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
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BY

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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.

EXPERIMENTAL HYPOTHESES

Two sets of experimental hypotheses will be examined. The first set deals with the question of whether subjects sampled at different times in the academic year differ in terms of how closely they resemble the "classic" volunteer subject. It is hypothesized:

(1) that beginning-of-the-term subjects will score higher on a measure of general intelligence than middle or end-of-the-term subjects;

(2) that beginning-of-the-term subjects will indicate more favourable attitudes to psychology and psychological research than middle or end-of-the-term subjects;

(3) that beginning-of-the-term subjects will report higher need for approval than middle or end-of-the-term subjects;

(4) that beginning-of-the-term subjects will be higher in trait anxiety than middle or end-of-the-term subjects;

(5) that beginning-of-the-term subjects will be higher in state anxiety than middle or end-of-the-term subjects;

(6) that beginning-of-the-term subjects will perform better at a paired-associate learning task than middle or end-of-the-term subjects.

The second set of hypotheses will examine volunteering behaviour, first in terms of whether this behaviour is randomly distributed throughout the academic year, and second, whether "volunteers" in this study do in fact resemble the classic volunteer subject. It is hypothesized:

(7) that proportionately more beginning-of-the-term subjects will indicate their willingness to participate in "extra" experimental work than will middle or end-of-the-term subjects.

(8) that subjects indicating their willingness to volunteer for extra experimental work will resemble the volunteer subject to a greater extent than subjects not willing to volunteer (i.e. higher general intelligence, more favour-

able attitudes to psychology, higher need for approval, better performance on a paired-associate learning task).

Sex differences are not of predictive concern here; however, sex will be treated as a factor in order to obviate confounding of results.

METHOD

Subjects

A total of 228 subjects (124 female, 104 male) from first year psychology classes at the University of Manitoba were sampled. Subjects participated as partial fulfillment of the Psychology Department's requirement that students serve in 7 hours of experimental work. Participants in one phase of the study were restricted from later phases in order that the independence of samples assumption of the statistical method chosen would not be violated. It is recognized that this sampling without replacement procedure may have introduced some bias; however, this biasing effect can be considered minimal within a 2,000 subject pool.

Experimenter

The same male experimenter administered all testing materials and instructions to all subjects.

Design of Data Analysis

Experimental sign up booklets were made available to the subject-pool at three times during the academic year; early October, early January, and late March. The resultant design was a two (male-female) by three (early-middle-late) factorial model. A third factor, volunteer status, was added for the volunteerism analysis. This design was thus a two (male-female) by three (early-middle-late) by two (volunteer-non-volunteer) factorial model.

Procedure

Fifteen of the total of 33 introductory psychology sections were chosen at random. These 15 sections were further divided randomly such that subjects were obtained from five sections for each experimental phase. Several experimental sign up booklets were provided for each section.

Subjects participated in groups of approximately 25. Three time slot options were offered for each of the three sampling periods. This helped ensure that scheduling factors did not affect subjects' decisions as to whether or not to participate. Subjects were given an opportunity to receive complete feedback concerning the experiment at a predetermined date following termination of the study.

A paired-associate learning task was presented first. Fifteen paired-associates, equated for associative strength (Palermo, 1964) were projected by slides on a screen at the front ot the experimental room. The list was repeated twice. Order of pairs was random for each presentation and each pair was presented for 1¼ seconds with a 3/4 second changeover interval. Subjects were instructed to remember "which words go together or are paired with each other". During the recall phase stimulus words only were listed in random order on a page of the experimental booklet. Subjects were instructed to write, in the spaces provided beside each stimulus word "the word that went together with each word shown on the page". Seventy-five seconds were allowed for recall. This procedure required a total of about 15 minutes to complete.

The questionaires were presented in individual booklets (see Appendix B) for each subject. The intelligence measure, being a power test, was administered first in order that the situation could be controlled by the experimenter. The intelligence measure used was the Shipley-Hartford Institute of Living Scale (Shipley, 1967). The utility of this scale in predicting WAIS (Wechsler, 1955) IQs has been demonstrated by Black (1974). Using the Paulson and Lin (1970) age corrected table, Shipley-Hartford IQs correlate with WAIS IQs at the .001 level of significance. Administration time for this scale was approximately 25 minutes. The Marlowe-Crowne Social Desirability Scale (Crowne and Marlowe, 1960) was given. Reliability of this scale has

been reported as .88 using Kuder-Richardson formula 20. A test/re-test reliability of .89 was reported by the authors of the scale. Subjects required about 20 minutes for this scale. Attitudes to psychology were assessed by the Psychological Research Survey (Adair and Fenton, 1971). Split-half reliabilities of .89-.95 have been reported for this scale. Administration time was about 20 minutes. The State-Trait Anxiety Inventory (STAI, Speilberger et al, 1970) was also given. Data on the A-trait portion of the scale indicate reliabilities of .73 and .77 for males and females respectively over a 104 day test/retest period. A-state correlations are predictably low. Subjects required approximately 20 minutes to complete the STAI.

In order to determine what proportion of each subject sample (early, middle, late) represented "true volunteers", i.e. individuals who were willing to participate in psychological research although neither course credit nor financial remuneration were given, the final page of the experimental booklet asked subjects to indicate: (a) whether or not they would be in Winnipeg during the summer of 1977 and if so, (b) whether or not they would be willing to participate as subjects on a "gratis" basis for (fictitious) research projects during the summer of 1977. No identification was required in order to prevent any biasing effects of subjects' being concerned about having their identities traced.

RESULTS

Hypotheses concerning specific personal differences among subjects sampled at different times during the academic year were investigated by means of a 3 x 2 multivariate analysis of variance. The computer program used for all multivariate analyses was "MULTIVARIANCE, Univariate and Multivariate Analysis of Variance, Covariance, and Regression. Version V, Release 3." (Finn, 1976). Observed cell means and standard deviations are reported in tables 1 and 2 respectively.

INSERT TABLES 1 & 2 ABOUT HERE

Observed combined means, collapsing over sex and over time are reported in tables 3 and 4 respectively.

INSERT TABLES 3 & 4 ABOUT HERE

Correlations among dependent variables are reported in table 5. Although several correlations reached significance the highest coefficient of determination was low (r^2 state anxiety-trait anxiety = .21). It is recognized that interpretations of the highly dependent elements of a correlation matrix are tenuous; however, it would appear that the set of dependent variables are fairly independent from each other, sharing relatively little variance in common (4% at the most).

INSERT TABLE 5 ABOUT HERE

Because the design was nonorthogonal each factor was tested for significance when entered last in the analysis. Univariate F statistics were not directly interpreted although they are reported for the time and sex factors in tables 6 and 7 respectively.

INSERT TABLES 6 & 7 ABOUT HERE

Multivariate analysis of variance results are summarized in table 8. No suppressor relationships were evident and since each effect was stepped into the model last the F statistics are conservative and both

Sex F (6,217) = 5.44, $p < .001$ and Time F (12,434) = 1.7, $p < .06$ effects were considered significant. Interaction effects did not reach significance, $F < 1$.

INSERT TABLE 8 ABOUT HERE

Although not of predictive concern, a discriminant analysis was performed on the Sex factor to determine which variables contributed most strongly to the significant Sex effect.[2] Raw and standardized discriminant function coefficients are reported in table 9. The paired-associate variable contributed most to the male-female discrimination, females scoring higher than males ($\bar{X}$ females = 8.11, $\bar{X}$ males = 6.03). Only the univariate F associated with the paired-associate variable reached significance. Taken together then both the discriminant function loadings and univariate F statistics indicated that females' superior performance on the paired-associate learning task most parsimoniously explained the sex effect.

INSERT TABLE 9 ABOUT HERE

Subsequent to the significant omnibus multivariate test of the Time main effect, multivariate contrasts were performed in order to determine personal characteristic dimensions. Hypotheses predicting that the beginning-of-term sample would differ from both middle and end-of-term samples were not supported. The middle-of-term sample was found to differ from the end-of-term sample F (6,217) = 2.42, $p < .03$. The discriminant function analysis for the middle-of-term/

(2) Discriminant analysis coefficients are similar to standardized regression weights in a multiple regression equation. Each coefficient represents the relative importance of a given variable with the effects of all other variables "partialed out" (Tatsuoka, 1970)

end-of-term comparison is reported in table 11. The most heavily weighted variable was need for approval, end-of-term subjects showing the lower mean ($\overline{X}$ middle-of-term = 13.66, $\overline{X}$ end-of-term = 10.57). The remaining variables received considerably lower discriminant function coefficients, indicating that need for approval contributed most to the observed between group difference. This contention finds support in that the p value associated with the univariate F for the need for approval variable was less than .001.

INSERT TABLE 10 ABOUT HERE

Similar results were observed with regard to the comparison of the combined beginning-of-term and middle-of-term sample with the end-of-term sample F (6,217) = 2.20, $p < .04$. Discriminant function coefficients for this comparison are reported in table 12. Need for approval received a considerably higher discriminant function coefficient than any other variable. The univariate F (1,222) = 9.06, $p < .003$ associated with the need for approval variable was the only statistically significant one. The mean on the need for approval variable for beginning and middle-of-term subjects combined ($\overline{X}$ = 12.97) was higher than the need for approval mean for end-of-term subjects ($\overline{X}$ = 10.57)

INSERT TABLE 11 ABOUT HERE

In sum then these data indicated that the end-of-term sample's low need for approval relative to the beginning and middle-of-term samples was the primary contributer to the significant time effect.

Of the total sample of 228, 114 subjects indicated that they would be staying in Winnipeg through the summer of 1977. A contingency table indicating the frequencies of yes/no responses to the question of whether subjects were willing to participate in extra ex-

perimental work is shown in table 12.

INSERT TABLE 12 ABOUT HERE

It had been hypothesized that more beginning of term subjects would indicate willingness to participate in extra experimental work than would middle or end-of-term subjects. A chi-square test of independence was performed on the data. The resultant statistic did not reach significance. Thus, no relationship was evident between when a subject chose to participate and whether he/she indicated willingness to do extra experimental work.

Using the same subset of the total experimental sample a 3x2x2 (time x sex x yes/no) multivariate analysis of variance was performed in order to determine how those subjects who were willing to participate voluntarily as research subjects differed from those who were unwilling. The relative importance of the dependent measures were examined by means of both univariate F tests and standardized discriminant function coefficients. No main effects proved significant. The results for the yes/no factor however, cannot be totally ignored. Given low power due to the small sample size in a 12 cell design, the multivariate F $(6,97) = 1.63$, $p < .14$ is encouraging in terms of the possibility of detecting an effect with larger sample size. Among the various dependent measures, one univariate F reached significance, that associated with the attitudes to psychology measure $F(1,102) = 7.61$, $p < .01$. Willing subjects indicated more positive attitues. The same variable received a considerably higher discriminant function coeffecient than any other measures.

DISCUSSION

The primary question addressed in this study was whether the

"when" of subject sampling could be shown to have an effect on the characteristics of those samples. The assumption that researchers draw equivalent subject samples regardless of when the sample is taken in the academic year was questioned. It was presumed that those subjects who chose to fulfill their research participation requirement early in the academic year would more closely resemble the "volunteer" subject than would subjects sampled at the middle or end of the year. Specifically, it was predicted that beginning-of-the year subjects would be more intelligent, more favourable in their attitudes to psychology and psychological research, higher in need for approval and higher in trait and state anxiety than middle or end-of-term subjects.

Hypotheses regarding significant specific directions and characteristics of differences among subject samples were not supported. Intelligence, measured by means of both a standard I.Q. test and a verbal learning task, was not found to be a salient variable although Evans and Donnerstein (1974) found I.Q. differences between early and late-term subjects. Contrary to Adair's (1970 b) findings, virtually no differences in attitudes to psychology apparent although differences were in the expected direction. Trait and state anxiety differences expected on the basis of work with volunteers and non-volunteers by Barefoot (1969) and Jaeger et al (in Rosenthal & Rosnow, 1975) similarly were not found. Differences in need for approval were found. Subjects sampled at the very end of the academic year were substantially lower in need for approval.

By inference from the conclusions of Crowne and Marlowe (1964) regarding high need for approval individuals, those low in need for approval can be considered less favourably disposed toward what may be extremely dull and boring tasks, less easily conditioned in verbal conditioning experiments, less socially conforming, less susceptible to persuasion, and generally less reactive in situations where evaluation-apprehension is salient. In other words, the researcher can expect differences in the effects of some kinds of experimental manipulations by virtue of this subject variable alone. Hence, researchers in the areas of attitude manipulation, verbal conditioning, or conformity could very well reach differing conclusions depending upon when

the subject sample was drawn. The generalizability of freshman-dependent research becomes truly questionable when one considers that a "significant" experimental effect may be explainable in terms of the time of the year when the research was performed.

Only one variable of the many examined here was relevant in terms of discriminating among subject samples. Consequently the hypothesized parallels between early-term subjects and volunteers and late-term subjects and non-volunteers cannot be drawn. The need for approval effect was, however, sufficiently salient to demonstrate the importance of the "when" in subject sampling. The question of whether the observed need for approval difference among subject samples resulted from the operation of a so-called need for approval "trait", i.e. low need for approval subjects were less "eager to please" and hence did not sign up for experiments until absolutely necessary, or from a change in need for approval (perhaps as a result of dull experimental experience (Holmes, 1970)) across the entire subject pool over time remains unanswered. These data do, however, indicate that the assumption that the behaviour of a human subject pool is equivalent to the "non-behaviour" of a random number table is unfounded.

It was further hypothesized that proportionately more beginning-of-term than middle or end-of-term subjects would report their willingness to participate in completely "volunteer" work.
The data failed to support the hypothesis, no relationship being evident between when a subject participated and whether or not he/she reported willingness to participate in later research on a purely "gratis" basis.

A possible confound was noted regarding subjects' responses to the portion of the experimental questionaire dealing with "voluntary" participation. Subjects were first asked whether or not they would be staying in Winnipeg during the summer of 1977. If subjects answered negatively to this item they were instructed to not concern themselves with the next question; this question asked whether subjects would be willing to participate voluntarily in experiments during the summer of 1977. Half the total subject sample indicated they would not

be staying in Winnipeg over the summer and were subsequently excluded from the data analysis. It seems unrealistic that such a large proportion of students would be leaving town for the summer. An alternative explanation is that some subjects said they would not be in town rather than indicate their reticence regarding voluntary experimental participation. Assuming such a phenomenon to be operative, more negative responses to the item would have occurred. Speculation regarding the sample-time distribution of these "phantom" non-volunteers would then indeed be idle. More rigorous questionaire design, perhaps masking the overt connection between the two questions might have yielded different results.

Relationships among dependent variables in terms of their relative importance in discriminating between subjects who were willing or unwilling to participate in psychological research on a voluntary basis were examined. Multivariate significance was not reached for this test although the test statistic did approach significance. It should be noted that the same subgroup of the total sample as was used for the analysis of the relationship between when a subject was sampled and whether or not he/she was willing to participate on a voluntary basis was used for the yes/no analysis. Thus, the same confound, namely that subjects said they would not be staying in town rather than indicate their reticence regarding voluntary experimental participation may have been operative. In addition to raising questions concerning the "true" nature of the subsample used for the analysis (as well as questions concerning the characteristics of those subjects "inappropriately" excluded from the analysis) a further consequence was "small" sample size and concomitantly low statistical power. The nonsignificance of the difference between those subjects who indicated willingness to volunteer and those who did not may have been as much a function of insufficient power to detect the effect as it was a function of no effect's being present. Given a nonsignificant multivariate F no firm conclusion can be drawn, however, the probable relevance of the attitudes to psychology variable cannot be overlooked. Both the univariate F and the discriminant function coefficient associated with the attitudes to psychology variable

indicated its importance in discriminating between volunteers and non-volunteers. These data, then, provided tenuous support for previous findings (Aiken and Rosnow, in Rosenthal & Rosnow, 1975, Kennedy and Cormier, 1971) that have shown voluntary research participants to report more positive attitudes to psychology and psychological research than non-volunteers.

Although the phenomenon of subject sampling differences as a function of when subjects are sampled has by no means been reliably demonstrated, differences over time were found in this study and others (Evans and Donnerstein, 1974, Mulry & Dunbar, in Rosenthal and Rosnow, 1975). Jung (1969) and Johnson (1974) have suggested subject recruitment methods that could circumvent the problems associated with subjects' self-selecting experimental dates. It has been recommended that all students supply a psychology department with a timetable. The subsequent bank of subject availability times could be randomly sampled by the researcher as necessary. A relatively simple storage-retreival computer routine may prove convenient to both subject and researcher. More importantly, the bias inherent to subjects' self-selecting experimental dates would be reduced.

An appropriate closing comment has been provided by Johnson (1973).

> "Better research will not be forthcoming until university researchers concern themselves with the problems of obtaining human subjects." (p. 210)

SUMMARY AND CONCLUSIONS

This study was designed to examine whether subject-sampling procedures currently in use at the University of Manitoba provide the researcher with a truly random sample of experimental participants. The hypothesis that subjects signing up for experiments earlier in the academic year resembled the "volunteer subject" (as described by Rosenthal & Rosnow, 1975) to a greater extent than those subjects who put off experimental participation until the very end of the academic

year was tested.

Volunteering behaviour was also examined, first in terms of whether this behaviour was randomly distributed throughout the academic year, and second, whether "volunteers" in this study in fact resembled the classic volunteer subject.

Male and female subjects were recruited at three times during the academic year, early October, early January and late March. All subjects were given identical experimental treatments. Dependent measures taken included a paired-associate learning task, a measure of general intelligence, a need for approval scale, an attitudes to psychology questionaire and a state-trait anxiety measure. In addition, subjects were asked to indicate whether or not they would be willing to participate as subjects in extra research on a purely "gratis" basis.

The data indicated that the subject-sample taken at the end of the year was significantly different from samples taken at the beginning or middle of the year. Late-term subjects' comparatively low need for approval was the primary contributor to the significant time-of-sampling effect. No relationship was evident between when a subject chose to participate and whether or not he/she indicated willingness to do extra experimental work. Differences in personal characteristics between subjects who were willing or unwilling to participate in extra experimental work were marginally significant, attitudes to psychology being the most relevant variable.

A possible confound regarding the volunteerism analysis, namely that subjects may have been reticent about indicating that they were unwilling to do extra experimental work, was discussed. It was concluded that researchers be more mindful of the problems associated with the obtaining of human research subjects. An alternative, less bias-prone subject recruitment method was recommended.

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Appendix A: Tables 1 - 12

Table 1

Dependent Variable Cell Means

Sex	Variable	Sample time October	January	March
Female	Paired Associates	7.95	7.98	8.47
	Intelligence	44.75	44.52	43.44
	Need for Approval	12.80	14.05	10.94
	Attitudes to Psychology	188.39	187.77	188.58
	State Anxiety	32.41	30.91	34.17
	State Anxiety	41.0	39.73	40.47
Male	Paired Associates	5.86	6.0	6.33
	Intelligence	43.0	44.58	44.70
	Need for Approval	11.75	13.15	10.07
	Attitudes to Psychology	188.68	189.79	187.85
	State Anxiety	37.36	32.39	32.41
	Trait Anxiety	41.32	38.27	37.41

Table 2

Dependent Variable Cell Standard Deviation

Sex	Variable	Sample time October	January	March
Female	Paired Associates	4.04	3.49	2.41
	Intelligence	5.83	4.72	6.86
	Need for Approval	5.36	4.22	4.55
	Attitudes to Psychology	22.11	25.64	18.35
	State Anxiety	7.41	7.90	7.76
	Trait Anxiety	8.22	8.20	5.85
Male	Paired Associates	2.99	4.08	3.14
	Intelligence	8.02	6.89	7.17
	Need for Approval	5.80	6.21	6.23
	Attitudes to Psychology	19.59	17.23	20.21
	State Anxiety	10.02	7.13	12.31
	Trait Anxiety	8.45	8.76	8.92

Table 3

Observed Combined Means Sample Time Collapsed Over Sex

Variable	Sample Time		
	October	January	March
Paired Associates	6.91	7.13	7.56
Intelligence	43.87	44.55	43.98
Need for Approval	12.27	13.66	10.57
Attitudes to Psychology	188.50	188.60	188.30
State Anxiety	34.89	31.55	33.41
Trait Anxiety	41.16	39.10	39.16

Table 4

Observed Combined Means
Sex Collapsed over Sample Time

Variable	Sex	
	Female	Male
Paired Associates	8.11	6.03
Intelligence	44.29	43.94
Need for Approval	12.70	11.76
Attitudes to Psychology	188.20	188.80
State Anxiety	32.39	34.50
Trait Anxiety	40.40	39.34

Table 5

Dependent Variable Correlation Matrix

	Paired Associates	Intel-ligence	Need for Approval	Attitudes to Psychology	State Anxiety	Trait Anxiety
Paired Associates	1.00					
Intelligence	.26**	1.00				
Need for Approval	-.06	-.28	1.00			
Attitudes to Psychology	-.15*	-.04	.08	1.00		
State Anxiety	-.02	-.07	-.22**	-.13	1.00	
Trait Anxiety	-.16*	-.11	-.16*	-.08	.46**	1.00

* $p < .05$

** $p < .01$

Table 6

Summary of the Univariate Analysis of Variance

Time Main Effect

Variable	df	Mean Square	F	p less than
Paired Associates	2	4.80	.41	.66
Intelligence	2	9.61	.22	.80
Need for Approval	2	162.07	5.61	.01
Attitudes to Psychology	2	5.38	.01	.99
State Anxiety	2	212.76	2.77	.06
Trait Anxiety	2	128.16	1.95	.14
(error)	222			

Table 7

Summary of the Univariate Analysis of Variance
Sex Main Effect

Variable	df	Mean Square	F	p less than
Paired Associates	1	240.25	20.49	.01
Intelligence	1	5.80	.14	.72
Need for Approval	1	50.45	1.75	.19
Attitudes to Psychology	1	19.60	.04	.83
State Anxiety	1	214.42	2.80	.10
Trait Anxiety	1	81.46	1.24	.27
(error)	222			

Table 8

Summary of the Multivariate Analysis of Variance
Three Levels of Time X Two Levels of Sex

Source of Variateon	Degrees of Freedom	F	p less than
Time	12,434	1.71	.06
Sex	6,217	5.60	.01
Time X Sex	12,434	.61	.83

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Table 9

Discriminant Function Coefficients
for Sex Factor

Variable	Raw Coefficient	Standardized Coefficient
Paired Associates	.26	.90
Intelligence	-.01	-.07
Need for Approval	.05	.25
Attitudes to Psychology	.01	.07
State Anxiety	-.06	-.49
Trait Anxiety	.08	.61

Table 10

Discriminant Function Coefficients for the Contrast of the middle-of-term sample with the end-of-term sample

Variable	Raw Coefficient	Standardized Coefficient
Paired Associates	-.06	-.21
Intelligence	.70	.46
Need for Approval	.18	.99
Attitudes to Psychology	-.01	-.10
State Anxiety	-.02	-.21
Trait Anxiety	.03	.24

Table 11

Discriminant function coefficients for the contrast of the combined beginning and middle-of-term samples with the end-of-term sample

Variable	Raw Coefficient	Standardized Coefficient
Paired Associates	.07	.23
Intelligence	-.07	-.43
Need for Approval	-.19	-1.01
Attitudes to Psychology	.01	.06
State Anxiety	-.01	-.04
Trait Anxiety	-.05	-.41

Table 12

Time of Sampling and Willingness to Participate in Extra Research

	Sample Time		
	Beginning of Term	Middle of Term	End of Term
Willing to Participate	26	23	14
Unwilling to Participate	20	14	17

N = 114

Chi Square = 2.02, $p < .20$

df = 2

Appendix B: Experimental Booklet

PLEASE DO NOT OPEN THE TEST BOOKLET UNTIL INSTRUCTED TO DO SO.

This experiment consists of 2 timed tests and several questionaires that may be answered at your own pace. Please read all instructions carefully and answer to the best of your ability.

The first task will involve the learning and recalling of pairs of words. Word pairs will be presented on the screen at the front of the room. Your task is to remember which words go together or are paired with each other. Pay close attention to the pairs as they are presented and remember which words go together as best you can.

The word READY will be presented on the screen just before the word pairs begin. This will be your signal to watch the screen closely and get prepared to concentrate on the pairs of words being presented.

When the word RECALL appears on the screen, open the booklet and, in the spaces beside each word on the page, write the word that was matched with that word when it was presented on the screen. For example, if the word pair that was presented on the slide was:

red match

you would fill in the word "match" beside the word "red" on the answer page like this:

red *match*

You will be given a limited time for the recall period so work quickly and accurately.

chair _____

priest _____

spider _____

buying _____

appear _____

stand _____

mountain _____

hand _____

bread _____

very _____

house _____

tell _____

faster _____

carpet _____

butter _____

IF YOU HAVE FINISHED THIS PART OF THE EXPERIMENT PLEASE DO NOT TURN TO THE NEXT PAGE UNTIL INSTRUCTED TO DO SO.

In the test below, the first word in each line is printed in capital letters. Opposite it are four other words. Choose the one word which means the same thing or most nearly the same thing as the first word and fill in the appropriate space on the IBM answer sheet. A sample has been worked out for you. If you kon"t know, guess. Be sure to choose the one word in each line that means the same thing as the first word.

sample

	1	2	3	4
LARGE	red	big	silent	wet

The right choice is "big", so you would fill in space number 2 on the IBM sheet. Please do not mark on this page, show all your choices on the IBM sheet.

begin here

1.	TALK	draw	eat	speak	sleep
2.	PERMIT	allow	sew	cut	drive
3.	PARDON	forgive	pound	divide	tell
4.	COUCH	pin	eraser	sofa	glass
5.	REMEMBER	swim	recall	number	defy
6.	TUMBLE	drink	dress	fall	think
7.	HIDEOUS	silvery	tilted	young	dreadful
8.	CORDIAL	swift	muddy	leafy	hearty
9.	EVIDENT	green	obvious	sceptical	afraid
10.	IMPOSTOR	conductor	officer	book	pretender
11.	MERIT	deserve	distrust	fight	separate
12.	FASCINATE	welcome	fix	stir	enchant
13.	INDICATE	deft	excite	signify	bicker
14.	IGNORANT	red	sharp	uninformed	precise
15.	FORTIFY	submerge	strengthen	vent	deaden
16.	RENOWN	length	head	fame	loyalty
17.	NARRATE	yield	buy	associate	tell
18.	MASSIVE	bright	large	speedy	low
19.	HILARITY	laughter	speed	grace	malice
20.	SMIRCHED	stolen	pointed	remade	soiled
21.	SQUANDER	tease	belittle	cut	waste
22.	CAPTION	drum	ballast	heading	ape
23.	FACILITATE	help	turn	strip	bewilder
24.	JOCOSE	humorous	paltry	fervid	plain
25.	APPRISE	reduce	strew	inform	delight
26.	RUE	eat	lament	dominate	cure
27.	DENIZEN	senator	inhabitant	fish	atom
28.	DIVEST	dispossess	intrude	rally	pledge
29.	AMULET	charm	orphan	dingo	pond
30.	INEXORABLE	untidy	involatile	rigid	sparse
31.	SERRATED	dried	notched	armed	blunt
32.	LISSOM	moldy	loose	supple	convex
33.	MOLLIFY	mitigate	direct	pertain	abuse
34.	PLAGIARIZE	appropriate	intend	revoke	maintain
35.	ORIFICE	brush	hole	building	lute
36.	QUERULOUS	maniacal	curious	devout	complaining
37.	PARIAH	outcast	priest	lentil	locker
38.	ABET	waken	ensue	incite	placate
39.	TEMERITY	rashness	timidity	desire	kindness
40.	PRISTINE	vain	sound	first	level

STOP HERE. DO NOT GO ON TO THE NEXT PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

Complete the following. Each dash (___) calls for either a number or a letter to be filled in. Every line is a separate item. Take the items in order, but don't spend too much time on any one. Write your answers in the spaces provided.

start here

41. 1 2 3 4 5 __
42. white black short long down __ __
43. AB BC CD D __
44. Z Y X W V U __
45. 12321 23432 34543 456 __ __
46. NE/SW SE/NW E/W N/__
47. escape scape cape __ __ __
48. oh ho rat tar mood __ __ __ __
49. A Z B Y C X D __
50. tot tot bard drab 537 __ __ __
51. mist is wasp as pint in tone __ __
52. 57326 73265 32657 26573 __ __ __ __ __
53. knit in spud up both to stay __ __
54. Scotland landscape scapegoat __ __ __ __ee
55. surgeon 1234567 snore 17635 rogue __ __ __ __ __
56. tam tan rib rid rat raw hip __ __ __
57. tar pitch throw saloon bar rod fee tip end plank __ __ __ __ __ meals
58. 3124 82 73 154 46 13 __
59. lag leg pen pin big bog rob __ __ __
60. two w four r one o three __

CONTINUE WITH THE REMAINING QUESTIONAIRES AT YOUR OWN SPEED. PLEASE READ ALL INSTRUCTIONS CAREFULLY AND ANSWER AS BEST YOU CAN.

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally.

Answer items true or false on the appropriate spaces on the IBM answer sheets provided. Please do not make any marks on the questionaire itself.

61. Before voting I thoroughly investigate the qualifications of all the candidates.
62. I never hesitate to go out of my way to help someone in trouble.
63. It is sometimes hard for me to go on with my work if I am not encouraged.
64. I have never intensely disliked anyone.
65. On occasion I have had doubts about my ability to succeed in life.
66. I sometimes feel resentful when I don't get my way.
67. I am always careful about my manner of dress.
68. My table manners at home are as good as when I eat out in a restaurant.
69. If I could get into a movie without paying and be sure I was not seen I would probably do it.
70. On a few ocaasions, I have given up doing something because I thought too little of my ability.
71. I like to gossip at times.
72. There have been times when I felt like rebelling against people in authority even though I knew they were right.
73. No matter who I'm talking to, I'm always a good listener.
74. I can remember "playing sick" to get out of something.
75. There have been occasions when I took advantage of someone.
76. I'm always willing to admit it when I make a mistake.
77. I always try to practice what I preach.
78. I don't find it particularly difficult to get along with loud mouthed, obnoxious people.
79. I sometimes try to get even rather than forgive and forget.
80. When I don't dnow something I don't at all mind admitting it.
81. I am always courteous, even to people who are disagreeable.
82. At times I have really insisted on having things my own way.
83. There have been occasions when I felt like smashing things.
84. I would never think of letting someone else be punished for my wrongdoings.
85. I never resent being asked to return a favor.
86. I have never been irked when people expressed ideas very different from my own.
87. I never make a long trip without checking the safety of my car.
88. There have been times when I was quite jealous of the good foutune of others.
89. I have almost never felt the urge to tell someone off.
90. I am sometimes irritated by people who ask favors of me.
91. I have never felt that I was punished without cause.
92. I sometimes think when people have a misfortune they only got what they deserved.
93. I have never deliberately said something that hurt someone's feelings.

The next questionaire is designed to investigate the psychological experiment from the subject's point of view. As most subjects are drawn from University student populations, your opinions are being sought.

Turn to the questionaire and read question 94. Select the response which best describes your feelings on this statement in accordance with the following scale.

1	2	3	4	5
STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE

If, for example, you strongly agree with the statement, blacken in the number 5 space for question 94 on the answer sheet.

If you strongly disagree with it, blacken in the number 1 on the answer sheet for question 94.

Now go ahead and answer all the items using the IBM sheet to record your answers.

94. Most psychology experiments are worthless since even the most carefully controlled experiments lead to inconclusive results.

95. Through experimentation psychologists have made a real contribution to the understanding of man.

96. Psychologists would be better advised to forget the laboratory, and go into the field where the "real people and problems" are.

97. Many of the questions asked in testing are personal and are none of the experimenter's business.

98. Given a free choice, most students would be willing to volunteer for experiments.

99. Many experimenters are smug and take a pretty high-handed attitude with subjects.

100. Most experiments in psychology are concerned with trivial observations of artificial behavior.

101. Tests and other experimental manipulations are generally not reliable measures of personality and behavior.

102. Most experiments deal with such a small segment of behavior that they are meaningless in the broad picture.

103. People generally express their real feelings on psychological tests.

104. Psychology experiments are fun but do not prove anything.

105. Human behavior is too complex to cut up and study piece by piece in the laboratory.

106. Most people would say that their experience as a subject in psychological experiments was favourable.

107. When an individual signs up for an experiment, it involves a commitment to do what is asked to the best of his ability.

108. Most students participate willingly in experiments.

109. People rarely express their "real" selves in psychology experiments.

110. Experiments in psychology have no value because of the inherent diversity of man and his environment.

111. Many experimenters ask too much from their subjects.

112. Experiments are nothing but "busy work" for psychologists.

113. Psychology experiments are too time consuming.

114. Some experimenters just seem to be waiting for the subjects to make fools of themselves.

115. As a matter of personal pride, most individuals would try to do their best when acting as a subject.

116. Experimentation is of no practical value in the understanding of the fundamental causes of behavior.

117. The psychological journals are mostly filled with unimportant trivia.

118. It doesn't matter too much what subjects do; the experimenter usually manipulates the data to prove his hypothesis anyway.

119. Psychological tests are generally reliable measures of personality.

120. Laboratory studies in psychology are too artificial to produce valid data.

121. Most students are "good" subjects, that is, they perform well in their role as experimental subjects.

122. Many subjects in psychological experiments go through the motions without really trying.

123. The experimental method can be used effectively in the study of human behavior

124. Subjects in most psychology experiments are treated with respect.

125. The experimental approach to psychology has been both fruitful and helpful in understanding human nature.

126. Most experimenters are considerate and polite in their treatment of subjects.

127. Participation in psychology experiments is not a great imposition on students.

128. Psychologists sometimes forget that subjects are still human beings.

129. Through psychological tests and experiments psychologists have acquired the knowledge to predict behavior in many real life situations.

130. Most students follow the experimenter's instructions carefully so that they will be able to perform as a good subject.

131. Laboratory studies in psychology have contributed significantly to the knowledge of mankind.

132. The complexity of individuals make it necessary to study human behavior under controlled conditions.

133. From experiments, psychologists can validly generalize to the population-at-large.

134. Subjects in most psychology experiments are treated as guinea pigs.

135. Many students do not cooperate and therefore make poor subjects.

136. Psychology has proven its worth as an experimental science.

137. Any minor discomfort that subjects may go through such as electric shock, embarrassment, etc., is worth it in the long run.

138. Psychological data is useless because its interpretation is based on the manipulation of statistics.

139. Many students feel a responsibility to cooperate in any way possible in the pursuit of knowledge.

140. Subjects frequently feel manipulated by the experimenter.

141. Participation in psychological experiments is a waste of the students' time.

142. Students should not be asked to give up their time to serve as subjects.

143. College students tend to share with experimenters the hope that the study in which they are participating will in some material way contribute to science.

144. Subjects in psychology experiments are "contributors to science."

145. Experiments in psychology almost always involve deception or "tricking" the subject in some way.

A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate space ON THE SECOND IBM SHEET you have been given, according to the following scale.

1	2	3	4
NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO

Indicate how you <u>feel</u> right now, that is, <u>at this moment</u>. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

1. I feel calm
2. I feel secure
3. I am tense
4. I am regretful
5. I feel at ease
6. I feel upset
7. I am presently worrying over possible misfortunes
8. I feel rested
9. I feel anxious
10. I feel comfortable
11. I feel nervous
13. I am jittery
14. I feel "high strung"
15. I am relaxed
16. I feel content
17. I am worried
18. I feel over-excited and "rattled"
19. I feel joyful
20. I feel pleasant.

This questionaire also includes statements which people have used to describe themselves. Read each statement and then blacken in the appropriate space on the IBM sheet to indicate how you generally feel. Answer the items according to the following scale:

1	2	3	4
ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS

Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

21. I feel pleasant
22. I tire quickly
23. I feel like crying
24. I wish I could be as happy as others seem to be
25. I am losing out on things because I can't make up my mind soon enough
26. I feel rested
27. I am "calm, cool, and collected"
28. I feel that difficulties are piling up so that I cannot overcome them
29. I worry too much over something that really doesn't matter
30. I am happy
31. I am inclined to take things hard
32. I lack self-confidence
33. I feel secure
34. I try to avoid facing a crisis or difficulty
35. I feel blue
36. I am content
37. Some unimportant thought runs through my mind and bothers me
38. I take disappointments so keenly that I can't put them out of my mind
39. I am a steady person
40. I get in a state of tension or turmoil as I think over my recent concerns and interests.

Thank you for your participation in this study. As a final question we would like you to help us with a survey of how many experimental subjects will be available to researchers over the next summer. Please answer the following questions to the best of your knowledge at the present time. Circle the appropriate response.

1. Will you be staying in Winnipeg during the summer of 1977. yes no

If you answered question 1 as "no" do not bother with question 2.
If you answered question 1 as "yes" please answer the following question.

2. Would you be willing to participate as a subject in psychological experiments on an entirely voluntary basis, that is for no course credit or pay. yes no