Between Fact and Fiction: Artifacts and Ethics in Social Research

by

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ABSTRACT

The purpose of this paper is to raise awareness among new researchers on the importance of recognizing the effect of systematic errors or artifacts on the validity of a knowledge claim based on the scientific method.Efforts to minimize such artifacts may however come into conflict with the need to comply with ethics. This paper explores the rationale of the scientific approach, outlines some of the possible threats to a knowledge claim, and emphasises the need to find a balance between scientific rigor and the need to comply with ethics.

INTRODUCTION

The study of human behavior is both difficult and subject to error. Unlike the physical sciences inquiry into human behavior can be froth with inaccuracies and inconsistencies given the complex nature of human behavior. It is therefore more imperative that social researchers must ensure that their work modeled along the scientific approach do not slide into the realm of fiction in their effort to document and explain reality. The theme of this paper is about the need to minimise systematic errors in research while at the same time ensure that such efforts do not ignore ethical issues in research. The paper is thus organized along the following thesis. Firstly, the difference between the scientific and the nonscientific approach to knowledge is briefly outlined to give the reader an overview of the rationale of the scientific approach as a valid approach to knowledge claims. Secondly, the concept of internal and external validity as a yardstick to scrutinize the validity of a knowledge claim is explained in the context of the scientific approach to knowledge. Finally, some of the common artifacts and ethical issues that may threaten the validity of a knowledge claim are highlighted. Much of the literature here is drawn from three main writers, namely Rosnow and Rosenthal (1997), Shaughnessy and Zechmeister (1997), and Borg and Gall (1989).

SCIENTIFIC AND NONSCIENTIFIC APPROACHES TO KNOWLEDGE

It is important at the outset to make a neutral stand in terms of the controversies surrounding the paradigm issue. It is the premise of this paper that both positivistic and postpositivistic paradigms to knowledge claim are equally valid in social science inquiry. Both are scientific in their approach to knowledge and both are equally subject to errors in their pursuit of knowledge. The important issue is whether a piece of work has

adequately separated fact from fiction. In relation to the theme of this paper, these two terms, fact and fiction, are being used analogously to emphasize the need for rigor in research to ensure validity of a knowledge claim.

One important distinguishing feature between fact and fiction is whereas the former is the product of empirical, systematic and controlled observations of reality the later is usually the product of creative imagination and intuition based on general observations of reality. Our knowledge of reality can be fiction or fact or a combination of both, depending on our approach to knowledge. The scientific approach is an approach to knowledge that attempts to separate fact from fiction, and is best described by distinguishing it from the nonscientific or "everyday" approach to knowledge (Shaughnessy & Zechmeister, 1997). There are several differences between these two approaches. Table 1 summarizes these differences.

Table 1 . Differences between Scientific and Nonscientific Approaches to Knowledge

	Nonscientific (everyday)	Scientific
General Approach	Intuitive	Empirical
Observation	Casual, controlled	Systematic, controlled
Reporting	Biased, subjective	Unbiased, objective
Concepts	Ambiguous, with surplus meanings	Clear definitions, operational specificity
Instruments	Inaccurate, imprecise	Accurate, precise
Measurement	Not valid or reliable	Valid and reliable
Hypothesis	Untestable	Testable
Attitude	Uncritical, accepting	Critical, skeptical

Source: Shaughnessy, J.J. & Zechmeister, E.B. (1997). *Research methods in psychology*. N.Y.: McGraw-Hill, pp 7.

The scientific approach is based on empirical, systematic and controlled observations rather than on intuition where observations are casual and uncontrolled. Empiricism emphasizes on direct observation and experimentation but this does not mean that scientists do not use intuition as most research work begins with intuition about a phenomenon. The importance of these differences is illustrated in the classic case of Clever Hans, a horse that was claimed to have amazing talents. Hans could count, read and tell the time by tapping its foot or by pointing its nose at alternative answers provided. The public was taken in by its amazing feats until Oscar Pfungst, a German psychologist solved the riddle of Hans's amazing performances through a series of controlled experiments that debunk the myth of Hans's cleverness. Hans was no longer clever when its owner was out of its sight and Hans can be clever when certain body cues

of the experimenter are present. Casual uncontrolled observations can indeed be deceptive.

Scientific reporting is aimed at being unbiased and objective. However, many biases are too subtle and go undetected even in scientific reporting. An awareness of possible biases that may contaminate the results and confound the findings is important so that the researcher can minimize errors. In relation to this, concepts must be well defined and should not be ambiguous and have surplus meanings. Operational specificity refers to a concept being defined in terms of the specific operations used to produce and measure it. A concept thus defined will avoid arguments since the concept will only mean according to its specific operational definition. To be able to measure operationally defined concepts, the use of accurate and precise instruments where measurements are both valid and reliable is imperative in the scientific approach. Any hypothesis must be testable and finally, the scientific approach emphasizes an attitude that should be critical and skeptical rather than uncritical and accepting. All these characteristics of the scientific approach are basically to ensure the validity of a knowledge claim. In general, the validity of a knowledge claim can be scrutinized in terms of two kinds of validity, vis a vis, internal and external validity.

INTERNAL AND EXTERNAL VALIDITY

When we ask the question of how true and trustworthy is the finding of a research we are questioning about the validity of the research. Two types of validity are of interest here. The first type is known as internal validity**. Internal validity** is related to the question of how trustworthy is the hypothesis in explaining the phenomenon studied. In causal comparative designs, we want to be sure that there are no alternative hypotheses to explain the effect. Confounding occurs when we are not sure if our hypothesis is correct and there are other possible alternative hypotheses. For example, in a study comparing two methods of teaching, two classes of students were assigned to two teachers. The first class was taught by a teacher using an innovative method whereas the other class was taught by the other teacher using the traditional method. If the results showed that the first class performed better, can we say that the innovative method is superior to the traditional method? The confounding variable (also known as extraneous or noise variable) here could be teacher quality, that is, the first class could have performed better because the teacher is superior and not the method. Even if a single teacher was used to teach both the classes but using different methods, there is still the possibility that the teacher teaches better in the first class because of bias. When research is confounded, it is impossible to determine what variable is responsible for the difference in performance. Results are then merely artifacts of the research process. When no confoundings are found the research is said to have internal validity (Borg & Gall, 1989). The problem of confounding is not limited to quantitative research designs but is equally true of qualitative designs as well. In qualitative research, history, maturation, experimental mortality, and instrumentation can also seriously jeopardize internal validity.

External validity is the extent to which the findings of a research can be generalized to the population from which the sample was drawn for the study. The important question is whether the sample drawn is representative of the population. This aspect of external validity is known as population validity. Ecological validity refers to the extent to which the results of a study can be generalized from one set of environmental conditions to other environmental conditions. If the generalization is limited we say that the study has low ecological validity. Quantitative designs use probability-sampling techniques to ensure external validity. This is not the case for qualitative designs, which have often been criticized for lacking external validity since they do not employ such sampling techniques. However, there are measures to enhance validity in qualitative research (see Drew et al., 1996; Miles & Huberman, 1994).

The characteristics of the scientific approach as outlined earlier are generally attempts to ensure the internal validity of the research but unfortunately they are no guarantee as each characteristic can be subject to error and thus resulting in artifacts. The various methods of sampling to increase external validity are also subject to sampling error. The next section explores the sources of these errors.

ARTIFACTS AND ETHICS IN RESEARCH

The major threat to internal validity of a research can be attributed to systematic errors. Rosnow and Rosenthal (1997) termed systematic errors as artifacts and differentiate them from random errors. *Random errors* are chance errors and occur randomly but systematic errors imply a specific bias arrangement. Rosnow & Rosenthal (1997) provide a good illustration of systematic error. If a trader were to weigh an item using the same scale a number of times in a row, we would expect that the weight of the same item to be the same or consistent. But in reality the measurements will tend to be a bit different each time. Some of the measurements will slightly overestimate the true weight and some will slightly underestimate the true weight. These overestimates and underestimates of the true weight are due to what we termed random errors. The problem is to find out the true weight. This can be done by averaging all the measurements so that the overestimates and underestimates can cancel one another and the average weight will be a good estimate of the true weight.

However, if the trader is a dishonest trader and always weighs with a thumb on the scale and thus inflating the true weight, then he is introducing a systematic error. Random errors are cancelled out by using the average. However, systematic errors will tend to inflate or deflate the true measurement, and thus do not cancel out the errors. Artifacts are systematic errors and are usually unintentional in research. They threaten the validity of a research and the source of systematic errors can be attributed to the researcher as well as to the participants.

Rosnow and Rosenthal (1997) identified two categories of **researcher-related artifacts**. The first type is termed as noninteractional artifacts and includes observer bias, interpreter bias, and intentional bias. Observer bias refers to a researcher's overestimate

or underestimates during the observation phase and can be controlled by independent replication. Interpreter bias occurs when there is error in the interpretation of data and can be controlled by making data accessible to other scientists. Intentional bias is unethical and occurs when the researcher fabricates or fraudulently manipulates data. This problem can be controlled by independent replication and making data accessible to others.

The second category of artifacts is termed interactional artifacts. These artifacts arise when the researcher's characteristics or the research setting affect the research. The researcher's characteristics such as gender, ethnicity, age and personality could affect the research and introduce errors. Participants may respond differently to different researcher characteristics and thus confound the research. A situational effect occurs when the nature of the research setting and the participants introduce error into the research. Sometimes the researcher's expectancy of certain results could also lead to participant behavior that increases the likelihood of confirming a hypothesis (Pygmalion effect). Controlling of such effects is usually through the use of replication.

The term "participant" is often used in place of the term "subject" because the term participant implies a "free, intentional agent, susceptible to external pressures but able to evaluate them and act independently" (Rosnow & Rosenthal, 1997). The implication is that a participant may respond or react in ways different from the person's normal behavior resulting in artifacts. Some of these effects include the "good subject" effect when participants' behavior is influenced by their knowledge or sensitivities of the research setting. The classic Hawthorne effect is an example where participants tend to alter their performance as a result of being aware that they are participating in a study. The use of volunteers in research therefore warrants careful consideration of the artifacts associated with participants.

One would think that perhaps the best way to guard against participant-related artifacts in research is to use deception or naturalistic settings so that participants are unaware of the study being carried out on them. However, in carrying research with human participants, the issue of ethics cannot be ignored. The need to comply with ethics may in some way present a dilemma to the researcher who is concerned about avoiding or minimizing artifacts. The researcher is faced with the need to balance between ethics and participant-related artifacts. For example, the ethical principle of informed consent can seriously jeopardize the validity of the research when participant related artifacts occur. Ethical standards related to the use of deception can therefore make artifact avoidance difficult.

The potential conflict between ethics and artifacts makes it hard to draw a clear line between the need to comply with ethics and the need to ensure scientific rigor. The trade-off between the risks of non-compliance and the benefits of science is not as clearly defined, as we would want it to be. Rosnow and Rosenthal (1997) propose an ethical risk-benefit decision model to illustrate how decision about a study can be made by comparing the risk and the benefit of the study. Studies with low risk but high benefits should be approved while those with high risk but low benefits should not be carried out. However, one is confounded when it comes to measuring risks and benefits. There seems

no common consensus as to how these two variables can be measured to determine their weight.

CONCLUSION

Artifacts in research are a bane to the researcher and its threat to the validity of a knowledge claim should not be underestimated. There is the potential risk that in seeking to establish a fact about reality we may end up in a world of fiction. To compromise on ethics is not the answer to our dilemma. The risk of wasteful use of time, resources and energy of both the participants and the researcher attributed to poor research designs should be an important concern. However, this concern should not hinder us from our pursuit of knowledge. The intention of this paper is to raise awareness about artifacts in research and its threat to validity and not to promote pessimism. It is to remind us of the crucial importance of good research designs. The validity of a study is as good as its design. If the design is poor we cannot expect the study to provide us any confidence about its knowledge claim.

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