



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Research Commons

<http://researchcommons.waikato.ac.nz/>

Research Commons at the University of Waikato

Copyright Statement:

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

The thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- Any use you make of these documents or images must be for research or private study purposes only, and you may not make them available to any other person.
- Authors control the copyright of their thesis. You will recognise the author's right to be identified as the author of the thesis, and due acknowledgement will be made to the author where appropriate.
- You will obtain the author's permission before publishing any material from the thesis.

A SCALE TO MEASURE MOTIVATION AND
BEHAVIOUR IN PSYCHOLOGICAL
EXPERIMENTS

Brian Richard Flay

Submitted as part fulfillment for the degree of

BACHELOR OF PHILOSOPHY

in

Psychology

at

THE UNIVERSITY OF WAIKATO

Hamilton, New Zealand

1972

TABLE OF CONTENTS

	<u>Page</u>
Table of tables	iv
Acknowledgement	v
Abstract	vi
<u>Chapter</u>	
1	
<u>Subject Effects in Psychological Research</u>	
Introduction	1
Theoretical and empirical contributions to the area	3
The volunteer subject	4
Subjects' general attitudes	6
Suspicion and deception	7
Evaluation apprehension	10
Demand roles:	
The "subject role" concept	12
I The good subject role	13
II The faithful subject role	15
III The negativistic subject role	17
2	
<u>Test Development</u>	
Objectives	19
Item development and selection	21
Administration:	
The instrument	21
Subjects and procedure	22
Analysis	22
Discussion	26
3	
<u>Validation</u>	
Item selection	30
Validation hypotheses	30
Variables used	33
Factors I to VII	33
Method:	
Materials	39
Subjects and procedure	41
Analysis	42
Results and discussion	
Factor scores	43
Differences between groups	43
Relationships between factors	48
Factors I to VII	52

TABLE OF CONTENTS (Contd.)

<u>Chapter</u>		<u>Page</u>
4	<u>Conclusions</u>	
	Validity	67
	Limitations and usefulness	72
	Suggestions for further research	74
	Conclusions	77
	 <u>Appendices</u>	 78
	 <u>References</u>	 86

TABLE OF TABLES

<u>Table</u>		<u>Page</u>
I	The highest loading items on each factor.	24
II	Intercorrelations among the first five oblique factors.	27
III	Intercorrelations between the factor scores for seven factors.	27
IV	Items included in each factor score, validation phase.	31
V	Item-total correlations of the hypothesised items for each factor score.	44
VI	New item-total correlations for each factor score, and KR reliabilities of each factor score.	45
VII	Test-retest reliabilities.	46
VIII	(a) Experience in psychology for two groups.	47
	(b) Experimental differences between the two groups.	49
IX	Intercorrelations of the seven factors.	50
X	All hypothesised and/or significant correlations with Factor I.	53
XI	All hypothesised and/or significant correlations with Factor II.	55
XII	All hypothesised and/or significant correlations with Factor III.	57
XIII	All hypothesised and/or significant correlations with Factor IV and the volunteer criterion measure.	59
XIV	Correlations of Factor IV and the criterion measure of volunteering with the other factors.	60
XV	All hypothesised and/or significant correlations with Factor V.	62
XVI	All hypothesised and/or significant correlations with Factor VI.	64
XVII	All hypothesised and/or significant correlations with Factor VII.	66

ACKNOWLEDGEMENT

I would like to express my appreciation to my supervisor, Dr. P.N. Hamid, for his attention, constructive criticisms, and sound advice, and for the constant interchange of ideas we have had which has helped my work immeasurably.

ABSTRACT

The aim in this study was to develop and validate a set of scales to measure subject motivation and behaviour in psychological experiments. This was achieved by factor analysing the responses by 140 subjects to 60 statements concerning the feelings aroused and the behaviour adopted when a subject in a psychological experiment, and attitudes towards psychology, psychological research, science, and scientific method. Seven factors were obtained:

- I Attitudes towards psychology and psychological research
- II Evaluation apprehension
- III The good-negativistic subject role
- IV Volunteering
- V The faithful subject role
- VI Awareness of deception

and VII Attitudes towards science and scientific method.

The validity of each factor was studied by considering its relationship with other psychological variables and the other factors, using a sample of 96 psychology students. Reliability estimates were also obtained from test-retest scores for 31 subjects, as well as from item-total correlations.

The limitations and usefulness of the scale are discussed, and suggestions for further research are made.

CHAPTER 1

SUBJECT EFFECTS IN PSYCHOLOGICAL RESEARCH

INTRODUCTION

One of the major problems in social psychological experimentation is the identification, analysis, and measurement of some sources of unintended variance in experimentation. In this study we will be particularly concerned with those sources of variance which are a function of the attitudes towards psychology, research and science, and the previous experience in psychological research. That is, we are interested in those aspects of subject attitude and motivation which are mediated by the subjects' previous experience with psychology, science, and the research situation, as well as by his personality. Such attitudes and motivations are (partly) responsible for unexpected (and often undesired) variation in the behaviour of subjects in a psychological experiment.

Experimental method, the fundamental technique of psychological investigation, has been receiving increasing research attention during recent years but has not gone unnoticed by earlier psychologists. In 1933, Saul Rosenweig, in an extensive paper titled, "The experimental situation as a psychological problem" stated:

"...when one works with human materials one must reckon with the fact that everyone is a psychologist. How many subjects in a psychological experiment are purely receptive? How many are willing fully to adopt the humble role of subject in an investigation of their motives, aims, and thoughts? Most, as a matter of fact, are carrying on a train of psychological activity that is rather about the experiment than a part of it by the intention of the experimenter ... Moreover, the experimenter (subject or observer) is himself often unaware of the insidious ways in which these extraneous motivational factors have crept into and influenced the experiment" (pp 342) .

Thereupon, Rosenweig went on to describe much the same notions that have concerned recent research, but under a brand new set of labels.

Why has the Zeitgeist for the systematic study of these sources of artifact waited about 30 years. The reason appears to be tied to the

influence of the physical sciences model upon psychology, for the common conception of the human subject (more often than not, the psychology undergraduate) seems to be that he functions as "a stimulus-response machine: you put a stimulus in one of the slots, and out comes a packet of reactions (Burt, 1962, pp 232)." Or to use an analogy used by Silverman and Shulman (1970), we tend "to regard putting input into a human subject as something akin to putting chemicals into a test tube (pp 98)." Richards (1972) too, has succinctly commented on the superficial and shallow view of the human subject apparently held by many researchers involved in experimental research.

However, any psychologist who is involved in research with human subjects soon comes to the conclusion that such an image is totally incorrect and misleading. "We are now coming to the full awareness that the analogy holds only with the profound qualification that we are inevitably working with an unclean test tube, contaminated by all of the needs, anxieties, self-deceptions and intentions of someone who is aware that his behaviour is being scrutinized as part of a psychological experiment (Silverman and Shulman, 1970, pp 98)."

Jourard (1968), in the form of an imaginary letter from a subject to an experimenter, provides a hint of the seriousness of this problem. The letter is disturbing for the subject says to the experimenter:

"It's getting so I find it difficult to trust you. I'm beginning to see you as a trickster, a manipulator 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)."

This is indeed cause for concern, and illustrates clearly why so

much human psychological research is not replicable, and in fact often yields conflicting data in different experimental settings. This paper will examine the theoretical and empirical contributions to this field, and go on to report an attempt to devise an instrument to measure some of the sources of unintended variance in data collected from human subjects.

As has already been implicitly indicated, the range of interest of this paper will be confined to those sources of variance attributable to the human subject himself, and his motivations. Wherever "the experimental situation" is referred to we mean any social context in which a psychological experiment may be carried out, whether it be laboratory or classroom, whether actual behaviour be observed or responses to pencil and paper tests scored. However, sources of variance due to variations in the social context, or due to experimenter effects (Rosenthal, 1966) will not be considered, except where they are relevant to the discussion. Further, attention will be confined to the study of subjects who come from the population of psychology undergraduates, since availability seems to be the most common basis of subject selection for psychological research in most psychology laboratories in the world today.

THEORETICAL AND EMPIRICAL CONTRIBUTIONS TO THE AREA

One essential aspect of the research process is the nature of the person who supplies our data: the human subject (commonly, the psychology undergraduate student). The conception that the subject has of his role, and his understanding of what happens in experiments, of what is required, and what is appropriate behaviour as a participant in an experiment, may well have important effects on his performance. A subject is not a passive responder to the situation. He is an active participant in it, and this very activity changes the nature of the

situation for him. His world is not simply what the experimenter defines and presents to him. No matter how thoroughly a researcher attempts to control and standardize the experimental situation, it is, in fact, neither controlled nor standardized to the subject. The resulting situation is one that may not be intended and, more importantly, may not be known to the experimenter, and one that will likely vary among subjects.

The most outstanding feature of the experiment as a social situation is that it is an invitation, or a demand, for one person to behave under the scrutiny of another. Subjects may or may not volunteer; different subjects will have different attitudes and views about psychology, psychological research, science and scientific method; some subjects will be suspicious of the experimenter or his manipulations, or of anything to do with psychology; and subjects will be motivated to assume different roles according to their experience of such situations and their personality.

The Volunteer Subject

While some students are required to serve as subjects as part of their course work, others voluntarily agree to serve. Those who do volunteer to serve as subjects may do so for a variety of reasons. Orne (1962), Riecken (1962), Rosenthal and Rosnow (1969), among others, give several reasons including pay, course credit, the opportunity to learn something about oneself, and a desire to contribute to science.

Jackson and Pollard (1966) reported that among the volunteers for a sensory deprivation experiment, 50% of the subjects said they volunteered out of curiosity, 21% for the money, and only 7% in order to help science. Rosenthal and Rosnow (1969) noted that psychology majors appear to have a higher volunteer rate than non-psychology majors, and suggest that a higher proportion of such volunteers may be volunteering to help psychology advance.

It remains to be determined what differences there are in actual task performance as a function of the reason for volunteering. It seems plausible to suggest, however, that a subject volunteering in the hope of learning something about himself might perform differently from, for example, one volunteering for course credit, or to help science (MacDonald, 1972).

Non-volunteers, who, nevertheless, are required to serve as subjects, may have various different reactions which may affect their performance, either intentionally or unintentionally (Rosenthal, 1965; Rosenthal & Rosnow, 1969; and Rosnow & Rosenthal, 1970). Besides situational variables that affect the rate of volunteering, researchers have found that certain personal attributes are likely to be associated with a higher level of volunteering. They conclude that volunteers tend to have greater intellectual ability, interest and motivation: greater unconventionality; less authoritarianism; greater need for social approval; and greater sociability (Rosenthal 1965, pp 403-404). Hood and Back (1971) have pointed out that the first of these characteristics is indicative of superior ability to perform and greater confidence in it, and the other characteristics indicate greater openness and willingness to be looked at. Drawing support from Bell (1962), Lasegna and von Felsinger (1954), Martin and Marcuse (1958), Riggs and Kaess (1955), and Maslow and Sakoda (1952), they (Hood and Back, 1971) present experimental evidence to support their contention that individuals who volunteer may be seeking cathartic situations. Such subjects would view the experiment as a self-revealing situation, so behaving far differently to non-volunteers who, it is assumed, do not desire catharsis.

There is, then, strong reason to suspect that volunteer subjects probably differ in various ways from non-volunteers, and that they perform in the experimental situation in different ways possibly as a function of their different personal characteristics. Rosnow and

Rosenthal (1966) have reported exploratory research which suggests that volunteers, because of their greater need for social approval, are more highly motivated than non-volunteers to verify the experimenter's hypothesis (or at least their interpretation of it).

Subjects' general attitudes

What is a subject's set or attitude as he begins an experiment? Is he totally naive with regard to psychological experimentation or does he approach the situation with certain predispositions that can influence his task performance in ways not intended by the experimenter?

Gustav (1962) investigated the attitudes of students at New York University toward their compulsory participation as subjects. His results indicated that large numbers of required-service subjects may not be entering our laboratories with completely neutral feelings about the situation. About 40% of the subjects expressed unfavourable attitudes, ranging from annoyance and irritation to fear and apprehension, toward their experience as subjects, and 37% stated flatly that they would not have participated voluntarily. The remaining subjects reported more positive attitudes of great interest, enthusiasm, curiosity, and eagerness.

In a report on an evaluation of the general psychology course by 600 undergraduates at a large university, Argyris (1968) noted that an overwhelming majority of the students focused on the course requirement of research participation. "The students were very critical, mistrustful, and hostile to the requirement. In many cases they identified how they expressed their pent-up feelings by 'beating the researcher' in such a way that he never found out ..."(pp 188).

It seems eminently possible that either favourable or unfavourable attitudes can influence the subjects' performance in a number of kinds of experimental tasks. For example, subjects who report irritation at being required to serve might deliberately distort their responses in an

attempt at revenge.

In an investigation of the influence of performance in past experiments on performance in later experiments, Holmes (1967) found that subjects with a greater degree of experimental experience (more than six studies) tended to see the later experiment as more scientific and more valuable than those with low experience (one study). Further, the more experienced subjects made more of an attempt to work in with the experimenter but evidenced less interest in what the later experiment was about. Thus, subjects' perceptions of and behavioural intentions in experiments were influenced by their prior experience as research subjects.

Students who intend to major in psychology are likely to have a higher regard for psychology and psychological research than non-psychology majors. This fact may motivate them to behave in a way that is different to the way a naive subject would behave in the same social situation.

A subject's attitude towards science and scientific method may be another factor. If an individual has a high regard for science, he may wish to help science in any way he can - a wish which may influence the way he behaves in the experimental situation.

Overall, it seems that a subject's level of commitment to psychology and to the scientific method could have an important effect on the data he will supply.

Suspicion and Deception

Students, especially of psychology, are becoming more sophisticated with regard to certain aspects of research methodology and attempts at deception. Orne (1962) has noted that our attempts at concealing the true purpose of our studies are:

"...so widely known in the college population that even if a psychologist is honest with the subject, more often than not he will be distrusted. As one

subject pithily put it, "psychologists always lie."
This bit of paranoia has some support in reality."
(pp 778-779).

Argyris (1968) has also commented that subjects now come into the laboratory fully expecting to be deceived.

Shultz (1969) has suggested that perhaps it is the researchers who are being deceived by the subjects. As Kelman (1967) noted, "Subjects may not know the exact purpose of the particular experiment in which they are participating, but at least they know, typically, that it is not what the experimenter says it is" (pp 6).

Stricker (1967) has documented the prevalence of studies which involve deception and has noted that very few studies reported any information about subjects' suspicions of deceptions that were employed, this being true regardless of the substantive area and for all kinds of deception. Consider the case of a subject who has been deceived in the course of a previous experiment who now becomes a subject in another experiment. Such a person may be suspicious of various aspects of the experimental situation, and may not be ready or willing to respond only on the basis of information supplied by the experimenter in the instructions. The fact that such suspicions may have important consequences or effects on experimental performance obviously raises some significant issues with regard to the interpretation and generalizability of results (see McGuire, 1969, for a presentation of some of these problems).

The problem of subject suspicion can be approached in at least two different ways: by experimental manipulation or by subject selection. There have been several experiments in which the first tactic has been used, where prior deception and debriefing have immediately preceded a test experiment. In some cases the prior deception did not affect experimental performance (Brock and Becker, 1966, Fillenbaum, 1966) or only affected it weakly in interactive contexts (Cook, Bean, Calder,

Frey, Krovetz and Reisman, 1970; Cook and Perrin, 1971; Silverman, Shulman and Wiesenthal, 1970). In experiments using the second tactic, that of selecting suspicious subjects and comparing their performance with that of trustful subjects, Fillenbaum and Frey (1970) found no significant difference in performance by the two groups, whereas Stricker, Messick and Jackson (1967) found that suspicious subjects did differ strikingly from nonsuspicious subjects in their experimental performance. In the latter study males also showed more suspicion than females, and there was also some tendency for males to show a positive relationship between need for approval and suspiciousness.

Stricker, Messick and Jackson (1969) have noted that differences in intelligence, in the desire to ingratiate oneself with the experimenter, in the predispositions to use "deceit in the service of manipulating other people (Machiavellianism)", etc. may all make a difference with regard to suspicion, the reporting of suspicion, and the action taken given one is suspicious. "Potentially, the effects of suspicion may be quite various depending on who the subject is, what he is suspicious about, what he may want to do about his suspicions, and what he may regard as appropriate or legitimate behaviour, and, finally, what he is able to do about his suspicions in the given experimental setting" (Fillenbaum and Frey, 1970).

The results reviewed above indicate that prior deception is not systematically related to bias in experimental performance. It is not even obvious how prior deception should affect performance, for while prior deception might increase frustration when it is considered illegitimate, it might also make subjects more apprehensive about appearing to be "dupes" who fail to spot a hypothesis (see Weber and Cook, 1972). As a consequence, two countervailing motivations might be set up, which would make it hard to understand the effects of prior deception. It is also not clear whether suspiciousness might be more usefully conceived as a dichotomous variable (one is or is not

suspicious) or as a continuous variable that might be called certainty of deception, or certainty of knowing a hypothesis. Weber and Cook (1972) suggest that the latter conceptualization would permit testing whether bias and such certainty measures are related curvilinearly, something that is implied by Orne (1962). This also highlights the possibility that the study of suspicion may be nothing more than the study of effects of deception or of knowing a hypothesis.

Whatever, a suspicious subject, whether or not he knows the true purpose of an experiment, is likely to make an effort to figure out its purpose, since he does not believe what the experimenter tells him, and therefore he is likely to operate in the situation in terms of his own hypothesis of what is involved, rather than in terms of the conception that the experimenter is trying to induce.

Evaluation Apprehension

The experimental situation is one of social interaction, but the relationship has some of the characteristics of a superior-subordinate one. In most cases the experimenter is a psychology staff member or graduate student, while the subject is an introductory psychology student. And, as Shultz (1969) has pointed out, not only is the experimenter a member of a superordinate group, he is also a psychologist, "reputed to have uncanny skills and techniques to probe and prod and poke into our innermost workings, to find out things about us which we would rather keep secret" (pp 221).

Not only is the experimenter a powerful figure to the subject, there is also a one-sided distribution of information in this relationship. As Rieken (1962) suggests, the experimenter plays:

"... a serious game with the subject, inviting the latter to behave under specified conditions but revealing neither what the experimenter regards as the "right answer" nor even the criteria by which a particular answer will be judged... "the right answer" remains the property of the master of these ceremonies until the program is over" (pp 30-31).

The subject and the experimenter have a relationship that has, then, a socially defined character. A subject implicitly agrees to come under the control of the experimenter, to do whatever the experimenter asks on the basis of limited information, with little, if any, opportunity to ask questions. Argyris (1968) likened the situation of the subject to that of the lower level employee, and has subsequently predicted many of the behaviours of subjects with which we are here concerned.

Rieken (1962) has suggested that because of this superior-subordinate relationship the subject may look for meaning and purpose in the situation and try to discern the "right answer" or "right behaviour". Several reasons have been suggested as to why subjects may make such efforts. Rieken (1962) felt that one reason a subject may attempt to uncover the rationale of an experiment is for the purpose of presenting himself in the best possible light - to "put his best foot forward". This concept was further described and demonstrated by Rosenberg (1965, 1969) who called it "evaluation apprehension". Rosenberg postulated that subjects are sometimes anxious or apprehensive about how their performance will be used to evaluate their abilities or their socioemotional adjustment. He further assumed that subjects are especially motivated to present themselves favourably to psychologists, and hence desire to conceal any psychological weaknesses which the experimenter may be probing, to present themselves as strong and stable as possible; that is, to look good to the experimenter by either excellence of performance or by making responses that reveal a favourable personality or adjustment. Such desires are motivated by the experience of evaluation apprehension; that is, "an anxiety-toned concern that he win a positive evaluation from the experimenter, or at least that he provide no grounds for a negative one" (Rosenberg, 1965 pp29).

As well as various aspects of the experimental situation, personality

variables will have some bearing upon the extent to which this pattern of apprehension develops. In this sense, the dynamics underlying the behaviour of subjects who are apprehensive about how they will be evaluated are similar to the dynamics involved in giving socially desirable responses (Crowne and Marlow, 1964) or self-enhancing self-presentations (Goffman, 1959; Jones, 1964) (see also Rosenberg, 1969).

As Weber and Cook (1972) have pointed out, the construct of the apprehensive subject is especially difficult to falsify (Popper, 1959). The dependent variables often allow multiple interpretations of the outcome of a single experiment; that is, often it is not clear exactly how an apprehensive subject might be expected to respond. In a poorly disguised attitude-change experiment, for example, apprehensive subjects may show no change because they want to present themselves as independent, or they might show change because they want to appear flexible. This post hoc explanatory latitude lessens the predictive usefulness of evaluation apprehension in some experimental situations, but in other settings in which the socially desirable response is less ambiguous (for example, conformity research, and performance tasks) prediction is somewhat easier.

After reviewing a large number of studies, Weber and Cook (1972) concluded that there is widespread evidence for the apprehensive subject, but warn of its limited predictive usefulness.

Demand Roles: The 'Subject Role' Concept

It is necessary, at this point, to discuss the concept of role. We will refrain from speaking of an apprehensive subject as adopting an 'apprehensive subject role', a suspicious subject as adopting a 'suspicious subject role', or a volunteer subject as adopting a 'volunteer subject role'. These latter concepts are better thought of as personality or attitude type characteristics of subjects, factors which may motivate a subject to adopt one or other of the roles possible in the experimental

situation.

Weber and Cook (1972) speak of the 'apprehensive subject role', and group the concept with the other subject roles to be discussed here. It is felt, however, that the distinction that Weber and Cook themselves make between the motivational status of their roles, precludes the inclusion of evaluation apprehension as a role. They conclude from a review of the literature that evidence for the good and the negativistic subject roles is nearly always confounded with the 'apprehensive subject role', and also discuss the difficulty of separating these roles conceptually. They point out that the 'apprehensive subject role' is the only one that specifies the subject's motivation, but it does not describe responses with reference to the experimental hypothesis. On the other hand, various motivations might lead to the response characteristics of any one of the other three roles, which, at a descriptive level, indicate that subjects make responses which do not affect, falsely confirm, or falsely disconfirm the experimenter's predictions.

Evaluation apprehension is better thought of as one of the factors contributing to a final motivation to adopt a particular subject role. It acts, along with the act of volunteering or not volunteering, the degree of suspiciousness felt, and other personality and attitude factors, to produce the final motivation to adopt one particular role as a subject.

Demand Roles: I The Good Subject Role

At approximately the same time as Rieken (1962) postulated that subjects attempt to uncover the rationale of an experiment for the purpose of presenting themselves in the most favourable light, Orne (1962) suggested that most subjects in psychological experiments have such a high regard for the aims of science that they:

"... tend to share (with the experimenter) the hope and expectation that the study in which they are participating will in some material way contribute

to science.... Both subject and experimenter share the belief that whatever the experimental task is, it is important, and that as such no matter how much effort must be exerted or how much discomfort must be endured, it is justified by the ultimate purpose" (pp 778).

With such purpose, subjects are motivated to seek cues about the experimenter's hypothesis, which Orne termed "demand characteristics", and generally try to respond in accordance with them. The report by Jackson and Pollard (1966) cited earlier would tend to indicate that such purpose can be attributed to only a minority of student subjects though.

The concept of the "good subject" also comes from Orne's (1962) discussion of demand characteristics, where the concept is defined and its motivational strength alluded to:

"Admittedly, subjects are concerned about their performance in terms of reinforcing their self-image; nonetheless they seem even more concerned with the utility of their performance. We might well expect that as far as the subject is able, he will behave in an experimental context in a manner designed to play the role of a "good subject" or, in other words to validate the experimental hypothesis" (pp 778).

As Orne has made clear, the motivation for playing the good subject role is the subject's wish to provide data that will be of use to science or to the experimenter. Thus, this notion entails both the motivation to perform the good subject role and the availability of interpretable cues that allow the subject to infer how he can perform the role adequately. The good subject has also been called the cooperative subject (Sigall, Aronson and van Hoose, 1970) and the beneficent subject (Levy, 1967).

Orne (1962) did suggest that subjects were concerned about their own self-image as revealed by their task performance, but he felt that they were more concerned with behaving in a way that, in their opinion, would validate an experimental hypothesis. However, this does point up

possible confusion or ambiguity between the concepts of the good subject and the apprehensive subject. If a subject is apprehensive about what the experimenter will think of him as a person, he may be motivated to give the data which he thinks will validate the hypothesis. That is, in this case, high evaluation apprehension and the adoption of the good subject role both predict the same behaviour. In other settings, for example, in conformity studies, the apprehensive subject would be expected to make himself look good by not conforming, whereas the good subject would be expected to conform to validate the hypothesis. Sigall et al (1970) have provided evidence that when the good subject role and evaluation apprehension are pitted against each other, subjects prefer responses indicative of evaluation apprehension.

Evidence for the existence of a good subject role is not yet clear-cut. After reviewing a large number of studies (for example, Levy, 1967; Sigall et al, 1970; Page, 1968, 1969, 1970; Page and Lumia, 1968; Holmes, 1967; Holmes and Appelbaum, 1970; Silverman, 1968; Silverman and Regula, 1968; Silverman et al, 1970; Adair and Schachter, 1972) we agree with Weber and Cook (1972) that evidence for the good subject role is consistently confounded with evaluation apprehension.

Demand Roles: II The Faithful Subject Role

Using incidental statements by Orne (1962) and Rieken (1962) and results from some of his own research, Fillenbaum (1966) coined the term "faithful subject". The faithful subject is one who, "regardless of any suspicions or private hypotheses, tries to follow instructions and may refrain from going beyond the givens lest this vitiate the experiment" (Fillenbaum and Frey, 1970, pp48). The faithful subject believes that a high degree of docility is required in research settings and that his major concern should be to scrupulously follow experimental instructions.

It is apparent that there could be two types of faithful subject, the passive version and the active version (see Weber and Cook, 1972).

The passive subject is relatively uninvolved in experiments and docilely and apathetically follows instructions. The active subject is assumed to be motivated to help science and will "lean over backwards to be honest... otherwise, erroneous conclusions will be drawn by the experimenter" (Orne, 1967, pp780), even when they are suspicious. The major importance of both versions of the faithful subject role is that biased experimental performance should not result from playing the role.

Note the similarity of the motivations of the active faithful subject to those of the good subject, a fact that makes it difficult to separate the two roles in some situations. In one case the subject wants to help by confirming hypotheses, and in the other case he wants to help by being honest and responding as if he were not aware of the demands of the experimental situation.

The faithful subject role is more difficult to test than other roles, and evidence for it is not clear-cut, except perhaps for certain restricted contexts. One situation where subjects are probably passive and submissively follow instructions, is when subjects do not know a hypothesis, when experimental realism is low, and evaluation apprehension is not aroused (e.g. Fillenbaum, 1966; Fillenbaum and Frey, 1970; Holmes and Appelbaum, 1970; Cook et al, 1970). A second situation, where subjects are probably cued into the active role, is when subjects are specifically asked to role play and do not know a hypothesis (Bem, 1967; Greenberg, 1967; Horowitz and Rothschild, 1970), when subjects hear an obvious cue to deception in an experiment that immediately follows a prior deception (Brock and Becker, 1966; Cook et al, 1970), and when a simple persuasion study is introduced as "one of those studies whose true purpose cannot be revealed to you right now" (Cook and Perrin, 1971). (See Weber and Cook, 1972, for a more complete review of these reports).

Demand Roles: III The Negativistic Subject Role

A third aspect of subject motivation, is the dispositions of some subjects, in some circumstances, to deliberately and perversely respond in a way that is counter to demand characteristics. This was first suggested by Orne (1962), who proposed that it may occur when demands are too explicit or too obvious. Some subjects resent compulsory participation and so might wish to perpetrate revenge on the experimenter. Masling (1966) has called this the "screw you effect". This orientation has also been called that of the recalcitrant subject (Fillenbaum and Frey, 1970). Cook et al (1970) coined the term "the negativistic subject", which will be used here as it more obviously reflects the connotations of all the above derivations. Just as a good subject is assumed to want to confirm a hypothesis, then, so the negativistic subject is assumed to want to disconfirm it by corroborating some hypothesis other than the experimenter's or by giving responses that are of no use to the experimenter.

These motivational approaches are similar to Brehm's (1966) theory of psychological reactance, and though not specifically directed to testing the negativistic subject role, a study by Brehm and Krasin (In Brehm, 1966, pp 106-108) showed the occurrence of this effect under conditions of "too-obvious" demands. Their manipulation clearly allowed subjects to learn the presumed hypothesis (opinion change), though not the true hypothesis (reactance), and subjects in the high-reactance condition changed opinion less than subjects in the low-reactance condition. Note, however, that this decreased compliance when the presumed hypothesis is known may be interpreted either as negativism or as evaluation apprehension.

Similarly, it appears that subjects conform less when they learn a hypothesis in a conformity study (e.g. Stricker et al, 1967; Horowitz and Rothschild, 1970), and this outcome can also be interpreted in terms

of either the negativistic or the apprehensive subject. In the conditioning studies by Page and his co-workers (Page, 1968, 1969, 1970; Page and Lumia, 1968), a small proportion of subjects reported awareness and failed to emit the reinforced behaviour, which was interpreted by Page as negativism. However, again, an interpretation based on evaluation apprehension cannot be ruled out. Only by overcoming the problem of confounding negativism and evaluation apprehension will unambiguous results be obtained.

CHAPTER 2

TEST DEVELOPMENT

OBJECTIVES

Three possible subject roles have been discussed; the good, the faithful, and the negativistic subject roles. There is considerable practical advantage to be gained if experimenters were able to establish whether an individual subject regularly seeks to confirm, disconfirm, or disregard hypotheses, for each of these orientations describes a different kind of performance with respect to an experimenter's hypothesis. In a more practical way, an experimenter would be able to test whether, in his particular experiment, subjects who habitually adopt a particular role supply data that is different to that supplied by subjects who adopt a different role. The existence of such an effect would warn an experimenter against generalizing too broadly, as well as indicating that demand characteristics may be confounded in experimental treatments.

Once it has been verified that subjects do habitually adopt a preferred subject role, the existence of such subject roles could be used to predict the behaviour that a particular subject or group of subjects are likely to engage in during any experiment.

The three possible subject roles discussed above each imply a two-stage process; the arousal of motivation to adopt a role, and the perception of cues that guide behaviour and make it congruent with the aroused motivation. Factors within a particular experiment, for example, cues and demand characteristics, may arouse motivation to adopt a subject role, as well as providing the cues necessary for the second stage of the above process, and whenever such cues are correlated with experimental treatments, it will not be clear whether effects are due to treatments or to a particular subject motivation. It is also realised that situational variables within an experiment may interact with personal factors in arousing the motivation to adopt a subject role. That is, situational factors may act to systematically increase

or decrease, for example, the amount of suspicion felt by a subject, or the degree of evaluation apprehension a subject may experience which, in turn, will influence his adoption of a subject role. Such situational factors and their interactions, however, cannot be considered in full in this paper.

Of concern in this paper are the personal factors which antedate an experiment and which are also extremely important in arousing the motivation to adopt a particular subject role. Such factors may include personality differences and prior experience in experiments, both of which contribute to the amount of suspicion and evaluation apprehension experienced, general attitudes towards psychological research and science, and the act of volunteering.

The objectives of this study, then, are:

- (A) to attempt to develop a set of attitude scales that will,
 - (i) discriminate subjects according to the role they prefer to adopt in an experiment,
 - and (ii) reflect selected personal factors that antedate the experiment;
- and (B) to study the relationships between the personal factors and the subject role adopted.

An attitude scale would enable experimenters to compare the experimental performance of their subjects according to which subject role they prefer to adopt, and also facilitate further research into what factors influence the adoption of a subject role. Obtaining the factor structure of a large number of statements regarding attitudes towards psychology, psychological research, science and scientific method, feelings experienced when a subject, and describing ways to behave when a subject in a psychological experiment, will go some way towards achieving objective A. It was expected that factors would be obtained to represent each of the three subject role factors and the four personal

factors discussed in Chapter One. Studying the intercorrelations of such factors obtained should go some way towards achieving objective B.

ITEM DEVELOPMENT AND SELECTION

A large pool of statements which were likely to load on the factors discussed in Chapter One was obtained by two methods. The first method was simply to search the literature of the area and record any sentences, phrases, or statements that could be attributed to psychological research subjects. This resulted in two thirds of the final pool of items. The second method was to ask 50 students, one third of which were from each of the second year, third year, and graduate levels, and all of whom had had substantial research experience of their own, to write down statements that reflected their attitudes towards psychological research in general, and the way they felt motivated to behave in the experimental situation. After discarding items on the basis of the most obvious repetition, irrelevancy, and ambiguity, (c.f. Edwards, 1957, pp 9-14) an initial pool of 120 items was obtained. This pool was further reduced first to 105 items, then to 60 items by a series of judging and item analysis procedures.¹

ADMINISTRATION

The Instrument

The 60 items were randomly ordered and typed in a booklet. Each page contained 10 items, and each item was followed by a scale ranging from totally agree, agree very much, tend to agree, neutral or don't know, tend to disagree, disagree very much, to totally disagree. A seven-point scale was chosen in response to work by Finn (1972) who found the optimum number of points to be 7, and the labelling was chosen

1. Details of the procedures involved can be obtained from the author.

in response to work by Rotter (1972) who concluded that this was one of the few scale alternatives that represented an equidistant scale.

Subjects and Procedure

Subjects were 140 introductory social psychology students, two-thirds the way through their introductory course(s). There were 72 males and 68 females, average age 21.4 years, and they had previously participated as subjects in an average of 5.62 psychological research projects. Part-way through a scheduled lecture on attitude measurement they were asked to fill in the above described scale. Average time taken was about 40 minutes.

ANALYSIS

All computation was carried out using an IBM 1130 computer. A big difficulty encountered was the limitations of the available computing facilities and programs. The factor analysis package would take only 30 variables, while 60 variables were of interest. To overcome this difficulty, several runs were made on various subsets of the items, to give some idea of the factor structure to be expected.

Also, a complete intercorrelation matrix was built up and an attempt made at hand-picking factors. This was done independently by two people familiar with factor analysis. Neither person had any knowledge as to what the items were; they had been randomly ordered prior to administration so that even the experimenter wasn't familiar with their labels.

There was complete agreement between judges, each picking seven factors. In the series of analyses already referred to, as well as in a further series involving varimax rotations, the same seven-factor structure was repeatedly obtained and seen to be almost

invariant² (c.f. Kaizer, 1958). The items with the highest loadings on each factor are presented in Table I.

Factor I had high loadings on items referring to the usefulness and value of psychological research to both the individual and society, and was accordingly labelled, "Attitudes towards psychological research". Factor II had high loadings on items reflecting anxiety and apprehension about the research situation, and seemed to be indicative of evaluation apprehension. Items such as, "I would like my performance in a psychological experiment to disprove the experimenter's hypothesis", and "As a subject in psychological research I like to try and figure out what the experiment is all about so that I can help the experimenter", scored in opposite directions, indicating that the third factor represented both the good and the negativistic subject roles. The items loading highly on Factor IV all seemed to indicate the degree of willingness to be a subject in psychological research. Factor V contained items such as, "I try to the best of my ability to do what is asked of me in an experiment", and "In a psychological experiment the experimenter's instructions should always be followed to the letter", indicating that it possibly represented the faithful subject role. The sixth factor had high loadings on items concerning deception, and Factor VII loaded high on items referring to the relationship of science and scientific method with psychology. The seven factors obtained, then, were labelled as follows:

- I Attitudes towards psychological research.
- II Evaluation apprehension.
- III Good-negativistic subject roles.
- IV Volunteering.
- V Faithful subject role.
- VI Awareness (or suspicion) of deception.
- VII Attitudes towards science and scientific method.

2. Details of the analyses computed can be obtained from the author. (Some data from an analysis of a pool of 30 items making up five of the seven factors is reported here).

TABLE 1

The highest loading items on each factor

Factor	Loading	Items
I	64 ^a	1. Psychological research helps man realise himself by gaining understanding of himself and others around him.
	-56	4. Psychological research accomplishes nothing worthwhile, either for the individual or for society.
	-51	12. Psychological researchers have too much control over their subjects.
	53	20. The study of human behaviour is important in advancing society to higher levels.
	-67	30. Psychological research is a complete waste of time and money.
II	57	6. Answering questionnaires makes me feel anxious.
	71	8. I am afraid of being ridiculed by a researcher.
	79	17. I am afraid of revealing my weaknesses to a researcher.
	-49	31. I never worry about how I do on any psychological task that an experimenter might give me.
	78	42. I am afraid of revealing some inadequacy in a personality test.
III	56	3. I have a strong desire to always please the experimenter if I am a subject in psychological research.
	59	10. I would like my performance in a psychological experiment to contribute towards proving the experimenter's hypothesis true.
	49	25. As a subject in psychological research I like to try and figure out what the experiment is all about so that I can help the experimenter.
	64	33. I always try to please a research worker in psychology.
	64	38. I like my performance on a questionnaire to contribute towards proving a hypothesis.
IV	49	23. I welcome the opportunity that psychological experiments give me to learn something about myself.
	-55	29. My time is too valuable to take part in psychological experiments.
	-70	35. I would never volunteer to take part in a psychological experiment.
	78	44. I like volunteering to take part in psychological research.
V	61	5. I try to the best of my ability to do what is asked of me in an experiment.
	65	15. I always perform any task in a psychological experiment to the best of my ability.
	45	21. In a psychological experiment the experimenter's instructions should always be followed to the letter.
	45	36. I like to follow instructions properly so as not to ruin a researcher's work.
	48	37. In a psychological experiment I try to cooperate with the researcher as much as possible.
	69	43. I prefer to help rather than hinder a researcher.

^a Decimal points omitted.

TABLE 1 (Contd.)

The highest loading items on each factor

Factor	Loading	Items
VI*	-59	11. I don't think that experimenters ever deceive their subjects.
	-70	22. Psychological experimenters do not deliberately deceive their subjects.
	56	28. Researchers in psychology generally misinform their subjects.
	67	40. If I am asked to take part in a psychological experiment I fully expect to be deceived.
VII*	-60	2. Scientific method lacks imagination.
	-61	7. Scientific method forgets that people have feelings.
	-73	14. Science is dehumanizing.
	-60	34. Scientific method is too exact for psychology.

* Factor loadings for the first five factors are taken from one analysis, and the loadings for Factors VI and VII are taken from another. See footnote 2.

In order to be able to compare scores on all seven factors, factor 'scores' were derived for each factor. These were obtained, for each subject, by adding the responses to the items with high loadings for each factor, reversing scores where necessary to correct for direction. The correlations among the oblique primary factors for the first five factors could be computed and are set out in Table II. Similar data for the other two factors could not be obtained, but the intercorrelations between all seven 'derived factor scores' were computed and are set out in Table III. Note that the pattern of intercorrelations for the first five factors is similar in both tables, indicating that the 'derived factor scores' are measuring the same things as the factor analytically derived scores.

DISCUSSION

Two distinct subject role factors and five personal factors were obtained. The finding of only one factor for both the good and the negativistic subject roles is supported by the conceptual derivations discussed in Chapter One. They are both a reaction to demand characteristics, to cues present in the experiment, as well as being motivated by personal factors, and could be expected to be on opposite ends of the one continuum. Thus, the passive version of the faithful subject role could be at the 'neutral' point of the good-negativistic continuum, being considered as a 'non-reaction' to cues. The motivations leading to the adoption of the active version of the faithful subject role, on the other hand, appear to be rather similar to the motivation leading to the adoption of the good subject role. These points would indicate a separate factor for the faithful subject role. A distinct factor does appear to represent the faithful subject role, but it correlates 0.22 with the good-negativistic subject roles

TABLE II

Intercorrelations among the first five oblique factors

Factor	I	II	III	IV	V
I		-29* ^a	-07	29*	52*
II			39*	-06	-06
III				-07	29*
IV					32*
V					

^a Decimal points have been omitted.
 * $p < .001$.

TABLE III

Intercorrelations between the factor scores for the seven factors

Factor	I	II	III	IV	V	VI	VII
I		-11 ^a	-01	43**	46**	-08	31**
II			38**	-23*	-06	-08	-26*
III				-03	22*	-12	-26*
IV					36**	-11	26*
V						04	06
VI							01
VII							

^a Decimal points omitted
 ** $p < .001$
 * $p < .01$

which could reflect the similar motivations leading to their adoption, and the impossibility of separating the good and the faithful subject roles in some circumstances.

The attitudes towards psychological research and science held by a subject could be expected to influence the role adopted by that subject, but how? Highly favourable attitudes would seem to be necessary to motivate a subject to adopt the faithful subject role, and this is reflected in the significant correlations of both attitude factors (F.I and F.VII) with the faithful subject role factor (F.V). Favourable, as against unfavourable, attitudes could be expected to predominate in the adoption of the good as against the negativistic subject role, but this is not supported by the negative correlations between the attitude factors and Factor III. Attitudes would be expected to have a strong effect on the tendency to volunteer, and this is reflected in the correlations of Factors I and VII with volunteering (F.IV).

Evaluation apprehension seems to be the prime motivation to adopt either the good or the negativistic subject role, but which role is adopted seems to depend almost completely on what the apprehensive subject thinks will make him look good. The correlation of 0.38 between evaluation apprehension (F.II) and Factor III seems to support the contention that more apprehensive subjects will think that giving the experimenter the 'right' data will make them look good.

It would seem that it is the non-apprehensive subject who tends to adopt the faithful subject role, but the near zero correlation between evaluation apprehension (F.II) and the faithful subject role (F.V) would not support this, indicating instead that other factors, such as attitudes, are possibly stronger motivators than evaluation apprehension in the adoption of the faithful subject role. It is also possible that some apprehensive subjects will realise that what the

experimenter really wants is 'true' data, and try to please him by being faithful.

The results of Jackson and Pollard's (1966) study would indicate that only a small proportion of volunteers are likely to be motivated to adopt the faithful subject role. However, if the motivation to volunteer is "for the love of science", rather than course credit or payment, then it seems likely that more volunteers might adopt the faithful subject role (c.f. MacDonald, 1972). The correlation of 0.36 between volunteering³ (F.IV) and the faithful subject role (F.V) would support the latter contention. Perhaps subjects who are asked to volunteer for course credit may be more motivated to adopt the good or the negativistic subject roles than the faithful subject role.

It would seem reasonable to expect volunteers to hold more favourable attitudes than non-volunteers, and this is supported by the significant correlations of both attitude factors (F.I and VII) with volunteering (F.IV).

The negative correlation between evaluation apprehension (F.II) and volunteering (F.IV) may indicate that apprehensive subjects are less likely to volunteer than non-apprehensive ones.

Awareness of deception (F.VI) seems to be entirely unrelated, at least linearly, to any of the other factors, supporting the conclusion reached in Chapter One that prior deception is not systematically related to the role that a subject will be motivated to adopt.

The seven factors and their intercorrelations, form a pattern largely consistent with the conceptual derivations and empirical findings discussed in Chapter One. It now remains to validate each of the factors and their interrelationships, and to develop a preliminary set of scales to measure them.

3. Volunteer subjects at Waikato University do not receive course credit or payment for their services.

CHAPTER 3

VALIDATION

ITEM SELECTION

The correlations of all 60 items with all seven factor scores derived in Chapter Two were calculated, and the correlations of those items included in the factor scores corrected to the 'item - total without item' correlation (Nunnally, 1967, p262). Selection of a smaller set of items for the validation phase of the study was based on the item - factor score correlations. All those items (40) that correlated with the factor scores to an equal or greater degree than the items included in the factor scores were used in the final instrument. The items included in each new factor score are given in Table IV.

Four other items, though not satisfying the above criteria, correlated 0.37 or greater with one or more of the factor scores, and, in this respect, stood out from the remaining items as being worthy of further consideration. They were items 9, 16, 18 and 32, which were, accordingly, retained in the final instrument of 44 items (Appendix A). In order to satisfy the requirement of having as near as possible, an equal number of positively and negatively worded items contributing to each factor, the wording of a number of items was changed to give the reverse meaning (see Appendix A). Although there is support for such a procedure (e.g. Cloud and Vaughan, 1970), it may, however, change the factorial structure (c.f. Campbell, Siegman and Rees, 1967) and reliabilities, requiring, therefore, that the 'new' items be further substantiated.

VALIDATION HYPOTHESES

Two subject role dimensions and five personal factors have been isolated by factor analytic procedures. Each factor appears to satisfy the requirements of content validity, that is, on logical grounds the items that make up each factor would appear to be measuring the

TABLE IV

Items included in each factor score,
validation phase

Factor	I	II	III	IV	V	VI	VII
	1	3*	3	23	5	11	2
	4	6	10	29	15	22	7
	12	8	19*	35	21	28	12*
	20	13*	25	39*	36	40	14
	23*	17	33	44	37		27*
	26*	24*	38		41*		34
	30	31	41*		43		
		42					

* Items added by the criteria described in text.

construct defined by that factor. However, an important step in the development of any measure or set of measures is further construct validation from a re-administration of the items, along with other variables hypothesised to be related or unrelated, and, where possible, predictive validation by correlating with chosen criterion.

With regard to predictive validity, only the volunteer factor allows an easily obtainable criterion score in the time available. It can be asked, "does the score on this factor predict the act of volunteering or not volunteering?" For a measure of volunteering, all subjects were asked to indicate whether or not they would be willing to belong to a suggested "volunteer subject pool", described as a list of persons willing to be volunteers for any kind of departmental research. They were also asked to indicate how many hours of their time each week they would be willing to commit to being a volunteer subject. Thus, by scoring the number of hours volunteered, a score on a continuum of "likelihood of volunteering" was obtained to compare with the score on the volunteer factor. It was hypothesised that there would be a high positive correlation between these two measures (H.14).

The first step in construct validation is to check the item-total correlations for each factor score to ascertain whether or not the items within a score are all measuring the same construct, that is, the construct which it is assumed the factor score represents. This was done for each of the seven factors, and any items found to correlate non-significantly, discarded before further construct validation was attempted.

It is also necessary to compare the intercorrelation matrix of factor scores from a second sample with the intercorrelation matrix from the first sample. The correlation in each cell should not be significantly different between samples. Further, each factor score should be compared with a series of other variables, testing a set of

hypothesised relationships. As time was limited in this study a set of variables had to be chosen, which, together with the items, would take no more than one hour to administer to a group of subjects.

Variables

The variables chosen for use in construct validation were age, sex, high school interests, the number of psychology courses enrolled in, intended major subject, previous experience as subjects and feelings about experience as subjects, reactions to responding to the 44 items. The biographical and personal data, including the amount of previous research experience was simply asked for. Feelings about the previous research participated in were measured by the responses to five statements in a "Previous Research Experience" (PRE) form (Appendix C). Reactions to responding to the 44 item scale were measured by responses to eight statements in an "About This Scale" (ATS) form (Appendix B), and reactions to taking part in the complete project by responses to ten similar statements in a "Final Comments" (FC) form (Appendix D). (See the Method section and the Appendices for greater detail on the above forms). The Budner Scale of Intolerance of Ambiguity (Budner, 1962), a shortened version of the Rokeach Dogmatism Scale (Schulze, 1962), the Social Responsibility Scale of Berkowitz and Lutterman (1968), a short self-rating scale of anxiety (Acker and McReynolds, 1966), and the Marlow-Crowne Social Desirability Scale (Crowne and Marlow, 1960, 1964), were included as measures of psychological variables.

Factor I

It was expected that attitudes towards psychology (F.I) would be predicted by the number of psychology courses enrolled in, and the intended major. Those subjects intending to major in psychology are more likely to have favourable attitudes towards psychology (H.1). Of the previous research experience measures, it could be expected that attitudes toward psychological research would correlate highly

with being impressed by the research previously participated in (H.2). It was hypothesised that attitudes towards psychological research (F.I) would correlate with many of the statements in the "About This Scale" and "Final Comments" forms, particularly those concerning the satisfaction and enjoyment gained from taking part, the contribution the subject felt that he had made, the usefulness of the project and the use of his (the subjects') time, and the representativeness of his responses and his willingness to cooperate (H.3). Of the psychological variables, only social responsibility was expected to relate to attitudes towards psychological research. It seems reasonable to expect socially responsible citizens to hold favourable attitudes towards psychological research, as being beneficial to society (H.4).

Factor II

Young psychologists could be expected to be less apprehensive of evaluation in the research situation than other students. For this reason the number of psychology courses enrolled in and the intended major were hypothesised to correlate negatively with Factor II (H.5). The amount of psychological research that a subject has previously been a subject in is also a likely indicator of how apprehensive of evaluation he will be. It was, therefore, hypothesised that the more research a subject had previously taken part in the less likely that he would be apprehensive of evaluation (H.6).

Some subjects believe that the methods used by researchers in psychology should be emulated to a great extent. Presumably such a belief reflects a degree of conformity with the status quo, a fear of doing things differently. For this reason, it was hypothesised that an indication of the extent to which methods used by researchers in psychology should be emulated (statement 3 in the PRE form) would correlate with evaluation apprehension (H.7).

No relationship between evaluation apprehension and the

statements in the ATS and FC forms were hypothesised.

Evaluation apprehension is defined as the tendency to present oneself in the best possible light. A need for social approval is defined in a very similar way, and so it was expected that a measure of the need for social approval (the Marlow-Crowne Social Desirability Scale) would correlate with evaluation apprehension (H.8). Apprehensive subjects were also expected to be more anxious (H.9). People who are intolerant of ambiguity could be expected to want to show themselves in the best possible light, to show no inconsistencies in their personalities; in short, they might be apprehensive of evaluation. Dogmatism is sometimes thought of as a construct very similar to intolerance of ambiguity. It was, therefore, hypothesised that evaluation apprehension would correlate with both intolerance of ambiguity and dogmatism (H.10).

Factor III

The good-negativistic subject roles Factor (III) was not expected to relate to any of the personal data. It was hypothesised to correlate with the amount of previous research participated in (H.11), because presumably subjects with more research experience, and probably less evaluation apprehension, would be less likely to adopt the good subject role. It seems reasonable that those subjects who are motivated to adopt the good subject role, might gain some satisfaction from supplying the data which they thought was required. Accordingly, it was hypothesised that Factor III would correlate with the satisfaction statement in each of the ATS and FC forms (H.12).

The motivation to adopt the good subject role comes from a desire to please the experimenter which probably also involves a need to present a consistent picture. On the other hand, people who adopt the negativistic role would appear to be not worried by inconsistency. This leads to the hypothesis that Factor III will

correlate with both intolerance of ambiguity and dogmatism (H.13).

Factor IV

As well as the hypothesis involving predictive validity (H.14), the volunteering Factor IV could be expected to be related to many other variables. Studies reviewed by Rosenthal and Rosnow (1969) indicate that females are more likely to volunteer than males, especially when they are required to participate in rather standard and unspecified psychological experiments. However, MacDonald (1972) found that this difference did not appear when there was no external motivation, such as payment or course credit, to volunteer. As our volunteering condition was most like MacDonald's "love of science" condition, it was hypothesised that there would be no significant relationships between sex and Factor IV (H.15).

The number of psychology courses enrolled in, and the intended major, could both be expected to be indications of the tendency to volunteer for psychological research (H.16). Subjects who see considerable meaning in, and were impressed by, the research in which they have previously participated are more likely to volunteer for the research. It was, therefore, hypothesised that statements 1 and 4 of the PRE form would correlate with Factor IV (H.17). Volunteers, because they are somewhat committed to the research, could also be expected to react positively to taking part in the research. Accordingly, it was hypothesised that all the statements in the ATS and FC forms would correlate with the tendency to volunteer (H.18).

Volunteers have been found to be more tolerant of ambiguity than non-volunteers (MacDonald, 1972). The volunteering Factor IV was, therefore, hypothesised to correlate negatively with intolerance of ambiguity (H.19).

Wrightsmann (1966) reported that scores on the Social Responsibility Scale predicted volunteering, so it was hypothesised that SRS scores

would correlate with Factor IV (H.20). It seems reasonable to expect that more anxious subjects would be less likely to volunteer. That is, a negative correlation was hypothesised between Factor IV and anxiety (H.21).

If both Factor IV and the volunteer criterion measure are both pure measures of the tendency to volunteer, then as well as correlating highly with each other (H.14), their correlations with other variables should be comparable. This was hypothesised (H.22).

Factor V

No relationships of the faithful subject role (F.V) with any of the personal data or previous research experience measures were hypothesised.

Subjects motivated to adopt the faithful subject role could reasonably be expected to gain some satisfaction from doing so, and feel that they had made a useful contribution. Factor V was, therefore, hypothesised to correlate with statements 1, 4 and 5 of each of the ATS and FC forms (H.23). The motivation to adopt the faithful subject role seems to suggest a willingness to cooperate, and also that responses would be representative of true feelings. Accordingly, it was hypothesised that Factor V would correlate with each of the final two statements of the ATS and FC forms (H.24).

It could be expected that subjects who are motivated to adopt the faithful subject role would be more tolerant of ambiguity than other subjects. By adopting the faithful subject role they would, in many instances, be putting themselves in an ambiguous situation. It was, therefore, hypothesised that Factor V would correlate negatively with intolerance of ambiguity (H.25). It might also be reasonable to expect socially responsible people to more often adopt the faithful subject role than other subject roles, because giving data that is not altered by demand cues can be seen to be a responsible act. That is, it was

hypothesised that Factor V would correlate with the SRS score (H.26).

Factor VI

Students who are enrolled in a number of psychology courses, students who expect to major in psychology, and those students who have had more previous experience in psychological research would be expected to be more aware of the deceptions commonly practised in psychological research. These relationships were hypothesised (H.27).

The statement in the PRE form indicating a belief that experimenters never deceive their subjects could almost be regarded as a criterion measure of awareness of deception. It was, therefore, hypothesised that this statement would correlate highly and negatively with Factor VI (H.28).

It seems likely that subjects who are aware of the deceptions practised in psychological research might not be impressed by the research that they had previously participated in, while, on the other hand, other aware subjects might look upon the methods used as being the only alternatives available and therefore indicate a willingness to emulate them. It was, therefore, hypothesised that Factor VI would correlate negatively with statement 4 (impression) (H.29), and positively with statement 3 (would emulate methods) (H.30) of the PRE form.

Subjects who are aware of deception, while going along with the task, might gain less satisfaction from participating than those subjects who are unaware of the deceptions practised. This leads to a hypothesised relationship between satisfaction gained (Statement 1 in both the ATS and FC forms) and Factor VI (H.31).

Those subjects who are freely aware of the deceptions practised in psychological research would seem to be more tolerant of ambiguity than those subjects who are unaware of the deceptions practised. Accordingly, a negative correlation was hypothesised between intolerance of ambiguity and Factor VI (H.32).

Factor VII

High school interest, which was analysed simply as a measure of experience with science, was hypothesised to correlate with attitudes towards science, Factor VII (H.33). Attitudes towards science and scientific method could reasonably be expected to relate to statement 2 in the PRE form which relates to how scientific previous research was seen as being (H.34). Presumably, those subjects who were impressed by the experiments in which they took part would more likely have favourable attitudes towards science, as well as towards psychology. It was accordingly hypothesised that statement 4 of the PRE form would also correlate with Factor VII (H.35).

The amount of enjoyment experienced when taking part in this research project would seemingly be related to attitudes towards science and scientific method, as well as to psychology and psychological research. It was hypothesised that enjoyment experienced (statement 2 of both the ATS and FC forms) would correlate with Factor VII (H.36). No relationships with any of the psychological variables used were hypothesised for Factor VII.

METHOD

Materials

A booklet containing all the variables of interest was compiled. Attached to the front was an introductory note and instructions, followed by a page containing space for biographical information and information concerning the number of psychology courses enrolled in and the number of psychological experiments participated in previously. Subjects were also asked to indicate whether or not they had taken part in the previous administration of the scale, and then sign the page.

The 44 item scale, followed by the "About This Scale" form came next. The "About This Scale" form (Appendix B) contained eight statements

concerning how the subject felt about responding to the 44 items. Each statement was to be responded to on a seven-point 'totally positive' (7) to 'totally negative' (1) scale.

Following were: the Marlow-Crowne Social Desirability Scale (Crowne and Marlow, 1960, 1964), which consists of 33 statements to which the subject is to respond 'True' or 'False'; the Social Responsibility Scale (Berkowitz and Lutterman, 1968) defined as an orientation towards helping others even when there is nothing to be gained from them, measured by an eight statement scale of Likert format, each statement being responded to on a seven-point agree- disagree continuum to correspond with other scales in this study; the Short Dogmatism Scale (Schulze, 1962), which was designed to measure dogmatism as conceived by Rokeach (1960) with ten items from Rokeach's D-scale selected by Guttman's scalogram analysis⁴, to which the subjects indicate agreement or disagreement; the Intolerance of Ambiguity Scale (Budner, 1962), defined as measuring "the tendency to perceive (i.e. interpret) ambiguous situations as sources of threat", the sixteen items of which were randomly ordered, and subjects asked to respond to each on a seven-point 'Totally Agree' (7) to 'Totally Disagree' (1) scale; the Short Anxiety Scale of Acker and MacReynolds (1966), which consists of eight statements of varying degrees of anxiety, the subjects being asked to indicate the one that best describes how they felt; and the "Previous Research Experience" form, which contained eight statements (see Appendix C) concerning attitudes about the research that the subject had previously participated in. Subjects were asked to respond to each statement on a 'Totally Agree' (7) to 'Totally Disagree' (1) continuum.

Several measures of the tendency to volunteer were then given by each subject. They indicate whether or not they would be prepared to

4. It was found to be impossible to score responses to the Short Dogmatism Scale in the normal Guttman way, because they did not form the characteristic pattern. It was, therefore, decided to score the responses simply by adding the number of 'agree' responses. Higher scores indicate greater dogmatism.

belong to a suggested 'Volunteer subject pool', and if so, how much time, how often, they would be prepared to commit to being a volunteer subject. These indications were scored as listed below:

<u>Time</u>	<u>Score</u>	<u>How Often</u>	<u>Score</u>
$\frac{1}{4}$ hour	1	every week	4
$\frac{1}{2}$ hour	2	every fortnight	3
1 hour	3	every month	2
2 hours	4	every term	1
More	5		

A total volunteer score was obtained for each subject by adding together the two above scores. Thus, a continuum of the tendency to volunteer was obtained, with non-volunteers scoring zero and those who volunteer more time scoring higher. It must be noted once again that, at the University of Waikato, taking part in experiments does not count for course credit, nor do subjects receive payment.

The "Final Comments" form (Appendix D) contained ten statements similar to those in the "About This Scale" form, which were each responded to on a seven-point 'Totally positive' (7) to 'Totally Negative' (1) scale. On each of the "About this Scale", the "Previous Research Experience", and the "Final Comments" forms, a space and instructions were supplied for any comments and criticisms. Subjects were finally thanked for their participation.

Subjects and Procedures

Subjects were 96 general psychology students nearing the end of their introductory year. Fifty of these subjects had been included in the previous sample. There were 56 males and 40 females, their average age being 20.9 years. They had previously participated in an average of 12.66 psychological research projects, double the average for the previous sample. First year psychology students are used extensively as subjects, particularly during the second half of the year.

At a programmed 2 hour practical class for the general psychology introductory course held in the second to last week of the academic year, the whole class was asked to fill in the above described battery of forms. This took them just over 1 hour, after which they left the room.

Analysis

Again, all computation was carried out using an IBM 1130 computer. The factor scores were obtained and the item-total correlations of the contributing items with each factor score were calculated. Where necessary these were corrected to the 'item-total without item' correlation (see Nunnally, 1967, pp262). After discarding items with a low item-total correlation, that is, low validity, new factor scores were calculated. The correlations of all variables with each factor score, and of all factor scores with the other factor scores, were then calculated. The reliability of each factor score was calculated by Cronbach's alpha formula (Guilford, 1954, pp385), which gives exactly the same result as the KR.20 formula (see Magnusson, 1966).

All hypotheses were tested using the factor scores as calculated for the complete sample. The sample was also divided into two groups, those who had completed the scale previously (n=50) and those who had not (n=46). The factor scores, and scores on all other variables were computed for the two groups, and their intercorrelations calculated just as for the complete sample. Any differences between the groups are discussed in the results.

Of those subjects who responded to the earlier version of the scale, it was possible to match up data for only 31. Test-retest reliabilities of the factor scores and the 44 items were calculated for this sample.

RESULTS AND DISCUSSION

Factor Scores

The item - total correlations of all the items making up each factor score are presented in Table V. Asterisked items were removed because their correlations with the total score did not reach significance, and all further comparisons were made on the altered factor scores.

The corresponding item - total correlations for the new factor scores with insignificant items removed are presented in Table VI, as are the KR reliabilities of the factor scores. Where invalid items have been removed the reliability of the factor score has improved in all cases, although to a significant degree in only one case.

Test-retest reliabilities for each factor score and the items making up each score are given in Table VII. Most of the reliabilities are acceptable. The reliability of Factors IV and V are dramatically increased (to the .70's) if the two unreliable items are removed in each case. No doubt, further reliability studies need to be done, yet it may not be necessary for scores to be highly reliable over time because, as will be discussed later, some changes are to be expected.

Differences Between Groups

The major difference between those subjects who had completed the scale previously (the 'before' group) and those who had not (the 'never' group) concerned the amount of research they had previously participated in as subjects, and the number of psychology courses they were enrolled in. This data is set out in Table VIII(a). It can be seen that the difference in previous research experience arises largely because of the large number of questionnaires that the 'before' group has responded to. This reflects one difference between the introductory social psychology course and the introductory general psychology course. In sum, then, the two groups differ in several ways: the quality of previous instruction in psychology (social or general), the amount of instruction received in

TABLE V

Item-total correlations of the hypothesised items for each factor score

		I	II		III		IV		V		VI		VIII	
Item			Item		Item		Item		Item		Item		Item	
1	48 ^a	(32) ^b	3	57 (40)	3	66 (47)								
4	70	(50)	6	67 (52)	10	20 (0)*	23	62 ^c	5	52 (38)	11	74 ^c	2	52 (25)
12	25	(0)*	8	69 (52)	19	39 (14)*	29	60	15	58 (37)	22	78	7	55 (31)
20	49	(22)	13	50 (31)	25	58 (38)	35	75	21	55 (31)	28	58	12	35 (07)*
23	52	(29)	17	70 (55)	33	61 (40)	39	57	36	27 (-13)*40	78		14	53 (21)
26	60	(36)	24	32 (12)*	38	52 (30)	44	67	37	56 (33)			27	49 (24)
30	69	(53)	31	57 (39)	41	62 (45)			41	57 (35)			34	57 (27)
			42	49 (31)					43	66 (48)				

^aDecimal points are omitted

^bCorrected correlations are in brackets

^cCorrected correlations were not calculated for factors IV & VI because it was obvious that all values were well beyond significance

*Items subsequently omitted from the factor score

TABLE VI

New Item-total correlations^a for each factor score,
and KR reliabilities for each factor score

Factor	I	II	III	IV	V	VI	VII
	1. 50 ^b	3. 59	3. 73	23. 62	5. 54	11. 74	2. 60
	4. 75	6. 68	25. 72	29. 60	15. 53	22. 78	7. 54
	20. 51	8. 71	33. 68	35. 75	21. 66	28. 58	14. 62
	23. 62	13. 54	38. 61	39. 57	37. 68	40. 78	27. 52
	26. 60	17. 75	41. 58	44. 67	41. 64		34. 58
	30. 75	31. 59			43. 79		
		42. 57					
<hr/>							
Reliabilities:							
Original Items	60	70	66	64	54	67	53
These Items	67	75	69	64	72	67	55

^a Uncorrected correlations.

^b Decimal points are omitted.

* A significant increase in reliability (at $p < .001$).

TABLE VII

Test-Retest Reliabilities

Factor	I	II	III	IV	V	VI	VII
	Item r	Item r	Item r	Item r	Item r	Item r	Item r
	1. 47 ^a	3. 59	3. 59	23. 09	5. 46	11. 44	2. 21
	4. 13	6. 58	25. 16	29. 22	15. 51	22. 27	7. 18
	20. 12	8. 60	33. 62	35. 50	21. 28	28. 16	14. 67
	23. 09	13. 04	38. 60	39. 56	37. 10	40. 63	27. 04
	26. 28	17. 21	41. -06	44. 67	41. 06		34. 74
	30. 0	31. 42			43. 28		
	42. 43						
Factor Reliability	42	43	70	25	28	64	74

^a Decimal points omitted.

TABLE VIII(a)

Experience in Psychology for two groups

Type	'Before' group (n=50)	'Never' group (n=46)	t
Number of psychology courses enrolled in.	2.66	1.78	4.81***
Number of experiments participated in.	6.84	5.09	n.s.
Number of questionnaires responded to.	9.12	3.93	2.27*
Total amount of previous psychological research.	16.00	9.02	2.06*

*** $p < .001$

* $p < .05$

psychology, the amount of psychological research experienced, and whether or not they previously completed the scale. These differences may make it difficult to attribute any experimental differences to any one cause.

There were very few differences in mean scores on the experimental variables (see Table VIII(b)). The 'never' group gained more satisfaction from the task as shown by the ATS 1. and FC 1. scores. Perhaps the 'before' group were bored or annoyed at having to complete the scale a second time. The 'never' group were more intolerant of ambiguity. The 'before' group were more aware of deception as reflected by scores on Factor VI and PRE. 5., and this seems reasonable in view of their greater experience as well as of their having completed the scale previously. Also reasonable, is the lower evaluation apprehension (Factor II) experienced by the 'before' group. Despite differences between the two groups on some of the factor scores, these had little effect on the intercorrelations between variables which make up the major part of this study. Such differences will not be discussed here, but as they affect the other results.

Relationships Between Factors

The intercorrelations of the factor scores with each other are presented in Table IX. This correlation matrix forms a very similar pattern to the one obtained from the first sample (Table III). Of those values that are significantly different from the corresponding values in Table III, only three involve a change in the previously established pattern.

Attitudes towards psychological research (F.I) shows a positive increase in its correlation with the good-negativistic subject roles (F.III). This is now more in keeping with original expectations, indicating that, regardless of evaluation apprehension, subjects with more favourable attitudes will more likely adopt the good subject role, and those with unfavourable attitudes the negativistic subject role.

TABLE VIII(b)

Experimental differences between the two groups

Variable	'Before' group	'Never' group	t
A.T.S.1. Satisfaction gained.	4.43	3.90	2.31
F.C.1. Satisfaction gained	4.57	4.06	2.14*
Intolerance of Ambiguity.	46.90	52.34	2.80*
PRE.5. Believed E never used deception.	4.20	4.96	3.36*
Factor VI Awareness of deception	18.66	15.57	7.80***
Factor V Faithfulness	31.82	33.72	4.00***
Factor II Evaluation Apprehension	23.52	26.26	5.20***

*** $p < .001$

* $p < .05$

TABLE IX

Intercorrelations of the seven factors

	I	II	III	IV	V	VI	VII
I		-03 ^a	25 ^{**+}	54 ^{***}	54 ^{***}	-08	37 ^{***}
II			57 ^{****+}	-22 [*]	04	-24 [*] (-31,-04) ^b	-01 ⁺
III				11	39 ^{****+}	-27 [*]	06 ⁺
IV					45 ^{***}	-05	20 [*]
V						-20 ^{*+} (01,-27)	14
VI							0

a Decimal points omitted.

b r 'Before' and r 'Never' respectively. These are significantly different.

*** Significant beyond .001

* Significant beyond .05

+ Significantly different from the corresponding value in Table III.

The correlation between evaluation apprehension (F.II) and the good-negativistic subject roles (F.III), while showing a significant increase, does not alter the pattern previously established.

Attitudes towards science and scientific method (F.VII) shows a change from a significant negative correlation to a near zero correlation with both the good-negativistic subject roles factor (F.III) and evaluation apprehension (F.II). With the increasing importance of Factor I with regard to Factor III, this might indicate that attitudes towards science become less important, and attitudes towards psychology more important, as subjects gain more experience with psychology and psychological research.

The increase in correlation between the good-negativistic subject roles (F.III) and the faithful subject role (F.V), while significant, does not alter the previously established pattern.

The correlation between the faithful subject role (F.V) and awareness of deception (F.VI) shows a significant change from zero to a significant negative correlation. This change is due entirely to the 'never' group, and might indicate that, for this sample, at this particular stage of their career, awareness of deception decreases the likelihood of adopting the faithful subject role, which makes psychological sense when it is considered that a suspicious subject, since he doesn't believe the experimenter, is likely to make an effort to figure out the purpose of an experiment, and therefore, he will operate in the situation in terms of his own hypothesis of what is involved.

In the relationship between awareness of deception (F.VI) and evaluation apprehension (F.II), the 'never' group produces a relationship equivalent to that found in the first sample, while the 'before' group changes from no relationship to a significant negative correlation. This seems to indicate that awareness of deception might be changing as a result of completing the scale, and that this increased awareness

reduces evaluation apprehension.

Overall, then, the pattern formed by the intercorrelations between factors remains little changed from that previously established, and what changes there are can be easily rationalized.

Factor I

The hypothesised relationships, as well as others which are significant, for Factor I are shown in Table X.

Apparently, such variables as the number of psychology courses enrolled in or the intending major do not relate to attitudes towards psychology and psychological research, at least not in the early stages of a student's career. However, whether or not these students were impressed by previous research in which they had participated did relate to attitudes towards psychological research ($r = 0.44$).

From the "About This Scale" and "Final Comments" forms, satisfaction gained, correlated significantly with attitudes towards psychological research (F.I) only for the 'never' group. This finding seems to be related to the fact that the 'never' group gained significantly more satisfaction than the 'before' group. Subjects (from both groups) with more favourable attitudes towards psychological research experienced more enjoyment while participating, felt that they had made a more useful contribution, felt that their time was more usefully employed, and felt that the results of the research would be more useful, than did those subjects with unfavourable attitudes, all as hypothesised (H.3).

Representativeness of responses and willingness to cooperate both correlated with attitudes towards psychological research (F.I), for the whole sample, as far as the complete project was concerned, but only for the 'never' group, as far as the scale was concerned. Apparently the novelty of the second part of the questionnaire increased the relationship between attitudes and feelings for the 'before' group.

Social Responsibility correlated with Factor I as hypothesised (H.4).

TABLE X

All hypothesised and/or significant correlations
with Factor I

Variable	Correlation	Hypothesis ^a	Status ^b
Number of psychology courses enrolled in.	0 ^d	1	-
Intended major	13 ^c	1	-
PRE 3. Impressed by previous research	44***	2	+
ATS 1. Satisfaction gained	19(02,40) ^e	3	-(-,+) ^f
FC 1. Satisfaction gained	18(02,40)	3	-(-,+)
ATS 2. Enjoyment experienced	25*	3	+
FC 2. Enjoyment experienced	20*	3	+
ATS 3. Contribution made by subject	26*	3	+
FC 3. Contribution made by subject	14	3	-
ATS 4. Usefulness of scale	32**	3	+
FC 4. Usefulness of project	29**	3	+
ATS 5. Use of subject's time	28**(09,52)	3	+(-,+)
FC 5. Use of subject's time	23*(11,41)	3	+(-,+)
ATS 7. Representativeness of responses	15(0,34)	3	-(-,+)
FC 9. Representativeness of responses	25*	3	+
ATS 8. Willingness to cooperate	16(-5,36)	3	-(-,+)
FC 10. Willingness to cooperate	29*	3	+
Intolerance of Ambiguity	-21*	0	
Social Responsibility	24*	4	+
Anxiety	-30*	0	

- a 0 indicates that no relationship with this variable was hypothesised.
b + signifies hypothesis was supported.
- signifies hypothesis was not supported.
c Decimal points omitted.
d All correlations of magnitude less than .10 are entered as zero.
e Correlations for 'never' and 'before' groups respectively.
f These are significantly different.
Status for 'never' and 'before' groups respectively.
*** Significant beyond .001
** Significant beyond .01
* Significant beyond .05

Two other psychological variables, intolerance of ambiguity, and anxiety, were found to correlate significantly and negatively with Factor I. These results would seem to indicate that the more intolerant and the more anxious individual is likely to have less favourable attitudes towards psychology. Maybe the relationship for intolerance of ambiguity relates to the subject matter in the introductory courses, which might leave a student feeling that there are not many final answers, that is, it might leave him with a feeling of ambiguity, which he may not be able to tolerate, so leading to derogation of the subject. Similarly, the finding that more anxious subjects are more likely to have unfavourable attitudes towards psychology might reflect the time of year (only two weeks prior to final examinations), and that feelings of anxiety might lead to derogating the source of that anxiety, namely course requirements.

Factor II

Table XI presents the data of interest for Factor II.

The number of psychology courses enrolled in at the introductory stage would not appear to predict evaluation apprehension, but intending major (whether or not it is psychology) and the amount of psychological research previously experienced do so. Those subjects who thought that the methods they had observed being used in psychological research were worth emulating, were found to be more apprehensive of evaluation, as hypothesised (H.7).

The hypothesised relationships of social desirability and anxiety (H.8 and 9) with evaluation apprehension were not supported. Perhaps the lack of a significant relationship with social desirability is evidence that Factor II does not measure or is not contaminated by social desirability, or that evaluation apprehension is indeed something different from need for approval. Intolerance of ambiguity and dogmatism both correlated significantly with evaluation apprehension as expected (H.10).

TABLE XI

All hypothesised and/or significant correlations
with Factor II

Variable	Correlation	Hypothesis ^a	Status ^b
Number of psychology courses enrolled in	-13 ^c	5	-
Intended major	-20*	5	+
High school interest	22*	0	
Amount of previous psychological research	-23*	6	+
PRE 3. Would emulate methods used	31**	7	+
ATS 5. Use of subject's time	-24*	0	
FC 5. Use of subject's time	-16	0	
ATS 8. Willingness to cooperate	-23*	0	
FC 10. Willingness to cooperate	0 ^d	0	
Soc'al Desirability	-12	8	-
Anxiety	14	9	-
Intolerance of Ambiguity	38***	10	+
Dogmatism	28**	10	+

- ^a 0 indicates that no relationship with this variable was hypothesised.
^b + signifies hypothesis was supported.
 + signifies hypothesis was not supported.
^c Decimal points omitted.
^d All correlations of magnitude less than .10 are entered as zero.
 *** Significant beyond .001.
 ** Significant beyond .01.
 * Significant beyond .05.

A number of other variables were found to correlate significantly with Factor II. High school interest, analysed simply as experience with science, correlated positively with evaluation apprehension, indicating that maybe students with a strong science background are more likely to be apprehensive of evaluation than students with a more liberal education. The negative correlation, between evaluation apprehension and use of the subject's time, might imply that such subjects realise that, in adopting either the good or the negativistic subject role, they will not be giving 'true' data, and, therefore, may as well have not taken part. The negative correlation, between willingness to cooperate in responding to the scale and evaluation apprehension, implies that apprehensive subjects are less willing (or unable) to cooperate, but the disappearance of a significant correlation when the whole project is considered cannot be easily explained.

Factor III

See Table XII for results regarding this factor.

Amount of previous research experience correlates with Factor III, possibly indicating that subjects with more experience are less likely to adopt the good subject role, which fits in with them being less likely to be apprehensive of evaluation. However, it could also indicate that such subjects are more likely to adopt the negativistic subject role. The satisfaction gained from responding to the 44 items did not correlate significantly with Factor III, but the effect was in the required direction. However, satisfaction gained from completing the complete project did correlate significantly with Factor III, thus, partially supporting Hypothesis 12.

Both intolerance of ambiguity and dogmatism correlated significantly with Factor III as hypothesised (H.13). These findings would seem to indicate that those subjects who adopt the good subject role are less tolerant of ambiguity and are more closed minded than those who adopt

TABLE XII

All hypothesised correlations with Factor III

Variable	Correlation	Hypothesis	Status ^a
Amount of previous psychological research	-21* ^b	11	+
ATS 1. Satisfaction gained	12	12	-
FC 1. Satisfaction gained	21*	12	+
Intolerance of Ambiguity	21*	13	+
Dogmatism	28**	13	+

- a + signifies hypothesis was supported.
 - signifies hypothesis was not supported.
- b Decimal points omitted.
- ** Significant beyond .01.
- * Significant beyond .05.

the negativistic subject role.

Factor IV

All the hypothesised and other significant relationships with Factor IV, as well as with the criterion measure of volunteering, are shown in Table XIII.

The high correlation between the criterion measure of volunteering and Factor IV lends support to this factor being a valid measure of the tendency to be a volunteer.

Contrary to some published findings, sex was entirely unrelated to the tendency to be a volunteer, thus lending support to MacDonald (1972), as well as our Hypothesis 15. As with Factor I, the number of psychology courses enrolled in at the introductory level does not predict the tendency to volunteer, but the intending major does. Seeing meaning in, and being impressed by, the research previously experienced also predict volunteering.

The expected relationship between Factor IV and all the ATS and FC measures (H.18) was fairly well supported. The notable exception concerns representativeness of responses, seemingly indicating that just as many non-volunteer as volunteer subjects try to give representative responses, even though they may not be as willing to cooperate. The big change in the correlation of willingness to cooperate and volunteering, from the scale to the complete project, seems to suggest that maybe the complete project overestimated volunteers' tolerances for cooperation.

With regard to the usefulness of the project and the use of the experimenter's time, the hypothesised relationships with volunteering were supported only by the 'never' group. This might indicate that subjects with greater research experience might be more selective in what they volunteer for.

MacDonald's (1972) finding that volunteers are more tolerant of ambiguity was not supported by this study, though the relationship was in the required direction. Wrightsman's (1966) finding that volunteering

TABLE XIII

All hypothesised and/or significant relationships with
Factor IV and the volunteer criterion measure

Variable	Factor IV Correlation	Hypothesis ^a	Status ^b	Criterion Correlation
Volunteer criterion measure	51***	14	+	
Sex	0 ^d	15	+	
Number of psychology courses enrolled in	0	16	-	
Intending major	22*	16	+	
PRE 1. Seeing meaning in previous research	27**	17	+	
PRE 4. Impressed by previous research	35***	17	+	
ATS 1. Satisfaction gained	42***	18	+	24*
ATS 2. Enjoyment experienced	45***	18	+	25*
ATS 3. Contribution made by subject	34**	18	+	24*
ATS 4. Usefulness of scale	39**(55,24) ^e	18	+(+,-) ^f	15
ATS 5. Use of subject's time	55***	18	+	42***
ATS 6. Use of experimenter's time	30**(59,0)	18	+(+,-)	22*
ATS 7. Representativeness	18	18	-	15
ATS 8. Willingness to cooperate	48***	18	+	18
FC 1. Satisfaction gained	44***	18	+	30**
FC 2. Enjoyment experienced	43***	18	+	24*
FC 3. Contribution made by subject	30**	18	+	23*
FC 4. Usefulness of project	28**(46,10)	18	+(+,-)	10
FC 5. Use of subject's time	54***	18	+	30**
FC 6. Use of experimenter's time	24*(46,01)	18	+(+,-)	24*
FC 7. Feeling for the experimenter	27*	18	+	18
FC 8. Benefit of scale to future subjects	15	18	-	21*
FC 9. Representativeness	0	18	-	15
FC 10. Willingness to cooperate	13	18	-	27**
Intolerance of Ambiguity	-16	19	-	-16
Social Responsibility	11	20	-	11
Anxiety	-22*	21	+	0

- a 0 indicates that no relationship with this variable was hypothesised.
b + signifies hypothesis was supported.
- signifies hypothesis was not supported.
c Decimal points omitted.
d All correlations of magnitude less than .10 are entered as zero.
e Correlations for 'never' and 'before' groups respectively. These are significantly different.
f Status for 'never' and 'before' groups respectively
*** Significant beyond .001
** Significant beyond .01
* Significant beyond .05

could be predicted by SRS scores was not supported either. Anxiety correlated significantly with Factor IV, but not with the criterion measure of volunteering.

In Hypothesis 22 it was suggested that Factor IV should show similar relationships to other variables as the criterion measure of volunteering. In Table XIII, where some of these values are given, it is noticeable that the criterion measure correlates lower with most of the ATS and FC statements than does Factor IV. The criterion measure also correlates lower with the other factors than does Factor IV, as can be seen in Table XIV. Such results probably indicate that Factor IV may not be a pure measure of the tendency to volunteer, and that some of the variance of Factor IV might be common to other factors, particularly V and I.

Factor V

The hypothesised relationships, as well as others which are significant, for Factor V are presented in Table XV.

Hypothesis 23 was largely supported, though the correlations between satisfaction gained and Factor V did not reach significance. Hypothesis 24 was also largely supported, though a noticeable pattern is the decrease, in the correlation of representativeness of responses with Factor V, from the 44 item condition to the complete project condition, accompanied by a parallel increase in the correlation of willingness to cooperate and Factor V. Such a change seems to indicate that subjects felt differently about the whole project than what they initially did about the 44 items, and that faithful subjects, while possibly becoming more willing to cooperate, begin to feel that their responses might be less representative of their 'true' feelings.

It was hypothesised (H.25) that faithful subjects would be more tolerant of ambiguity, but while the relationship is in the required direction it does not reach significance. Again, it seems that attitudes

TABLE XIV

Correlations of Factor IV and the criterion measure
of volunteering with the other factors

Variable	Factor	I	II	III	V	VI	VII
Factor IV		54 ^a	-22	11	45	0 ^b	20
Criterion measure		23	-18	0	28	0	0

^a Decimal points are omitted.

^b All correlations of magnitude less than .10 are entered as zero.

TABLE XV

All hypothesised and/or significant correlations
with Factor V

Variable	Correlation	Hypothesis ^a	Status ^b
PRE 5. Believed experimenter's never deceived	33** ^c	0	
ATS 1. Satisfaction gained	19	23	-
FC 1. Satisfaction gained	16	23	-
ATS 4. Usefulness of scale	31**	23	+
FC 4. Usefulness of project	26**	23	+
ATS 5. Use of subject's time	41***	23	+
FC 5. Use of subject's time	33***	23	+
ATS 7. Representativeness of responses	22*	24	+
FC 9. Representativeness of responses	10	24	-
ATS 8. Willingness to cooperate	23*	24	+
FC 10. Willingness to cooperate	30**	24	+
Intolerance of ambiguity	-14	25	-
Social Responsibility	10	26	-

- ^a 0 indicates that no relationship with this variable was hypothesised.
^b + signifies hypothesis was supported.
 - signifies hypothesis was not supported.
^c Decimal points omitted.
 *** Significant beyond .001.
 ** Significant beyond .01.
 * Significant beyond .05.

and commitment are stronger motivations to adopt the faithful subject role than personal factors such as intolerance of ambiguity or evaluation apprehension. Similar reasoning might be applied to the lack of support for Hypothesis 26 which expected a relationship between social responsibility and the faithful subject role.

Factor VI

Results concerning Factor VI are shown in Table XVI.

The number of psychology courses enrolled in, the intending major, and the amount of previous research experience, all seem to be good predictors of awareness of deception, as expected (H.27). The high correlation (-.51) between Factor VI and whether or not subjects believed that they had been deceived in previous research lends some predictive validity to this factor.

The hypothesis (H.29), that subjects who were more aware of deception would be less impressed by the research in which they had previously participated, was supported only by the 'never' group. It seems that the 'before' group, with their greater experience, recognise inevitability of deceptive methods and have come to accept them.

Subjects, who were more aware of deception, gained less satisfaction from taking part in the research, would be more likely to use the same (deceptive) methods in any research of their own, and were more tolerant of ambiguity, as hypothesised (H.31 and 30 and 32 respectively).

Seeing meaning in previous research (PRE) was unexpectedly found to relate to awareness of deception, significantly, but in opposite directions, for the two groups of subjects. That is, for the 'never' group, seeing meaning in previous research correlated negatively with Factor VI, while for the 'before' group the correlation was positive. This seems to indicate that when a subject initially becomes aware of deception a negative attitude is induced, but later, when awareness is accompanied by a realisation of the possible inevitability of deception, attitudes towards

TABLE XVI

All hypothesised and/or significant correlations
with Factor VI

Variable	Correlation	Hypothesis ^a	Status ^b
Number of psychology courses enrolled in	29** ^c	27	+
Intending major	20*	27	+
Amount of previous psychological research experience	27**	27	+
PRE 5. Believed experimenter's never deceived	-51***	28	+
PRE 4. Impressed by previous research	-14(-41,11) ^e	29	-(+,-) ^f
PRE 3. Would emulate methods	23*	30	+
PRE 1. Seeing meaning in previous research	-05(-42,32)	0	
ATS 1. Satisfaction gained	-23*	31	+
FC 1. Satisfaction gained	-23*	31	+
ATS 4. Usefulness of scale	-18(-41,03)	0	
Intolerance of ambiguity	-26*	32	+

- ^a 0 indicates that no relationship with this variable was hypothesised.
^b + signifies hypothesis was supported.
 - signifies hypothesis was not supported.
^c Decimal points omitted.
^e Correlations for 'never' and 'before' groups respectively.
^f These are significantly different.
 Status for 'never' and 'before' groups respectively.
 *** Significant beyond .001.
 ** Significant beyond .01.
 * Significant beyond .05.

psychological research become positive again. That is, a curvilinear relationship is suggested. Similar reasoning can easily be applied to the negative correlation between awareness of deception and a rating of the usefulness of the scale for the 'never' group, but a nonsignificant correlation for the 'before' group.

Factor VII

The hypothesised relationships, as well as some other significant ones, for Factor VII are shown in Table XVII.

Experience with science in high school, being impressed by previously experienced research and seeing it as being scientific, and enjoyment gained while responding to the questionnaire, all correlated significantly with attitudes towards science and scientific method.

Three unexpected relationships regarding Factor VII were found. It was found to be related to age, the only explanation for which seems to be, that some of the older students might be more settled in their values, and recognise the value of science and the scientific method to the advancement of knowledge. Anxiety correlated significantly and negatively with attitudes towards science and scientific method, just as it did with attitudes towards psychology and psychological research. It can only be suggested that this is also a carry-over from the general anxiety experienced at that time of year (only two weeks prior to final examinations) and an apparent derogation of one possible source of that anxiety. Note that this relationship holds only for the 'never' group. One can only suggest that this might be due to the fact that the general psychology course was to be assessed by an external examination, while the social psychology course was internally assessed. Social desirability was also unexpectedly found to correlate significantly with Factor VII. Does this mean that it is socially desirable to hold favourable attitudes towards science and the scientific method?

TABLE XVII

All hypothesised and/or significant relationships
with Factor VII

Variable	Correlation	Hypothesis ^a	Status ^b
High school interest	22* ^c	33	+
Age	24*	0	
PRE 2. How scientific previous research was seen to be	25*	34	+
PRE 4. Impressed by previous research	34**	35	+
ATS 2. Enjoyment experienced	25*	36	+
FC 2. Enjoyment experienced	24*	36	+
Anxiety	-23*(32,-16) ^e	0	
Social Desirability	24*	0	

- ^a 0 indicates that no relationship with this variable was hypothesised.
^b + signifies hypothesis was supported.
 - signifies hypothesis was not supported.
^c Decimal points omitted.
^e Correlations for 'never' and 'before' groups respectively.
 These are significantly different.
- *** Significant beyond .001.
 ** Significant beyond .01.
 * Significant beyond .05.

CHAPTER 4

CONCLUSIONS

VALIDITY

A simple model of subject motivation and behaviour in psychological research has been set up and a set of scales derived, the validity of both the model and the scales having been tested.

Taking, first, the factor scales one by one, evidence pertaining to the two attitude factors, attitudes towards psychology and psychological research (F.I) and attitudes towards science and scientific method (F.VII), seems reasonably clear. They each have high content validity and reasonable reliability, and their hypothesised relationships with other variables were largely supported. Their correlations with anxiety and social desirability are unexpected though, and may mean that some subjects are responding dishonestly to some of the items in these factors, or that some of the items load heavily on social desirability. Perhaps the requirement of a signature motivated some subjects to try and please the researcher in this way.

The attitude factors (I and VII) correlate significantly with each other, but presumably there are some subjects who have favourable attitudes towards psychological research but unfavourable attitudes towards science and the scientific method, and vice versa. Such subjects might experience conflicting motivations in a psychological experiment, and how this affects their behaviour is yet to be answered. Presumably, how scientific a particular experiment appears to such a subject will mediate his behaviour to some extent, with, for example, those who have a high regard for scientific method reacting negatively (adopting the negativistic subject role) to an experimental situation which they regard as non-scientific.

Factor I appears to be a general factor, underlying most of the other factors. Attitudes towards psychology and psychological research could be expected to be related to, to mediate in some way, other subject behaviours, such as, for example, whether to adopt the good or the negativistic subject

role, whether or not to be a volunteer, and whether or not to adopt the faithful subject role.

The evaluation apprehension factor (Factor II) also seems to have high content validity and reliability. The hypothesised relationships with other variables were also largely supported. It was also found that amount of previous research experience correlated negatively with this factor. Another finding was that those subjects who completed the earlier version of the scale had lower scores on this factor (in the second administration) than those subjects who filled out the later version only ($r=-0.20$). Both these findings imply that increasing experience in psychological research is likely to reduce apprehension of evaluation.

The lack of a significant correlation between evaluation apprehension and social desirability, although against prior expectation, could indicate that subjects are giving honest responses to the items in this factor rather than socially desirable ones, and that, therefore, evaluation apprehension is a concept different from social desirability.

Factor IV (volunteering) seems to be a reasonably valid measure of the willingness to volunteer, but certain reservations have already been noted in the previous chapter. While this factor, and its measure, is probably the easiest to validate because of the reasonable ease of obtaining a behavioural measure, there may really be no need for such a scale because of this very same reason. One can, therefore, recommend that future effort be spent on improving the other factors and exploring their interrelationships. The usefulness, and even the correctness of a continuous rather than a dichotomous measure of volunteering could be questioned. It is felt, however, that a continuous measure of the willingness or tendency to volunteer may give a truer general picture than that obtained when a subject either is or is not a volunteer. It would seem that a continuous measure is probably most useful in the

development of a theoretical model, but a dichotomous measure gives a truer picture of a selected experiment.

Volunteering (F.IV) relates to the two attitude factors (I and VII) as one would expect. It also shows a correlation with evaluation apprehension (F.II), indicating that volunteers are not likely to be apprehensive, or that apprehensive people are not likely to volunteer.

With regard to the volunteering factor (F.IV), it must always be kept in mind that in New Zealand most psychological research subjects receive neither course credit nor payment for their services. For this reason, relationships of this factor to the other factors in the proposed model will be different for different samples.

Awareness, or suspicion, of deception seems to be validly measured by Factor VI. The content validity and the reliability appear to be adequate, and the high negative correlation with a belief that experimenters usually do not deceive their subjects is additional support. This factor is also related to the amount of experience in psychology and psychological research, with those having more experience being more aware of the deception that is commonly practised. An additional interesting finding was that those subjects who did the earlier version of the scale were more aware of deception (as measured in the second administration) than those who completed only the later version, probably as a result of responding to the items in the first administration.

This factor (F.VI) most likely represents awareness of deception, as suggested by Weber and Cook (1972), rather than suspicion per se. It also seems unrelated, at least linearly, to most of the other factors, which supports the conclusions reported in Chapter One, namely that prior deception is not systematically related to bias in experimental performance.

The faithful subject role factor (F.V.) has been a more difficult one to validate. The content validity of some of the items may be

questionable, with an apparently highly valid item (36) being removed in the validation phase of the study. For example, an item like, "I try to the best of my ability to do what is asked of me in an experiment", might indicate evaluation apprehension or the good subject role, rather than the faithful subject role. The reliability of the factor score, however, is very acceptable at 0.72, and most of the hypothesised relationships with other variables, for example, the "About This Scale" statements, were supported. The hypothesised relationship with social responsibility, however, was not supported, indicating that either faithfulness is a different kind of social responsibility to that measured, or that Factor V is not a good measure of the faithful subject role.

It is interesting to note the changes in the relationships of Factor V with the statements in the "About This Scale" and "Final Comments" forms. The correlations are all, with the exception of the willingness to cooperate statement, lower in the latter form. This finding has been discussed briefly in the previous chapter, and can only mean that the subjects felt different about the meaningfulness of the psychological variables than they did about the 44 item scale.

It is felt that the significant correlations of the faithful subject role (F.V) with attitudes towards psychology (F.I) and volunteering (F.IV) are acceptable in terms of the model of subject motivation so far conceptualised, in which faithful subjects are more likely to have favourable attitudes towards psychological research, and volunteers (who volunteer "for the sake of science") are more likely to be faithful subjects. On the other hand, the high correlations found between the faithful subject role (F.V) and the good-negativistic subject roles (F.III), although expected, could suggest that these two factors are, in fact, measuring a similar concept. However, the high correlation between the faithful subject role (F.V) and volunteering (F.IV), together

with the low correlation between the good-negativistic subject roles (F.III) and volunteering (F.IV), seem to support the contention that Factors V and III do, in fact, represent completely different concepts.

Factor III, the good-negativistic subject roles factor, has also been a difficult one to establish and validate. For this factor also, an item of apparently high content validity (10) was removed in the validation phase, but the scale reliability of 0.69 is acceptable. This factor showed few significant relationships with other variables which were easily interpretable. The factor appears to be inextricably tied to evaluation apprehension (F.II), and while this was expected to a certain degree, it may still be questionable whether or not the correlation between Factors II and III is not too high. It could easily be this high, however, if there were relatively few people in the sample motivated to adopt the negativistic subject role, because then most apprehensive subjects would adopt the good subject role, thus giving rise to the high correlation. From intuitive observation, the author would have guessed that his first sample contained a far greater proportion of negativistic subjects than his second sample, which would be supported by the significant change in the correlation between evaluation apprehension (F.II) and the good-negativistic subject role factor (F.III) from one sample to the next.

The relationship found between the good-negativistic subject roles (F.III) and attitudes towards psychological research (F.I) seems acceptable because, in some cases, favourable attitudes would be a prerequisite to adopting the good subject role, and unfavourable attitudes a prerequisite to adopting the negativistic subject role. The negative correlation between the good-negativistic subject roles (F.III) and awareness of deception (F.VI) could mean that some subjects adopt the good subject role only if they are unaware of deception. One point that must be raised about Factor III is whether it is really measuring the

tendency to adopt both the good and the negativistic subject roles, or only one of them. If the former is the case, then it is obvious support for a unidimensional construct, but if the latter is the case, the question arises as to what happened to the negativistic subject role. At this stage the relationships established with Factor III, and the content of the items, very strongly suggest that both the subject roles are represented by the one factor as hypothesised. This will need further investigation before being accepted at face value though, and one point to be considered is the meaning of a neutral score - does it represent the passive version of the faithful subject role?

Limitations and Usefulness

"The most defensible reason a psychologist can have for making a factor analysis is to aim toward the clarification of useful concepts in a domain where adequate concepts are now lacking" (Guilford, 1954, pp522). This is how factor analysis was used in the first phase of this study. It is usual to expect, though, that concepts clarified by a factor analytic study should be replicable. Analyses of the data from the second administration of the items developed in this study seem to indicate that Factors II, IV, VI and VII are reasonably easily re-obtained, that Factor I is again a general factor, and that the two subject role factors (F.III and V) are not so easy to replicate. By some, such results would be regarded as evidence against the original structure, but it must be remembered that the second sample had experienced twice as much research as the first sample. It is suggested that the interrelationships between the postulated factors will change with increasing experience. It has been shown in this study that Factors VI (awareness of deception), II (evaluation apprehension), and possibly III (the good-negativistic subject roles), correlate with the amount of previous research experience. It was also noted that those subjects who responded to the items twice were more aware of deception, less likely to be faithful (as scored on

Factor V), and less likely to be apprehensive, in the second phase, than those who saw the items only once. Such changes must induce changes in the relationships between factors, and it is concluded that the amount of previous research experience is an important variable to be considered in this regard.

The above points lead to the recommendation that this scale needs much more extensive testing before its validity and, in particular, its reliability, are fully established. A program might involve testing introductory psychology students within their first few weeks and again half-way through the year and once again at the end of the year. This would enable checks to be made on reliability, as well as a study of the changes that subjects go through as they acquire greater research experience.

The observed changes from one study to the other also raises questions about the effects of the items on the subjects. What are the demand characteristics of this scale? This author is of the view that the demands made by this scale will not be greatly different from those made in an experimental situation, and that, therefore, the responses to the scale should reflect the likely behaviours in the experimental situation. As long as the conditions under which the subject is working remain constant for the filling in of the scale and for the experiment, there is no reason not to accept the above conclusion. For this reason, it is suggested that the scale be presented to the subject immediately before he undertakes the main phase of a study, and used in this way, it is felt that the scale, even in its present form, has considerable research value. It will enable an experimenter to determine whether or not his sample varies widely on any of the seven factors, and, if so, what effects he must take particular efforts to control. A suggested scale suitable for such exploratory work would include those items finally retained for each factor as reported in Table VI.

It must be realised, of course, that everything discussed in this study will be confounded, to quite a degree, by situational variables, and that such variables will eventually have to be considered in interaction with the factors discussed here. Situational variables might, for example, have a marked effect on the degree of evaluation apprehension felt by a subject, which, in turn, will effect our predictions as to which subject role he will adopt. Other situational factors, such as the subjects attitudes towards the experimenter, or the emotional state of the subject on the day of the experiment must, of course, eventually be considered. Still other variables, such as previous research experience, the conditions under which volunteers are called for, and whether or not subjects have to identify themselves, have already been touched upon.

It may be concluded that once the simpler relationships that have been the concern of this paper have been established, then more complex hypotheses, involving the interaction of situational variables and the factors of this study, can be studied. Meanwhile, a suggested short-term measure for trying to eliminate the effects of such variables is to try and keep the conditions under which the scale is administered the same as those under which the experiment proper is to be done.

Suggestions for future research

It can be seen that the relationships between the predicted factors appear to be rather more complex than the simple linear ones discussed so far. If the personal factors obtained are to be useful in predicting the subject role that a particular individual would prefer to adopt, it is obvious that some interactive and multidimensional relationships will have to be considered.

Although the hardest role to test, evidence reported in the literature to date leads to the view that the faithful subject role might be, nevertheless, the easiest to predict. It would seem plausible that a subject who adopts the faithful subject role would be low in evaluation

apprehension, would not be very suspicious (there is some evidence against this point though), would have favourable attitudes towards science and psychological research, and would very likely be a volunteer. That is, a profile showing these characteristics might predict the adoption of the faithful subject role. Scores by graduates and staff doing research in psychology might provide such a profile for the "faithful" subject.

The good and the negativistic subject roles may not be quite so easy to discriminate, especially as evaluation apprehension seems to be such a strong motivating force. It would appear that a subject who adopts either of these roles experiences high evaluation apprehension and is probably also suspicious. However, the good subject will more likely have a favourable attitude towards psychology, and be a volunteer, while the negativistic subject will more likely have an unfavourable attitude towards psychology and be a non-volunteer.

With respect to the above relationships the intercorrelations between factors already obtained can give some insight into these relationships, at least on the linear level. The good-negativistic subject roles (F.III) appear to be predicted by a high degree of evaluation apprehension (F.II), attitudes towards psychology (F.I), and the level of awareness of deception (F.VI). The faithful subject role (F.V), on the other hand, appears to be predicted largely by attitudes towards psychology (F.I) and the tendency to volunteer ("for the love of science") (F.IV).

Future work should involve the use of multiple regression, discriminant analysis, cluster analysis, and profile analysis techniques to predict the subject role adopted by a subject, in an effort to clarify the interrelationships between factors. Curvilinear relationships ought also to be considered; in fact, they might provide the richest source of understanding. One possibility, for example, is that subjects who are either very aware or totally unaware of deception may adopt the faithful subject role, while those subjects who are just becoming aware of how much deception is really

practised in psychological research might be tempted to adopt the negativistic subject role. This could explain, for instance, the correlations of awareness of deception (F.VI) with the subject role factors (III and V) being non-significant in the first phase of the study, but significant in the second phase, as well as apparently inconsistent findings reported in the literature (see Chapter One). Another possibility is that subjects who are only mildly apprehensive of evaluation might more often adopt the negativistic subject role, while those subjects who are extremely and overwhelmingly apprehensive might always adopt the good subject role so as to be evaluated good by the experimenter. A complicating point in this area is the possibility of some apprehensive subjects adopting the active version of the faithful subject role, which will also result in their being favourably evaluated by the experimenter.

Further work should also involve attempts to clarify the relationship between the two versions of the faithful subject role. It also needs to be clarified whether or not the 'neutral' point of the good-negativistic subject role factor (Factor III) represents the passive version of the faithful subject role, and if it does, how does it relate to the active version as measured by Factor V. It could also be suggested that attempts be made to derive separate scales for the good and the negativistic subject roles, for then hypotheses involving them need not be so complex. However, if they are truly unidimensional, which it appears they are, then it will be impossible, and, indeed, undesirable, to measure them separately.

Further suggestions involve the use of experimental paradigms to validate the factors against the behaviours of subjects in experimental situations. There should also be an attempt to use methods such as the multitrait-multimethod technique (Campbell and Fiske, 1959) in an effort to further validate the factors and their interrelationships.

CONCLUSION

A set of scales has been developed to measure subject motivation and behaviour in psychological experiments. Each factor has been shown to be reasonably valid and reliable, relating to other variables in expected ways. The factors should now be useful in predicting behaviour in particular experimental situations, though much more research into their predictive usefulness, validity, and reliability is required.

APPENDIX A

PSYCHOLOGICAL RESEARCH QUESTIONNAIRE

Up till now Psychologists have never been very concerned about how their subjects feel about taking part in Psychological Research. If Psychologists knew more about how their subjects felt, then they might change their methods somewhat.

To try and formulate a clearer picture, this questionnaire has been designed to find out how you feel about Psychological Research. Indicate your level of agreement or disagreement with each of the statements on the following pages. Do this by circling the appropriate response from the alternatives given. Be sure to respond to every statement. Remember, the right answer is the answer that is right for you, that expresses how you feel.

* Asterisked statements are those for which the wording has been reversed.

1. Psychological research helps man realise himself by gaining understanding of himself and others around him.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
- *2. Scientific method is imaginative.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
3. I have a strong desire to always please the experimenter if I am a subject in psychological research.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
4. Psychological research accomplishes nothing worthwhile, either for the individual or for society.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
5. I try to the best of my ability to do what is asked of me in an experiment.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
6. Answering questionnaires makes me feel anxious.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
- *7. Scientific method takes account of peoples feelings.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
8. I am afraid of being ridiculed by a researcher.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
9. I like the novelty of answering a questionnaire.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
- *10. I would like my performance in a psychological experiment to disprove the experimenter's hypothesis.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
11. I dont think that experimenters ever deceive their subjects.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree
12. Psychological researchers dont have enough control over their subjects.
Totally Agree Tend to Neutral or Tend to Disagree Totally
agree very much agree dont know disagree very much disagree

13. Where I have a choice I only fill out those questionnaires where I can give a good picture of myself.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
14. Science is dehumanizing.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
15. I always perform any task in a psychological experiment to the best of my ability.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
- *16. I know that any information I reveal to an experimenter will be confidential.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
17. I am afraid of revealing my weaknesses to a researcher.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
18. It is irritating to rate all these statements.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
- *19. I dont attribute much meaning to my performance on psychological tests.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
20. The study of human behavior is important in advancing society to higher levels.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
21. In a psychological experiment the experimenter's instructions should always be followed to the letter.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
22. Experimenters do not deliberately deceive their subjects.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
23. I welcome the opportunity that psychological experiments give me to learn something about myself.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|

- *24. I am not afraid of some of my values being undermined by answering a questionnaire.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
25. As a subject in psychological research I like to try and figure out what the experiment is all about so that I can help the experimenter.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
26. Researchers in psychology have always some good or legitimate reason for doing whatever they do and for whatever demands they make on a subject.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
27. Scientific method should be taught in all schools.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
28. Researchers in psychology generally misinform their subjects.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
29. My time is too valuable to take part in psychological experiments.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
30. Psychological research is a complete waste of time and money.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
31. I never worry about how I do on any psychological task that an experimenter might give me.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
32. Answering this questionnaire intrudes upon my privacy.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
33. I never try to please a research worker in psychology.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
34. Scientific method is too exact for psychology.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
35. I would never volunteer to take part in a psychological experiment.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|

36. I like to follow instructions properly so as not to ruin a researcher's work.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
- *37. In a psychological experiment I try to be as uncooperative as possible.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
38. I like my performance on a questionnaire to contribute towards proving a hypothesis.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
39. I am enjoying answering this questionnaire.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
40. If I am asked to take part in a psychological experiment I fully expect to be deceived.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
- *41. I dont have any desire to perform well in psychological experiments.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
- *42. I am not afraid of revealing my inadequacies in a personality test.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
- *43. I prefer to hinder rather than help a researcher.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
44. I like volunteering to take part in psychological research.
- | | | | | | | |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|
| Totally agree | Agree very much | Tend to agree | Neutral or dont know | Tend to disagree | Disagree very much | Totally disagree |
|---------------|-----------------|---------------|----------------------|------------------|--------------------|------------------|

APPENDIX B

ABOUT THIS SCALE

These items concern how you feel about the scale you have just completed.

On the 7 point scale

- 7 = Totally positive
- 6 = Strongly positive
- 5 = Tending to be positive
- 4 = Neutral
- 3 = Tending to be negative
- 2 = Strongly negative
- 1 = Totally negative,

rate your feelings with regard to this project on the following dimensions.

1. The degree of satisfaction it has given me to fill it in. _____
2. The amount of enjoyment I have gained by filling it in. _____
3. The contribution that I feel I have made towards forming the final scale. _____
4. The usefulness of the scale, in its final form, in enabling researchers to consider their subjects as individuals. _____
5. The use of my time (good use vs waste of time). _____
6. The use of the researcher's time. _____
7. The degree to which my responses to the scale represent my true views and feeling. _____
8. My willingness to co-operate in giving my true views and feelings. _____

If you have any other comments or criticisms to make about the scale you may make them here:-

APPENDIX C

PREVIOUS RESEARCH EXPERIENCE

These items are to be responded to on a scale like that in the first questionnaire.

- Let
- 7 = Totally agree
 - 6 = Strongly agree
 - 5 = Tend to agree
 - 4 = Neutral
 - 3 = Tend to disagree
 - 2 = Strongly disagree
 - 1 = Totally disagree,

and indicate your degree of agreement or disagreement with the following statements by putting the corresponding number to the right.

1. I see considerable meaning in the experiments in which I have participated. _____
2. The experiments I have been in have been very scientific. _____
3. If I were performing psychological experiments I would try to emulate the methods I have seen others use. _____
4. So far I have been very impressed by what I have seen concerning psychological experiments. _____
5. In most cases, I think the experimenter has told me the truth about the experiment. _____

We would like you to write here any other comments you have about your previous experience as a subject in psychological research.

APPENDIX D

FINAL COMMENTS

These items concern how you feel about this particular project.

On the 7-point scale

- 7 = Totally positive
- 6 = Strongly positive
- 5 = Tending to be positive
- 4 = Neutral
- 3 = Tending to be negative
- 2 = Strongly negative
- 1 = Totally negative,

rate your feelings with regard to this project on the following dimensions.

1. The degree of satisfaction it has given me to take part. _____
2. The amount of enjoyment I have gained by taking part. _____
3. The contribution that I feel I have made to the project. _____
4. The usefulness of the project to psychological research in general. _____
5. The use of my time (good use vs waste of time). _____
6. The use of the researcher's time. _____
7. My feelings towards the researcher. _____
8. The improvement such a project should make for subjects in psychological research. _____
9. The degree to which my responses in this project represent my true views and feelings. _____
10. The effort I have made to cooperate in this project. _____

Finally, we would like you to make here any other comments or criticisms you may have about this project. Thank you very much for your efforts.

REFERENCES

- ACKER, M., AND MACREYNOLDS, P. On the assessment of anxiety: III By self-ratings Psychological Reports, 1966, 19(1), 251-254.
- ADAIR, J.G., AND SCHACHTER, B.S. To cooperate or to look good? The subject's and experimenter's perceptions of each others' intentions. Journal of Experimental Social Psychology, 1972, 8, 74-85.
- ARGYRIS, C. Some unintended consequences of vigorous research. Psychological Bulletin, 1968, 70, 185-197.
- BELL, C.R. Personality characteristics of volunteers for psychological studies. British Journal of Social and Clinical Psychology, 1962, 1, 81-95.
- BEM, D.J. Self-perception: An alternative interpretation of cognitive dissonance phenomena. Psychological Review, 1967, 74, 183-200.
- BERKOWITZ, L., AND LUTTERMAN, K. The traditionally socially responsible personality. Public Opinion Quarterly, 1968, 32, 169-185.
- BREHM, J.W. A theory of Psychological reactance. New York: Academic Press, 1966.
- BROCK, T.C., AND BECKER, L.A. "Debriefing" and susceptibility to subsequent experimental manipulations. Journal of Experimental Social Psychology, 1966, 2, 314-323.
- BUDNER, S. Intolerance of ambiguity as a personality variable. Journal of Personality, 1962, 30, 29-50.
- BURT, C. The concept of consciousness. British Journal of Psychology, 1962, 53, 229-242.
- CAMPBELL, D.T., AND FISKE, D.W. Convergent and discriminatory validation by the multitrait-multimethod matrix. Psychological Bulletin, 1959, 56, 81-105.
- CAMPBELL, D.C., SIEGMAN, C.R., AND REES, M.B. Direction-of-wording effects in the relationships between scales. Psychological Bulletin, 1967, 68, 293-303.
- CLOUD, J., AND VAUGHAN, G.M. Using balanced scales to control acquiescence. Sociometry, 1970, 33(2), 193-202.
- COOK, T.D., BEAN, J.R., CALDER, B.J., FREY, R., KROVETZ, M.L., AND REISMAN, S.R. Demand characteristics and three conceptions of the frequently deceived subject. Journal of Personality and Social Psychology, 1970, 14, 185-194.
- COOK, T.D., AND PERRIN, B.F. The effects of suspiciousness of deception and the perceived legitimacy of deception on task performance in an attitude change experiment. Journal of Personality, 1971, 39, 204-224.
- CROWNE, D.P., AND MARLOW, D. A new scale of social desirability independent of psychopathology. Journal of Consulting Psychology, 1960, 24, 349-354.

- CROWNE, D.P., AND MARLOW, D. The Approval Motive. New York : John Wiley and Sons, 1964.
- EDWARDS, A.L. Techniques of attitude scale construction. N.Y. : Appleton-Century-Crofts, 1957.
- FILLENBAUM, S. Prior deception and subsequent experimental performance: The "faithful" subject. Journal of Personality and Social Psychology, 1966, 4, 532-537.
- FILLENBAUM, S., AND FREY, R. More on the "faithful" behaviour of suspicious subjects. Journal of Personality, 1970, 38, 43-51.
- FINN, R.H. Effects of some variations in rating scale characteristics on the means and reliabilities of ratings. Educational and Psychological Measurement, 1972, 32(2), 255-266.
- GOFFMAN, E. The presentation of self in everyday life. New York : Doubleday, 1959.
- GREENBERG, M.S. Role playing. An alternative to deception. Journal of Personality and Social Psychology, 1967, 2, 152-157.
- GUILFORD, J.P. Psychometric methods. McGraw-Hill, 1954.
- GUSTAV, A. Students' attitudes towards compulsory participation in experiments. Journal of Psychology, 1962, 53, 119-125.
- HOLMES, D.S. Amount of experience in experiments as a determinant of performance in later experiments. Journal of Personality and Social Psychology, 1967, 7(4), 403-407.
- HOLMES, D.S., AND APPELBAUM, A.S. Nature of prior experimental experience as a determinant of performance in subsequent experiments. Journal of Personality and Social Psychology, 1970, 14, 195-202.
- HOOD, T.C., AND BACK, K.W. Self-disclosure and the volunteer; A source of bias in laboratory experiments. Journal of Personality and Social Psychology, 1971, 17(2), 130-136.
- HOROWITZ, I.A., AND ROTHSCHILD, B.H. Conformity as a function of deception and role playing. Journal of Personality and Social Psychology, 1970, 14, 224-226.
- JACKSON, C.W., AND POLLARD, J.C. Some nondeprivation variables which influence the "effects" of experimental sensory deprivation. Journal of Abnormal Psychology, 1966, 71, 383-388.
- JONES, E.E. Ingratiation. New York : Appleton-Century-Croft, 1964.
- JOURARD, S.M. Disclosing Man to himself. Princeton, New Jersey : Van Norstrand, 1968.
- KAISER, H.F. The varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23(3), 187-200.

- KELMAN, H.C. Human use of human subjects: The problem of deception in social psychological experiments. Psychological Bulletin, 1967 67(1), 1-11.
- LASEGNA, L., AND VON FELSINGER, J.M. The volunteer subject in research. Science, 1954, 120, 359-361.
- LEVY, L.H. Awareness, learning, and the beneficent subject as expert witness. Journal of Personality and Social Psychology, 1967, 6, 365-370.
- MACDONALD, A.P.JR. Characteristics of volunteer subjects under three recruiting methods: Pay, extra credit, and love of science. Journal of Consulting and Clinical Psychology, 1972, 39(2), 222-234.
- MCGUIRE, W.J. Suspiciousness of experimenter's intent. In R. Rosenthal and R.L. Rosnow (Eds), Artifact in Behavioural research. New York : Academic Press, 1969.
- MAGNUSSON, D. Test Theory. Reading, Mass. : Addison-Wesley, 1966.
- MARTIN, R.M., AND MARCUSE, F.L. Characteristics of volunteers and nonvolunteers for hypnosis. Journal of Clinical and Experimental Hypnosis, 1957, 5, 176-180.
- MASLING, J. Role-related behaviour of the subject and psychologist and its effect upon psychological data. In D. Levine (Ed): Nebraska Symposium on Motivation, 1966, 67-104.
- MASLOW, A.H., AND SAKODA, J.M. Volunteer error in the Kinsey Study. Journal of Abnormal and Social Psychology, 1952, 47, 259-262.
- NUNNALLY, J.C. Psychometric Theory. McGraw-Hill, 1967.
- ORNE, M.T. On the social psychology of the psychological experiment, with particular reference to demand characteristics and their implications. American Psychologist, 1962, 17, 776-783.
- PAGE, M.M. Modification of figure-ground perception as a function of awareness of demand characteristics. Journal of Personality and Social Psychology, 1968, 9, 59-66.
- PAGE, M.M. Social psychology of a classical conditioning of attitudes experiment. Journal of Personality and Social Psychology, 1969, 11, 177-186.
- PAGE, M.M. Demand awareness, subject sophistication, and the effectiveness of verbal "reinforcement". Journal of Personality, 1970, 38(2), 287-301.
- PAGE, M.M. AND LUMIA, A.R. Cooperation with demand characteristics and the bimodal distribution of verbal conditioning data. Psychonomic Science, 1968, 12, 243-244.
- POPPER, K.R. The logic of scientific discovery. New York : Basic Books, 1959.

- PROGER, B.B., MORRELL, J.E., MANN, L., BAYUK, R.J.JR., TAYLOR, R.G.JR., BURGER, R.M. CROSS, L.H. AND GREEN, P. Models for measuring induced affective change: some neglected methodological considerations. Psychological Reports, 1972(June), 775-787.
- RICHARDS, F. The unknown subject. Journal of Humanistic Psychology, 1972, 12(1), 22-23.
- RIECKEN, H.W. A program for research on experiments in social psychology In Washburne, N.(Ed). Decisions, values and groups. Vol. 2, N.Y. : Pergaman Press, 1962.
- RIGGS, M., AND KAESS, W. Personality differences between volunteers and nonvolunteers. Journal of Psychology, 1955, 40, 229-245.
- ROKEACH, M. The opened and closed mind. N.Y. : Basic Books, 1960.
- ROSENBERG, M.J. When dissonance fails: On eliminating evaluation apprehension from attitude measurement. Journal of Personality and Social Psychology, 1965, 1, 28-42.
- ROSENBERG, M.J. The conditions and consequences of evaluation apprehension. In R. Rosenthal and R.L. Rosnow (Ed.): Artifact in Behavioral research. N.Y. : Academic Press, 1969.
- ROSENTHAL, R. The volunteer subject. Human Relations, 1965, 18(4) 389-406.
- ROSENTHAL, R. Experimenter effects in behavioural research. N.Y. : Appleton-Century-Crofts, 1966.
- ROSENTHAL, R., AND ROSNOW, R.L.(Ed.). Artifact in behavioral research. N.Y. : Academic Press, 1969.
- ROSENWEIG, S. The experimental situation as a psychological problem. Psychological Review, 1933, 40, 337-354.
- ROSNOW, R.L., AND ROSENTHAL, R. Volunteer subjects and the results of opinion change studies. Psychological Reports, 1966, 19, 1183-1187.
- ROSNOW, R.L. AND ROSENTHAL, R. Volunteer effects in behavioral research. In Newcomb, T.M.(Ed.): New Directions in Psychology, 4. N.Y. : Holt, Rinehart, Winston, 1970.
- ROTTER, G.S. Attitudinal points of agreement and disagreement. Journal of Social Psychology, 1972, 86, 211-218.
- SCHULTZ, D.P. The human subject in psychological research. Psychological Bulletin, 1969, 72, 214-228.
- SCHULZE, R.H.K. A shortened version of the Rokeach Dogmatism Scale. Journal of Psychological Studies, 1962, 13, 93-97.
- SIGALL, H., ARONSON, E., AND VAN HOOSE, T. The cooperative subject: myth or reality? Journal of Experimental Social Psychology, 1970, 6, 1-10.

- SILVERMAN, I. Role-related behaviour of subjects in laboratory studies of attitude change. Journal of Personality and Social Psychology, 1968, 8, 343-348.
- SILVERMAN, I., AND REGULA, C. Evaluation apprehension, demand characteristics, and the effects of distraction on persuasibility. Journal of Social Psychology, 1968, 75, 273-281.
- SILVERMAN, I., AND SHULMAN, A.D. A conceptual model of artifact in attitude change studies. Sociometry, 1970, 33, 97-107.
- SILVERMAN, I., SHULMAN, A.D., AND WIESENTHAL, D.L. Effects of deceiving and debriefing psychological subjects on performance in later experiments. Journal of Personality and Social Psychology, 1970, 14, 203-212.
- STRICKER, L.J. The time deceiver. Psychological Bulletin, 1967, 68, 13-20.
- STRICKER, L.J., MESSICK, S., AND JACKSON, D.N. Suspicion of deception: implications for conformity research. Journal of Personality and Social Psychology, 1967, 5, 379-389.
- STRICKER, L.J., MESSICK, S., AND JACKSON, D.N. Evaluating deception in psychological research. Psychological Bulletin, 1969, 71, 343-351.
- WEBER, G.J., AND COOK, T.D. Subject effects in laboratory research. An examination of subject roles, demand characteristics, and valid inference. Psychological Bulletin, 1972, 77(4), 273-295.
- WRIGHTSMAN, L.S. Predicting college students' participation in required psychological experiments. American Psychologist, 1966, 21, 812-813.