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## EXPERIMENTATION IN SOCIAL SCIENCES: POSSIBILITIES AND LIMITATIONS

**T. L. Smolina**

*Candidate of Psychological Sciences,  
assistant professor,  
e-mail: talesm@mail.ru,  
ORCID 0000-0002-1500-7075,  
St. Petersburg University of the Humanities  
and Social Sciences,  
St. Petersburg, Russia,*

**I. S. Gromkiy**

*student,  
e-mail: psychicvision@yandex.ru,  
North-West Institute of Management  
of the Russian Presidential Academy  
of National Economy and Public Administration,  
St. Petersburg, Russia*

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**Abstract.** This article examines experiment as a unique type of measurement technique which is used for the investigation of different social phenomena. The use of experiments today depends on the type of the phenomenon under investigation and the purposes of the researcher as well as restrictions posed by ethical issues. The artificiality of the laboratory settings, problems with randomization and validity as well as ethical considerations are all listed as weaknesses of the experimental design. The greatest value of the experiment can be seen in the possibility to investigate highly controversial issues of human behavior.

**Keywords:** experiment; social sciences; method; measurement technique.

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There are a number of various methods in the social science tradition used for the purposes of the researchers. Surveys, field studies and interviews are usually regarded as major instruments of scientific inquiry. Experiment, among them, presents a unique type of measurement technique which is used for the investigation of different social phenomena. In most cases, however, human behavior appears to be the main focus of the experimentation.

Many scholars have attempted to assess and explain patterns of social behavior by means of experiments. Since the implementation of the well-known classical experiments pioneered by Russian physiologist Ivan Pavlov, the experiment method became the prevailing technique for the study of behavior.

Experiment, thus, departs from the traditional behavioral studies which were greatly influenced by Pavlov's studies. Following this mainstream, scientists from different fields of the academic world have further developed experiment – the technique for measuring various aspects of human behavior, namely, attitudes and actions.

Clearly, each method of scientific inquiry has its own strengths and weaknesses [12]. Experiment is not an exception. Limitations and possibilities of the use of experiments in the social science is the major focus of the present work. We will argue here that the use of experiments today depends on the type of the social phenomenon under investigation and the purposes of the researcher as well as restrictions posed by ethical issues. This will

be achieved by using illustrative examples analyzing different types of experiments in the history of social science.

However, before a more detailed analysis of possibilities and limitations is discussed, one must clarify what the experimental method is. Of particular importance here are such questions as: What is experiment? What are the rules of its application? What are the primary elements and purposes of experiment?

Experiment in the social sciences is considered to be the structural technique of observation that has its specific rules of application. According to Babbie (1992), the most general stages of experiment include: “(1) taking action and (2) observing the consequences of that action” [3, p. 237]. More specifically, the sequence of the experimental technique involves the choice of independent and dependent variables, random selection of the subjects to be attributed to control/experimental groups, and pre-testing and post-testing. With slight variations all those elements are essential for the experimental studies of social phenomena.

First of all, one should mention that a researcher has to clearly formulate the research question, most preferably in relation to a theoretical framework. For instance, in Herbert Kelman’s experiment (1993, [1958]) of the effects of various communications and other forms of social influence on attitudes and actions, the broader theoretical conception was chosen to test the hypotheses. It was proposed that different sources of power produce various types of behavior. In particular, the following hypotheses were taken into consideration:

(1) Power based on control will affect the confirmative type of behavior which will take the form of compliance;

(2) Power based on attractiveness will produce conformity which will take the form of identification;

(3) Power based on credibility will produce conformity which will take form of identification [8, pp. 496–497].

In this case power is regarded as an independent variable. In other words, the type of power presented by a communicator to subjects is the stimulus of the study. The dependent variable here is the patterns of behavior demonstrated by subjects in response to the stimulus.

Having thus explained the nature of the independent and dependent variable in the experimental design by means of an illustrative example, it seems appropriate to turn to the other main elements, namely, control and experimental groups.

Typically in the experiment two groups are involved in the process. The experimental group in social science literature is usually defined as “the group of subjects that receives the treatment or experimental manipulation” [11, p. 188]. The control group is the group of people who are not subjects of this treatment. There can be variations in the amount of the groups as it is the case in a study of the effects of television violence on children. Albert Bandura, Dorothea Ross and Sheila Ross (1993, [1963]) conducted an experiment which consisted of three experimental groups and one control group. In their experimental design three groups of children were exposed to different kinds of violent scenes. While the first group watched the real life aggressive models, the second group of children was shown aggression on a film. The third group of subjects was exposed to a film with the aggressive cartoon characters. Furthermore, children in these groups were subdivided into male and female groups, thus forming a total of six groups under study. The control group consisted of children who watched a ‘neutral’ film [4, pp. 151–153].

The second experimental group in this study is usually referred to as a comparison group, that is, “the groups of subjects that is exposed to a different treatment than the experimental group (or that has a different value on the independent variable)” [11, p. 188]. The example of the experiment by Bandura, Ross and Ross indicates that the number of groups participating in the experiment can

vary. It depends solely on the purposes of the investigator who decides to study the phenomenon in the light of the strong-moderate effect.

If the number of the experimental groups can be subject to change, pre-testing and post-testing procedures cannot be varied in the same way. Pre-testing requires the researcher to measure subjects before the actual experiment takes place. In the study on televised violence mentioned above, children of the experimental and control groups were pre-tested in the following way. First, the aggression in the real world was rated by the analysis of the social interactions between the children. The rating included scales of physical aggression, verbal aggression and aggression inhibition. Then, several experimental settings were designed to pretest the level of aggression without showing violent films. After the main experiment was finished, investigators measured the changed level of aggression by means of performing post-testing. Specifically, the aggression investigation took place in a different experimental room where children were exposed to aggressive and non-aggressive toys. Experimenters and a special group of judges have observed children's behavior through a one-way mirror. Different types of games played with aggressive toys (e.g. guns, mallets and peg boards) and non-aggressive toys (e.g. a tea set, dolls, bears) were measured [4, pp. 153–154].

Thus, the effect of the violence on television exposed to children was studied by comparing the pre-test results with the findings obtained from the post-test procedure. The cause-effect of aggression phenomenon is very hard to analyze but the aim of the experimenters in that study was fully achieved. Therefore, the main purpose of the experiment is to indicate causal links between different phenomena and in this sense it is used for explanatory studies in the social sciences. Indeed, experiments most often were applied to investigate certain types of phenomena, particularly to study group interaction and

human behavior [8; 1]. In this case, research on obedient and conformist types of behavior are especially relevant for this analysis.

Several famous experiments conducted by such scholars as Solomon Asch, Philip Zimbardo and Stanley Milgram can be recalled here [2; 9; 10]. All of them revealed unique results and posed controversial issues in regard to the understanding of human behavior. Nevertheless, the study on obedience to authority done by Stanley Milgram presents a special case of experiment which highlights certain aspects of this method.

Milgram (1997, [1963]) conducted behavioral study of obedience under the auspices of Yale University. The advertisement was posted in the newspaper in order to attract people for the participation of the so-called 'memory and learning' study. Forty males took part in the experiment which was conducted in a laboratory setting. The general procedure which involved one naïve subject and one victim, consisted of the following stages. First, the subject of the study was chosen to perform the role of a teacher and was asked to administer a task to a learner using shock generator. Then, the subject under investigation was instructed that with each wrong answer he ought to punish the learner with a shock. What is more, the teacher had to increase the intensity of the shocks administered to the victim. Under these conditions the study of the obedient behavior was conducted and the controversial results were revealed afterwards. It was found that all subjects who participated in this experiment continued to administer shock to another person even after they have reached the point of a 'very strong shock'. Fourteen subjects refused to obey the command of the experimenter at the level of intense shock, while twenty-six obeyed the orders to the end reaching the sign: "Danger: severe shock" [10, pp. 41–53].

Milgram's experiment revealed the interrelationship between two major behavioral patterns: the obedience to authority and the inclination not to harm physically other peo-

ple. The laboratory setting of this experiment, it can be argued, does not reflect the actual human behavior. This artificial side of the laboratory experiment has been the subject of many controversies among the scholars due to the fact that the behavior is studied out of its social context. The remedy to this has been found in transferring and applying the laboratory technique into the real world. In the natural experiment the behavior is observed and evaluated in relation to the spontaneous effects of natural stimulus. Yet, the design of this kind of experiment requires precise actions toward its execution.

When an event occurs in the real life, researchers who engage in the experiments face the problem of validity, especially when it concerns the comparison and control groups. If the experiment group in a natural world is easy to find, people who would construct group for the appropriate comparison present one of the major problems for the design in natural setting. However, both laboratory and natural designs face general limitations of the experimental technique.

According to Catherine Hakim (1992), the design for both laboratory and natural experiments involves two main features, namely, experimental control and the randomization process. In the experimental control the researcher decides which subjects will be under investigation as well as the hypothesis of the event/experience to be tested. Randomization refers to the allocation of people into experimental or control groups on a basis of random sampling [6, pp. 101–102]. As a rule, when the random sampling is performed for the purposes of the experiment, the populations tend to be students or workers. People cannot be randomly chosen to experience such events as unemployment, war, migration other events. This presents one of the obstacles of the experimental design.

In addition to that, the experimenter faces other limitations concerning the research. Problems of internal and external invalidity of the experiment are of particular importance in regard to design difficulties. In-

ternal validity is “the possibility that the conclusions drawn from experimental results may not accurately reflect what has one on in the experiment itself” [2, p. 247]. Several aspects can be distinguished in this respect. For example, people under investigation are subject to constant changes due to the fact that the impact of the social realm cannot be totally eliminated. Then, the question arises of whether testing and retesting procedures will affect subjects’ behavior and as a consequence influence the final results. Additionally, some of the researchers argue that human behavior itself is an ambiguous phenomenon for the investigation: «...people do not show similar behavior patterns across a wide variety of situation. One may be dominant in one situation but not in others. Behavior is much more a function of the situation than of inner characteristics» [5, pp. 237].

What is more, the experimenter may project his or her bias by selecting subjects for experimental and control groups.

The other problem of the experimental design concerns the external invalidity and its impact cannot be underestimated. For instance, in the famous series of experiments conducted by Milgram, as it was shown earlier, highly controversial findings were obtained. Can those results be applied to the real world-situation? The subjects under investigation were American men which hold specific positions and were of a certain age. Are the findings true for women? And what about people coming from other countries? Milgram’s study consisted of series of experiments using different subjects, however, many experiments were done once without replications and only in one cultural setting. This problem of making generalizations about the results received from the study presents one of the fundamental criticisms of the experiment.

Besides, the ethical dilemmas posed by experimental research in the past increases the degree of limitations for the social scientists who seek to use this type of method. According to the American Sociological As-

sociation's Code of Ethics (1999), "the process of conducting sociological research must not expose respondents to substantial risk of personal harm" [11, p. 219]. It is difficult to decide, however, what is exactly considered to be the risk for a person. Even though it appears to be clear that certain types of experiences may cause damage to subjects, it is not as obvious when it concerns the consequences of the experiment. Evidently, Milgram's or Zimbardo's studies are not allowed to be performed on subjects due to the potential harm they may cause. Those kinds of experiments are hard to replicate not only in terms of ethical considerations, but also because of the problems of financial resources.

In spite of all the limitations posed by this type of research technique, experiment has its advantages. The majority of the experiments are easy to replicate and in this way they become especially useful. When the hypothesis concerning phenomenon can be tested several times and in different settings, its validity strengthens. Experiments are very helpful when a researcher tries to find causal relations between social phenomena and in the explanatory study this technique is extremely relevant. What is more, when the experiment meets the requirements of internal validity it can prove that the stimulus (independent variable) affects the respondents' behavior. In the experiment it is even possible to see directly how behavior changes. Also, experiments require "little time and money and relatively few subjects" [3, p. 257]. The greatest value of the experiment can be seen in the possibility to investigate highly controversial issues (e.g. obedience, conformity) and not by means of self-reflective techniques when the person reports what he or she feels, does, and likes. On the contrary, the subjects are put in the circumstances where they actually perform and thus, it is possible to make conclusions on the explicit behavior of the people under investigation. Nevertheless, one must be very careful when making general statements based solely on specific types of experiments.

Thus, those who seek to use an experiment in their scientific inquiry must be aware of the obstacles in the implementation of this method. It has been in fashion for decades because of the dominance of the behavioral approach in social sciences. However, the experiments illustrated in this article showed the main limitations of this type of technique. In particular, the artificiality of the laboratory settings, problems with randomization and validity as well as ethical considerations are all listed as weaknesses of the experimental design. On the other hand, it has been emphasized throughout the paper that an experiment can be a powerful instrument for the social scientists, especially those who attempt to study human behavior. For this reason, experiment has its own advantages in comparison to other methods. Nowadays, researcher can use different measurement techniques to assess the essential aspects that characterize behavior. Thus, the choice of the technique depends on the nature of the social problem under study and the personal preferences of the investigator.

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