975) seems to show that self-selection by subjects of when they sign up for experiments may proceed in a non-random fashion. "The volunteer-non-volunteer bias emerges in the form of a beginning-of-the-term willing subject versus an end-of-the-term reluctant participant," (Adair, 1973, p. 51).

Evans and Donnerstein (1974) examined differences between subjects who signed up for experiments during the second and eighth weeks of a ten week spring quarter. Subjects were members of introductory psychology classes who were given the alternative of either participating in four experiments or writing reviews of four journal articles. (Only 3% of subjects chose to write reviews). Multiple F tests were performed on several individual difference measures with time, (early versus late), and sex treated as factors on each measure. Significant time effects were reported for the variables of internal locus of control, intelligence, ($p<.08$), need for achievement, (males only), grade point average, ($p<.09$), and American College Testing, (ACT), composite scores. Males were found to score higher on the measure of intelligence and on ACT composite scores. Females were found to achieve higher

grade point averages and to express more favourable attitudes to psychology and psychological research.

Interestingly, while volunteer-non-volunteer differences in need for approval have been reported (Poor, 1967, McDavid, 1965) such differences were not found in this study. Noteworthy also is the observation that attitudes to psychology and psychological research were not significantly different for the two subject samples although such differences were reported by Adair (1970 b). This apparent difference in findings may be due in part to the different time factors involved. While Adair surveyed over a seven month academic year, Evans and Donnerstein worked within a ten week spring quarter. It is possible that the extent of differential self-selection over time is greater over a longer academic term. Differences in the tools used to measure these attitudes may also have been a factor.

Some aspects of the Evans and Donnerstein (1974) study warrant closer examination. Holmes and Appelbaum (1970) showed that previous experimental experience can affect attitudes to psychological research, dull and non-scientific experiments fostering negative attitudes and interesting experiments fostering positive attitudes. Evans and Donnerstein restricted participation in their experiment to subjects who had served in one and only one previous study. This proviso may have avoided any previous experimental experience bias; however, it may have introduced a serious sampling bias. If subjects who put off the experimental participation requirement are presumed to differ from those who fulfill the requirement early, Evans and Donnerstein selected subjects who were most prone to delay. The end-of-term sample was thus composed of the latest of the "lates". Subjects who were responsible about fulfilling their research participation requirement, and had participated in all but one of the necessary four experiments, were restricted from signing up for the end-of-term sample. On the other hand, individuals who were negligent in obtaining experimental credits and had participated in only one study, with only two weeks remaining in the term comprised Evans and Donnerstein's end-of-term sample. Typical subject sampling procedures, which Evans and Donner-

stein sought to duplicate, were violated, and any differences between typical early and late-term samples may thus have been magnified.

Another area of the Evans and Donnerstein (1974) study which should be examined is the statistical procedures used. Six individual difference measures and six attitudinal measures were examined by means of repeated applications of univariate analysis of variance. It has been shown that even if the outcome measures inter-correlate zero, the probability of a type 1 error, (rejecting a true null hypothesis), becomes large (Gabriel and Hopkins, 1974) when such procedures are applied. The possibility exists then that some significant differences reported by Evans and Donnerstein reflect chance alone and do not represent true population differences. It thus becomes difficult to interpret exactly what was shown in their study.

It is the aim of this study to examine differences between subjects who sign up for required experimental participation at different times during an eight month academic year. Generally, the hypothesis is that characteristics of early-term subjects will parallel closely those of voluntary research participants and late-term subjects will more closely resemble non-volunteers. In addition, the question of whether experimental results are altered by virtue of this subject variable alone warrants examination. Studies of volunteer-non-volunteer differences in intelligence have used performance tasks as measures of intelligence. For example, Brower (1948) found that volunteers performed better at difficult visual motor tasks than non-volunteers and Wolfgang (1967) showed that male volunteers performed better than non-volunteers at a concept learning task. This study will examine whether performance differences of this nature are evident when subjects sampled at different times in the academic year are compared.