Research Methods for Simple and Complex Systems

By David Alderoty © 2015

Chapter 7) The Limitations of the Research Techniques of the Hard Sciences, and the Advantages of the Research Techniques of the Soft Sciences

Over 4,400 words

To contact the author left click for a website communication form, or use:
David@TechForText.com

To go to the previous chapter left click on one of the following links:
For HTML) www.TechForText.com/R/Chapter-6
For PDF) www.TechForText.com/R/Chapter-6/PDF.pdf

If you want to go to the table of contents of this chapter left click on these words

To Access Additional Information with Hyperlinks

After I complete a writing task, I select a number of websites from other authors, and link to them. The links are the blue underlined words, and they can be seen throughout this book. The in-line links, such as the link on these words, are primarily to support the material I wrote, or to provide additional details. The links presented at the end of some of the paragraphs, subsections, and sections are primarily for websites with additional information, or alternative points of view, or to support the material I wrote. The websites contain articles, videos, and other useful material.

Brown text, like these words, represent quotes in this e-book. **You can access the original source, by clicking on a link presented just before a quote.**

If a link fails, use the blue underlined words as a search

phrase, with www.Google.com. If the failed link is for a video use www.google.com/videohp. The search will usually bring up the original website, or one or more good alternatives.

Note About Terminology in this Chapter

The term **hard science** means the physical and biological sciences, including physics, chemistry, and biology. The hard sciences deal with relatively simple systems, with the exception of biology, such as subatomic particles, atoms, molecules, planets, stars, galaxies, black holes, gravitational fields, etc.

The term **soft science** refers to the social and psychological sciences, or any science that involves human or animal behavior. This includes sociology, psychology, economics, anthropology, etc. The soft sciences deal with highly complex systems that are somewhat unpredictable.

Strictly Scientific Research, and its Limitations

Strictly Scientific Research

The strictly scientific research techniques that are used in the hard sciences generally produce the most accurate results. This usually involves qualitative and quantitative evaluations. However, these techniques do **not** work well with the social and psychological sciences, and when studying the thoughts and feelings of human beings. Listed below there are examples of

phenomena that would be **difficult or impossible** to study solely with **strictly scientific methods:**

1) The thought processes, reasoning, strategies, and philosophy an individual utilizes when solving a problem, creating a work of art, studying, setting goals, or making decisions

2) The thought processes and reasoning of individuals with various types of mental disorders, or criminal behavior

3) Thought processes and reasoning of an adult, child, baby, or animal when he or she performs a task, displays anger, or avoidance behavior

4) The level of discomfort or pain an adult, child, baby, or animal is experiencing, from adverse environmental conditions, confinement an illness, injury, or a medical procedure

5) The structure, dynamics, norms, customs of a social or cultural group, and the feelings, beliefs, and values of its members

There are research techniques that can be used to study all of the above, which include the commonly used methods of the social and psychological sciences. **Sometimes** these research techniques can be combined with the techniques of the hard sciences. For example, various types of brain scanning devices can be used to assist in the study of psychological phenomena.

However, brain scanning devices, or any other technique that involves hard science, generally cannot be used by **themselves** to study the complex systems of the social and psychological sciences.

The Dangers of Ignoring Phenomena that Cannot be Identified, Measured or Evaluated with Strictly Scientific Research

A dangerous and erroneous idea is to assume if phenomena cannot be identified and measured with strictly scientific techniques, it does not exist, or it can be ignored. For example, it is very difficult or impossible to use **Strictly Scientific** techniques to evaluate the pain a baby or animal is experiencing during a medical procedure. However, most people would assume a baby or animal is experiencing pain, if they start crying and screaming, when the medical procedure starts, but this is **not strictly scientific proof**. The crying and screaming could be erroneously interpreted as a reflex action, with no sensation of pain.

As a result of the above, many doctors assumed that babies do not experience pain. This erroneous assumption was assumed to be correct until the mid-1980s. Thus, babies would undergo surgery without anesthesia. The babies were restrained during surgery, such as with straps, or by temporarily paralyzing their muscles with medication.

The above is based on the following Internet sources:

1) Video: Doctor's used to believe babies couldn't feel pain?, **2)** Video: A Typical Infant Male Circumcision (WITHOUT Anesthetic), **3)** BABIES DON'T FEEL PAIN: A CENTURY OF DENIAL IN MEDICINE, by David B. Chamberlain, Ph.D., **4)** Before 1987, this baby might have had surgery without anesthesia Gwen Dewar, Ph.D., **5)** The dark history of modern medicine: U.S. surgeons routinely operated on babies without anesthesia, **6)** Babies, surgery and no anesthesia

The pain of farm animals are often ignored, which can be seen in the following videos: **1**) Piglets Castrated Without Pain Killer Castrate Pig Farm Undercover Video MFA **2)** Cruelty at New York's Largest Dairy Farm

MY OPINION, and Conclusion on Strictly Scientific Research, and its Limitations

The strictly scientific research techniques of the hard sciences are highly effective for studying physics, mechanics, electronics, chemistry, and biology. These techniques have led to the development of modern technology. As a result, the hard sciences have greatly influenced society, and its leaders. However, some of this influence is highly dysfunctional. The most obvious is the development of highly destructive weapons, especially atomic and hydrogen bombs. A less obvious but significant adverse influence, stemming from the hard sciences, is presented below.

Many believe that the discoveries and methodology of the hard sciences represent the ultimate way of thinking, reasoning, and solving problems. This is certainly true when the problems involve engineering, and/or resolving technological difficulties. However, the methodology used in the hard sciences have major limitations and weaknesses, in regard to studying feelings, thoughts, pleasure, pain, happiness, sadness, and suffering. From the perspective of hard science, human beings and animals are nothing more than objects, or biological machines. This appears to have influenced society, and some of its leaders, who ignore the pain and suffering of some humans and animals. The videos and articles on the websites **presented above** are excellent examples. The videos show babies and animals being treated as inanimate objects, and ignoring their agony.

The methodology of the soft sciences, also have limitations and weaknesses. This is partly because each human being is a unique system, which is highly complex. As a result, it is difficult or in some cases impossible, to obtain perfect theoretical concepts that can be consistently experimentally verified. Another difficulty is philosophy, and erroneous ideas are often intermingled with the concepts of the soft sciences.

However, from the perspective of the soft sciences human beings and animals are more than biological machines, or objects. With the techniques of the soft sciences, presented in the next section, feelings, thoughts, pleasure, pain, happiness,

sadness, suffering, joy, values, customs, norms, group dynamics, can be studied. With the techniques of the soft sciences pain and suffering can be identified, and eliminated. This may require the assistance of the hard sciences, such as

- To increase food production in the developing countries, to prevent starvation
- To wipe out, or reduce contagious diseases
- To destroy insects that carry pathogens

The hard sciences and the related technological developments require the philosophy and values of the **APPLIED soft sciences**, to guide efforts toward constructive objectives. Without this guidance, the hard sciences and related technology will result in more pollution and more destructive weapons. This will result in death, and pain and suffering, which cannot be detected with the techniques of the hard sciences.

For Supporting Information, Alternative Perspectives, and Additional Information, from Other Authors, on Hard Science vs. Soft science, See the following Websites

1) What is Soft Science?, **2)** The Hard Sciences and the Soft: Some Sociological Observations, **3)** Hard vs. the Soft Sciences, by Steven Burnett, **4)** Soft vs. Hard science, part I, **5)** Soft science and hard news, **6)** Social Science Research: Principles, Methods, and Practices Anol Bhattacherjee University of South

Florida, **7)** What Separates Science from Non-Science? By Alex B. Berezow & Tom Hartsfield, **8)** From the American Association for the Advancement of Science, **9)** "Soft Science" Secrets for Amazing Customer Communications, **10)** Observational Research this article is focused on psychology, **11)** How Hard Is Hard Science, How Soft Is Soft Science? By Larry V.

Less Scientific Research Techniques, the Methodologies of the Soft Sciences

Research Techniques for the Complex Systems of the Soft Sciences

Conventional research techniques were presented in the previous sections of this chapter. Some of these techniques are highly scientific and precise, but many of these techniques are only useful for the simple systems of the hard sciences.

The techniques that are useful for the complex systems of the social and psychological sciences are usually less precise, then the techniques used in the hard sciences. Four examples are 1) covert observations, 2) interviews, 3) surveys, and 4) various types of psychological testing.

There are a number of research techniques, which are even less scientific and less precise, than the four examples presented above. ***However, these less-than-perfect techniques are useful for studying how people think and feel. Some of these techniques are especially useful for studying social***

and cultural groups. **Some** of these research techniques are also useful for studying animal behavior. Below there are five examples, which will be discussed in detail in the following subsections: **1)** Common Sense Observations, and Interpretations, **2)** Projection and Evaluation, **3)** Self-Evaluations and Descriptions of Mental Processing, **4)** Participant Observation, **5)** Participant Observation, Based on Personal Experiences. The information gained by these research techniques, can sometimes be confirmed partly or totally with research methods that are more scientific and precise.

Common Sense Observations, and Interpretations

Common sense observations and interpretations is the simplest technique, which is used in everyday life. This simply involves interpreting what you see, hear, smell, taste, and feel. For example, if an animal behaves as if it is frightened, the assumption would be simply that it is frightened. If a person behaves in an angry manner, the assumption would be the individual is angry.

Obviously, from a scientific perspective, this technique has weaknesses. However, common sense observations and interpretations can reveal information that scientific instruments and highly scientific techniques might **not** be able to detect.

The accuracy and scientific validity of <u>common sense observations and interpretations</u> can be improved with the ideas presented in the following five paragraphs.

1) Examining a single behavior or emotional response can easily result in a misinterpretation. However, examining a **<u>related sequence</u>** <u>of behavioral and/or emotional responses</u> will probably result in interpretations that are more accurate. If the factors that initiated the <u>behavioral and/or emotional responses</u> are also considered, the interpretations will probably be highly accurate.

2) If emotional and behavioral responses are recorded with video and audio equipment, the accuracy of **<u>common sense observations, and interpretations</u>** can be increased. This is partly because videos can be examined frame by frame, as well as by a number of observers.

3) Emotional states of people can usually be confirmed by evaluating body language, and by interviews. Emotional states of both humans and animals can be at least partly confirmed by various types of physiological measurements, and brain scans.

4) If a number of observers simultaneously carry out **<u>commonsense observations and interpretations</u>** at the same point in time, with a specific animal, person, or group the results might be more accurate. Specifically, the most common interpretations of a group of observers might be the most accurate. In some cases, estimating a rough average of all of the

interpretations might be useful. This type of average cannot be mathematically calculated. However, in some cases, a team of observers can present the observations and interpretations on a number scale. For example, evaluating how angry an individual appears, on a scale of 1 to 10. In this situation, the results can be averaged mathematically.

5) If trained observers are used, with common sense observations and interpretations the results will probably be more accurate, then it would be if untrained observers were used.

Projection and Evaluation

Based on the way I am using the terminology, **Projection and Evaluation** is an attempt to gain insight of the emotional and/or behavioral responses of people or animals, by imagining how you would behave in their situation. This can involve imagining that you are the person or animal you are evaluating. To do this, you must obtain an adequate understanding of the circumstances that the individual or animal is faced with, and ask yourself how you might respond if you were the individual or animal.

The above will result in one or more initial hypotheses, which should be tested if possible. This can sometimes be done by removing adverse stimuli, or by talking to the individual, you are evaluating. This may require an adjustment in your initial hypothesis, or it may require a new hypothesis, which should be tested for validity.

To use this technique optimally (**Projection and Evaluation**) it is necessary to develop an awareness of the surroundings and circumstances of people or animals you are evaluating. In addition, you must realize that people and animals might experience their surrounding very differently than you would. For example, individuals that are significantly wealthier than you are will most likely experience the world differently than you do. The same idea applies to poverty, health, social status, intelligence, education, physical attractiveness, and any other positive, negative, or neutral component of life circumstances. You should also consider any other relevant information you have about the individual, to increase the accuracy of **Projection and Evaluation.**

The idea to keep in mind is **Projection and Evaluation** is certainly not a truly scientific technique, and it is **not** as precise as other techniques used in the social and psychological sciences. However, **Projection and Evaluation** can reveal information and insights that cannot be obtained with any other technique. Nevertheless the hypotheses derived with **Projection and Evaluation** should be tested, such as by **1)** interviewing the individual, **2)** asking a series of questions on a survey form, **3)** modifying the environment, and **4)** removing or adding different stimuli, which can be pleasant or adverse. Note, **3** and **4** are useful for evaluating babies and animals.

Self-Evaluations and Descriptions of Mental Processing

This technique involves asking research subjects to carry out self-evaluations of their own mental processing, in relation to a specific task, or experience. Then the subject reveals the result of his or her self-evaluation in writing, or orally. Presented below there are five examples that can be investigated with this technique.

1) Asking participants how they solved a specific problem This can be a problem solved under laboratory conditions, such as a puzzle, or a major difficulty the participant encountered in daily life. This can include the following questions. What are the steps you used to solve the problem? What did you visualize, feel, or experience when you were dealing with the problem? Is there anything else you could tell us about how you dealt with this problem?

2) Asking participants how they coped with an adverse life experience, such as divorce, the death of a relative, the loss of employment This can include the following questions. How did you feel when dealing with this difficulty? How did it affect your life? What problems resulted from this difficulty? Did you solve any of these problems? Is there anything else you could tell us about this difficulty? (***Note**, when the experience and/or questions are complex, such as the above, the best way to obtain the information may be with one or more interviews.*)

3) Asking participants to explain their feelings and reaction to specific stimuli, or experience, such as the startle response, a painful medical procedure, or their initial response to an

emergency This can also involve questions that relate to any interesting or pleasant experience.

4) Asking subjects how they develop a specific skill This can include the following questions? How long did it take you to develop this skill? What are the steps or strategies used to develop this skill?

5) Asking participants how they reached a specific goal, such as what steps they followed to obtain employment, a college degree, a business, financial success, etc.

This technique (self-evaluations and descriptions of mental processing) can probably provide more useful and insightful information, if there are questions that are focused on imagery, feelings, fears, uncertainties, etc. In addition there should be questions that relate to the actions that were initiated by the mental processing.

There are some limitations to this technique (self-evaluations and descriptions of mental processing). The results that are obtained can be influenced by the verbal skills of the research subjects. It can be difficult to explain internal imagery and experiences in words. People are sometimes not completely aware of their internal mental processes, such as their emotional reactions, the steps that they used to solve a problem or perform a task. Some of these limitations can be reduced by providing adequate time for the

research subjects to carry out their self-evaluations, and to answer the questions created by the researcher.

Participant Observation, and Related Concepts

What is Participant Observation

Participant observation is a technique used for studying cultural, social, religious, and deviant groups, by developing a personal involvement with the group and its members. This might involve developing personal relationships with the group members. The researcher might participate in some or all of the activities that are carried out by the members. In some cases the researcher may become an unofficial or official member of the group. In general the involvement of the researcher can range from minimal, with a couple of group members as acquaintances, **to** an official member, who participates in all of the group activities, and maintains close friendships with other members.

Participant observation essentially involves learning about a group and its dynamics as an insider. This can include studying the philosophy, values, norms, customs, beliefs, rules, and culture of the group. With participant observation the researcher might obtain information about the feelings, motivations, beliefs, concerns, and goals of the group members, with casual conversations.

It might be difficult or impossible to obtain the information listed in the previous paragraph with conventional research

techniques. Participant observation essentially circumvents the limitations of conventional research techniques, such as interviews, surveys, and nonparticipant observations.

However, when adequate information is obtained from participant observation, it may be easier to create useful questions for interviews and surveys. In addition, interviews and surveys can be used to check the research results and conclusions from a participant observation study. Studies of this nature can also be checked by using multiple participant observers, and comparing their results and conclusions.

Disadvantages, and Ethical Problems With Participant Observation

Research based on participant observation, might yield distorted results and conclusions, under some circumstances. For example, the members of the group may present idealized behavior patterns for the researcher, and conceal typical behavior patterns that might offend the researcher. This problem can be eliminated if the researcher does not inform the members that they are being studied. However this raises ethical issues, which might be partly reduced by not revealing the name, and location of the group, or any of its members.

Another difficulty is the researcher might present a biased description of the group. This can involve exaggerated positive or negative attributes. A positive bias might be facilitated by

pleasant experiences and friendships with members. A negative biased might result, if the researcher experiences conflict and/or rejection from group members. The difficulties mentioned above can be minimized by using well-trained participant observers.

The results and conclusions from a participant observation study can be checked by using two or more participant observers. Surveys and interviews might also be helpful in weeding out any erroneous results or conclusions from a participant observation study.

Ethical Issues when Studying Deviant Groups, With Participant Observation

When deviant groups are studied, such as street gangs, or criminal organizations, the participant observer may have knowledge of criminal activity. He or she may know individuals that committed serious crimes, and be aware of plans that involve serious criminal acts that threaten life and property. A failure to report such information to the police, involves serious ethical and legal issues. Perhaps, the researcher can reduce the above problems by minimizing the level of involvement with the group.

When there are many ethical issues involved with a planned participant observation study, the best strategy may be to use an alternative method of studying the group. A good alternative is to interview former members of the group.

For Supporting Information, Alternative Perspectives, and Additional Information, from Other Authors, on Participant Observation, see the following Websites

1) Participant observation, **2)** Participant Observation and Crime, **3)** Observation, Participant, International Encyclopedia of the Social Sciences, **4)** Overt Participant Observation, "Gang Leader for a Day", **5)** Ethical Challenges in Participant Observation: A Reflection on Ethnographic Fieldwork by Jun Li **6)** Participant Observation WHAT IS PARTICIPANT OBSERVATION?, **7)** Research Methods – a Case Example of Participant Observation Jessica Iacono, **8)** Participant observation is a research method, **9)** From Participant Observation to Observant Participation: Anthropology, Fieldwork and Organizational Ethnography By Brian Moeran July 2007, **9)** Participant Observation Becoming A Part Of The Research By Ashley Crossman, **10)** Participant Observation Becoming A Part Of The Research, **11)** Observation, Participant International Encyclopedia of the Social Sciences, **12)** Paper 1: Street Corner Society, **13)** Participant Observation and Crime, **14)** Ethical Challenges in Participant Observation: A Reflection on Ethnographic Fieldwork Jun Li, **15)** Participant Observation as a Data Collection Method

Participant Observation, Based on Personal Experiences, and Related Concepts

An Interesting Technique: Participant Observation, Based on Personal Life Experiences

We can use our personal observations and experiences, with a social or cultural group, to evaluate and document what we learned about the group. Specifically, any time we were a member of a group, we were more or less a participant observer. This suggests an interesting technique, which I am calling Participant observation, based on personal life experiences. This involves writing a *research paper about a group you were involved with, as if you were a participant observer. With this technique you use your **memory** as a source of information. You can also use diaries, photographs and/or videos if available.

(*Note, technically speaking, this is not a true research paper, because you are using information you already have acquired. However, the idea here is to write the paper more or less as if you were a participant observer writing a research paper.)

Participant observation, based on personal life experiences, is excellent for students that want to write an **ORIGINAL** paper, if the technique is accepted by their instructors. This is because unlike conventional techniques for **ORIGINAL** scientific work, it does not require money to obtain equipment, supplies, laboratory assistants, and experimental subjects.

Presented below, there are some topics that can be used to write a paper, which involves participant observation, based on personal life experiences.

- Your observations and experiences of any unusual group or organization you were involved with, is an ideal
- Your observations and experiences of a school you attended. This can be grammar school, high school, college, or trade school, etc.
- Your observations and experiences of a social club you attended
- Your observations and experiences of a religious group that you were involved with for more than three months.
- Your observations and experiences of your own culture and society
- Your observations and experiences of your friendship group
- Your observations and experiences of your family

Note all of the above examples involve some type of group, from the perspective of social science.

You can write about the group from varying levels of personal experience. This can range from a highly **objective presentation** strictly focused on the group, to a highly **personalized presentation,** or anything in between the two extremes. Alternatively, you can present your **objective**

observations, and your **personal experiences,** in separate paragraphs or sections of your paper.

An excellent example of a highly **personal presentation** can be accessed by left clicking on the following link. ON LOVING AND HATING MY MENTALLY RETARDED MOTHER, BY Carol Rambo Ronai, Ph.D. University of Memphis.

Note about the article: This article is written in the style of a true scientific research paper, and it contains references to other scholarly sources. However, the author conveys the conflicts and difficulties of having a mother who is mentally retarded in a very personal style.

The author of this article suffered sexual abuse, and other problems, because of the impaired judgment of her mother. Based on this, some people might argue that individuals with mental retardation should **not** be allowed to become parents. However, a mother with mental retardation produced an intelligent woman, with the PhD. My opinion is parents with mental retardation should be closely supervised by relatives and/or trained professionals, on an ongoing basis.

Participant observation, based on personal life experiences, is a useful and legitimate research method in my opinion. Some people will disagree, but this technique can be used to obtain information that may be difficult to obtain with conventional techniques. This will be obvious if you examine the article

mentioned above (ON LOVING AND HATING MY MENTALLY RETARDED MOTHER).

There is of course a risk of bias, and distortions with Participant observation, based on personal life experiences. This should be kept in mind when reading any article based on personal experiences.

Ethical Issues with Participant Observation, Based on Personal Life Experiences

In some cases, there may be ethical issues with this technique, if the individuals in the research paper can be identified. This is especially the case if you are revealing the personal information of others. For example, the author of ON LOVING AND HATING MY MENTALLY RETARDED MOTHER, revealed that her mother is mentally retarded, and she explained that her father and mother sexually abused her, which is a serious crime. There is an ethical issue here, unless the author obtained consent from her parents to reveal this information. An ethical issue of this nature can also be resolved, by using fictitious names. With the above example, the author would have to conceal her own name, because the parents can probably be identified, based on the author's name.

Participant Observation, Based on Personal Experiences of RESEARCH SUBJECTS

In this subsection I am presenting a modified version of the technique presented above, which I am calling: participant

observation, based on personal experiences of **research subjects**. With this technique, a number of research subjects must be obtained that **are,** or **were** members of the group, you want to study. Then you request that each subject write a research paper based on their observations and experiences in the group.

Many of the research subjects might need assistance in writing the research paper. This assistance can range from simple instructions, editing portions of the paper, rearranging and rewriting the paper. This can also involve providing a trained individual to write the paper for a research subject, based on detailed interviews.

When you have an adequate number of research papers from the subjects, you can compare the papers to obtain a clear picture of the group. This should include an attempt to weed out erroneous or inaccurate data. Then you can write your own paper with the results and conclusions, which are based on the data obtained from the subject's papers.

The accuracy and scientific validity of participant observation, based on personal experiences of research subjects will most likely be determined by the number of subjects you obtain.

Participant observation, based on personal experiences of research subjects, is especially useful for studying highly deviant groups, especially if they are involved with criminal activities.

This would involve using research subjects that were former members of the group.

To go to the first page of this chapter left click on these words

HYPERLINK TABLE OF CONTENTS

Below is the hyperlink table of contents of this chapter. If you left click on a section, or subsection, it will appear on your computer screen. Note the chapter heading, the yellow highlighted sections, and the blue subheadings are **all active links.**

To go to the first page of this chapter left click on these words

If you want to go to the next chapter left click on one of the following links

For HTML www.TechForText.com/R/Chapter-8

For PDF www.TechForText.com/R/Chapter-8/PDF.pdf

If you want to see a list of all