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ON THE HORNS OF A DILEMMA

THE UNEASY PARTNERSHIP BETWEEN ADVOCACY AND SOCIAL SCIENCE

by
Karl R. White



74th Faculty Honor Lecture
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Utah State University
Logan, Utah

SEVENTY-FOURTH HONOR LECTURE DELIVERED AT THE UNIVERSITY

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Karl R. White was selected by the committee to deliver the Annual Faculty Honor Lecture in the Humanities. On behalf of the members of the Association we are happy to present Professor White's paper.

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Committee on Faculty Honor Lecture

ON THE HORNS OF A DILEMMA

The Uneasy Partnership Between Advocacy and Social Science

By
Karl R. White

Most of us living in the United States enjoy the highest standard of living in the history of the world. Taken together, the technological, cultural, recreational, medical, and educational opportunities of our society are unsurpassed. But we also face an abundance of critical social problems. Widely quoted and seemingly accurate statistics which describe such problems include, but are not limited to the following.

- ◆ Last year 1.2 million American teenagers became pregnant; 400,000 of those pregnancies ended in abortion.
- ◆ Homelessness has reached epidemic proportions with over 3 million people reportedly being homeless. Families are the fastest growing segment of the homeless.
- ◆ The number of families living in poverty has increased by 40% in the last 5 years. Today one out of every two Black children and two out of every five Hispanic children are living in poverty.
- ◆ Single-parent families comprise one-quarter of all American families. An increasing number of divorced and abandoned women are the sole source of support for their children. The inadequate availability of affordable, high-quality day care places these parents in untenable situations and creates serious risks for their children.
- ◆ The United States has a higher infant mortality rate than 27 other nations, including Singapore, Malta, and Cyprus.
- ◆ Although the use of illegal drugs has recently declined among American youth, over 60% of children try an illegal drug before leaving high school.
- ◆ Homicide is the second and suicide is the third leading cause of death for all teens, and the rate of teenage suicide is rising.
- ◆ One in seven youngsters fails to complete high school 23 million adult Americans are functionally illiterate.

- ◆ Nearly one in five American children has no medical insurance (either private, employer provided, or Medicaid). Medicaid provides health services to less than one-half of our country's poor pregnant women and children.

The list of urgent social needs is almost endless. In addition to those listed above, people are justly concerned about our inadequate prison systems, high rates of alcoholism and depression, unavailability of early childhood education, the lack of affordable housing, the incidence of child abuse and neglect, the increase of stress-related illnesses, etc., etc.

Unfortunately, listing statistics about such problems tends to numb our sensitivity to how critical these problems really are. Unless we are careful, it is easy to forget that such statistics represent real people with real problems who often live in desperate situations. To set a context for what I want to say about the dilemma faced by those who advocate for solutions to such problems, let me give you two brief glimpses of people whose lives are fraught with some of these problems. The excerpts are from interviews that actually took place.

No, my children don't go to school. You see, you need an address to go to school. We live in a car.

There is my husband, myself, and our two daughters. We had a house. Then the business my husband worked for went bankrupt. He was only able to get minimum pay jobs since then. He worked all the time day and night, but he was not even earning \$5 an hour. It was not enough to make our house payments--\$700 a month--and eat too. We found a one bedroom apartment we could afford to rent and still have enough to eat.

Then one night, my husband didn't come home. I don't know what happened to him. I don't think he would desert us. He loved us. I think it was the neighborhood we rented in. There were terrible people--the things some of those young boys used to say to me and my daughters when we went out. They'd leer at me and say terrible things.

I reported my husband missing to the police. They said they would help and an officer did come by the apartment a few days later. That's the last I heard. I used to stop by the police station every few days to see if they learned anything, but they hadn't found him. I went down to the morgue once to look at a man. That was terrible. It was not my husband.

Then I couldn't pay the rent. The landlord was very mean. He evicted us the day after the rent was due. That's when we started living in the car.

Yes, I've applied for welfare. That was difficult because I didn't have an address. I haven't gotten a welfare check yet. We stay in shelters, but you can only stay there a few nights. I have to

be careful. I can only move the car a few blocks at a time because it's running out of gas.

How are we eating? We're begging. I am sure people give us money because of the children. What am I going to do?



My son is into drugs. He doesn't attend classes. The principal says he walks the halls. The principal says he can't continue to walk the halls. He is going to have to leave school. What is he going to do if he leaves school? What's going to happen to him?

The school says he needs drug treatment. I agree. I don't have medical insurance. The drug detoxification center won't take him unless I can guarantee to pay the bill. I can't. I have three other children. My wife and I are barely making it now.

My work? I am a laborer. I work for contractors when jobs come up. Benefits? You have to be kidding. I'm lucky to get the work. Straight salary--paid in cash. No records. No benefits. No drug therapy for my son.

I am thinking of going to work for Burger King. I could get benefits there. But, my other kids would suffer because I couldn't make enough money for food and housing.

The Dilemma

The statistics and the excerpts from these people's lives set the stage for the title of this lecture: **On the Horns of a Dilemma: The Uneasy Partnership Between Advocacy and Social Science**. The dictionary defines a dilemma as a situation involving choice between equally unsatisfactory alternatives. The phrase "On the horns of a dilemma" was first used by the Greek rhetoricians. Lemma means something which is taken for granted, a dilemma is a double lemma, or a two-edged sword--or according to the Greeks, a bull which will toss you whichever horn you lay hold upon.

Faced with societal problems of the nature referred to above, the advocate tries to convince someone of the urgency of the problem and to implement a proposed solution--some type of intervention which will ameliorate or even eliminate the problem. The question is always what type of intervention is best. For example, will a reduction in the infant mortality rate be achieved most cost efficiently by expanding Medicaid coverage for poor women, educating physicians in the latest techniques, reducing the frequency of caesarian section births, funding a national health insurance program, spending more on medical research, or mounting an educational campaign to encourage more extensive use of prenatal care by pregnant women?

For most problems, there are far more potential solutions than either money or interest. Thus, politicians, government leaders, and private groups must choose between competing alternatives. In most cases, a consideration of possible alternatives is preceded by an even more basic question--should infant mortality even be addressed or should they focus their attention and limited resources on increased rates of crime, homelessness, teen-age suicide, alcoholism, early childhood education, etc., etc. The advocate has two challenges. First, to convince the decision makers that a particular problem is important enough to address; and second, that the solution the advocate is proposing is really the best from among the alternatives.

The dilemma faced by the advocate is that if the argument is made based on political persuasion, emotion, common sense, or intuition; decision makers will often demand better data about the urgency of the need and the probability that the proposed solution will be effective. It is in trying to collect such data, however, that the advocate frequently becomes impaled on the dilemma's other horn. Either the data is not easily available and will take too long or be too expensive to collect; or what data are available are contradictory to the position being advocated. If the advocate waits to collect data, the opportunity may be lost and the available money spent elsewhere. If the advocate attempts to argue the case without such "scientific data" the decision makers will often give priority to those who have data. Thus, the advocate is caught on the horns of a dilemma--and all because of the decision makers' preoccupation with science.

Defining Science and Advocacy

To understand the dilemma faced by advocates, let me first clarify how I will use the terms "advocacy" and "science." Science is the pursuit of truth. Scientists seek to understand, predict, and explain phenomena. By definition, science is objective, impartial, and unbiased. Scientists are obligated to provide a balanced, objective interpretation of data, even when the interpretation of those findings may be unpopular or contradictory to previous findings. The very essence of science is replication, and scientific findings which have not or cannot be replicated have little value.

By contrast, advocates seek to protect and enhance the interests and welfare of those for whom they advocate. Advocacy is unashamedly biased, partial, and somewhat selective in the information presented. Although it has not always been an expectation that advocates use scientific data in their advocacy efforts, such an expectation is becoming common place. Earlier advocacy efforts for societal needs have depended very little on scientific data. For example, the merits of deinstitutionalization for handicapped people were argued for on the basis of what was morally correct, humane, and appropriate. Little if any reference was made to data. Frequently used bases for advocacy include morality, equality, justice, legality, and political patronage; but there is an increasingly frequent expectation that such advocacy will be backed up with facts and figures.

Although there is an increasing expectation that advocacy efforts will include some data, almost everybody agrees that it is inappropriate for science to use many of the techniques which are acceptable for advocacy. For example, advocates may argue a position based on feelings, popular opinion, and hopes; whereas a scientist is expected to argue based only on facts which have been impartially collected and are subject to independent replication.

The types of societal needs referred to above are real and in urgent need of solutions. Based on its ability to literally transform the world in other areas, many people have high expectations for the ability of social science to make the same sorts of contributions in solving society's ills as science made in developing atomic power, perfecting heart transplants, creating plastics, and putting man on the moon. As Bertrand Russell (1951) noted almost 40 year ago, ". . . We are only at the very beginning of [science's] work in transforming human life." (Page 1)

Unfortunately, the positive contributions of science to solving societal problems have been meager to date. Even though we have achieved stunning technological and medical advances in the last 20 years, we have done little to alleviate human suffering, improve education, or eliminate many of the social injustices which exist. Why, if science has been so successful in making technological and medical advances, has the progress been so meager in addressing these social needs? A major part of the answer is that scientific information frequently accumulates too slowly and yields information which is too narrow or overly qualified for addressing societal needs. As Walter Mondale once told the American Educational Research Association, "I need a one-armed scientist. I am tired of you people telling me, 'On the one hand . . . but, on the other hand.'" Consequently, in those situations where decisions are needed but good data are not available, people advocate for a solution based on their intuition, logic, emotion, and powers of persuasion. Unfortunately, people often advocate as if conclusive scientific evidence exists, when it does not. Such inappropriate use of data is referred to here as the use of pseudo-scientific data. There are at least three negative consequences associated with the use of pseudo-scientific data.

First, when pseudo-scientific data are used in advocacy efforts, encouragement is given to the widespread use of unproven practices. Some such practices will eventually prove to be effective (for example, reducing cholesterol as a means of reducing the risk of heart disease was widely advocated before there was conclusive scientific data). Some such practices will be harmless, but ineffective, such as the use of Laetrile in the treatment of cancer. The danger in such instances is that people will be placated by a harmless but ineffective treatment and will consequently not seek out more effective treatments. For example as far as we know, there is nothing physically harmful about taking Laetrile to cure cancer. However, people receiving Laetrile treatment are less likely to seek other effective forms of treatment. A few practices for which people advocate prematurely will actually be harmful, such as megavitamin therapy, the use of the Thiamidolide, and blood letting.

A second problem with using pseudo-scientific data as a part of advocacy efforts is that it often creates inappropriately high expectations among consumers, administrators, and funding agencies. All too often, specific reforms or programs designed to deal with societal problems are advocated as if they were certain to be successful. If these expectations are not achieved, public and private support can boomerang, resulting in an unwillingness to even address the problem area in the future.

Third, advocacy based on pseudo-scientific data often inhibits future research on those same questions. Having heard the incessant repetition of such data by advocates, funding agencies refuse to provide funding for such research because they believe that those questions have already been sufficiently answered. Thus, in the long term, the extensive use of pseudo-scientific data retards and sometimes even prevents the collection of the very data which are needed.

The Value of the Scientific Method

It is not that anybody questions the value of good data. The question is how to obtain such data for use in making decisions about which societal problems to address and how to solve them. Philosophers of science (e.g., Buchler, 1955; Cohen & Nagel, 1934) have suggested that there are at least four ways of knowing--all of which are relevant to making such decisions. The first is the **method of tenacity**. People who use this approach defend their positions through frequent and vigorous repetition of what they believe to be "obviously true." They operate on the principle that if you say something often enough, people will believe that it is true. How often have you heard that if you give your children sugar, they will become more hyperactive? It so happens that even though there is absolutely no evidence to support this position; it has been repeated so often that most people believe it is true.

A second method of knowing is the **method of authority**. In this case, a particular position is adhered to because it has been advanced by someone who ought to know (e.g., an "expert"). How many weight reduction programs are tried by people because the program was developed by a physician and physicians are seen by many people as experts regarding physical health? A third approach is the **method of intuition**, in which a particular position is preferred because it appeals to "common sense" or "seems logical". Although there is nothing wrong with "common sense", it can sometimes be misleading. These three approaches to gaining and using knowledge are what are used most frequently by advocates. They are used frequently because they are flexible, fast, and economical.

The least frequently used approach for determining the efficacy of a particular program is the **scientific method** of knowing. It is seldom used in advocacy efforts because it is slow, relatively expensive, and its results are unpredictable. The scientific method is well established in other areas, however, and has been used in countless thousands of studies from agriculture to medicine. One of the earliest examples is recorded in the Bible where Daniel of Lion's Den fame was held hostage in Nebuchadnezzar's court. For religious reasons, Daniel and his friends wanted to eat

a mix of vegetables called pulse instead of the king's food. The king's servant feared for his own life if he agreed to Daniel's request. Daniel proposed a controlled experiment and promised to eat the king's food if, at the conclusion of this experiment, his diet did not prove to be just as good. Quoting from a translation of the original article, (Daniel 1: 12-15)

Prove thy servants, I beseech thee, ten days; and let them give us pulse to eat, and water to drink.

Then let our countenances be looked upon before thee, and the countenance of the children that eat of the portion of the king's meat: and as thou seest, deal with thy servants.

So he (the servant) consented to them in this matter, and proved them ten days.

At the end of the ten days, their countenances appeared fairer and fatter in flesh than all the children which did eat the portion of the king's meat.

Although we may quibble about the specifics of this design--subjects were not randomly assigned groups, pretest data were not available, the experiment was of rather short duration for a nutrition study, and outcome measures were arguably subjective--the critical issue--and this is what is relevant to the dilemma faced by advocates of social needs--was that one group received one type of intervention, the second received another. After a time period, data were collected to see which group was functioning best.

The benefits of this comparative-experimental approach have been demonstrated thousands of times. Sometimes the results confirm clinical judgment, as when researchers confirmed that continual low doses of aspirin would reduce the incidence of repeat heart attacks--sometimes the results are surprising. Researchers using the scientific method attempt to define and isolate a single agent (or variable) in order to establish causal relations between observed phenomena and possible agents. Although there are many approaches, randomized experiments are one of the most widely accepted methods of establishing such causal linkages.

The term "randomized experiments" refers to the process of randomly assigning subjects to groups (i.e., ensuring that every subject has an equal chance of being in any group) to increase the probability that groups will be comparable on all variables that might affect the outcome except for group membership. Thus, any differences between the groups at the end of the experiment can be more confidently attributed to the differences in treatment rather than some extraneous variable.

As a more modern example of a randomized experiment, consider the recent case of a drug propranolol which was alleged to prevent reoccurrence of heart attacks (Borg & Gall, 1985). To determine the efficacy of this particular drug, almost 4,000 patients who had previously suffered at least one heart attack were randomly assigned to one of two groups. One group received propranolol, the other did not. At the conclusion of the

experiment, the mortality rate from new heart attacks was 28% lower in the propranolol group than in the comparison group. Because the only systematic difference between the two groups was that one had received propranolol and one had not, the difference in mortality rate was attributed to the drug.

Obviously, the use of randomized experiments is not the only way to establish a cause and effect relationship (e.g., it is now well-accepted that smoking is causally related to lung cancer even though randomized experiments have not been conducted), but it is one of the most efficient methods and has been used successfully in many different areas. Such research has demonstrated the ineffectiveness of many otherwise popular treatments (e.g., dietary treatments of hyperactivity, Spring & Sandoval, 1976; cell therapy for Down syndrome children, Pruess & Fewell, 1985; the use of laetrile in cancer therapy, Newell & Ellison, 1980; and Doman Delecatto treatments for learning disabled children, Glass & Robbins, 1967). In many other cases, randomized experiments have established the benefits of a particular treatment (Mosteller, 1981),--even in cases where the value of the treatment was not particularly obvious (e.g., the effectiveness of fluoride in reducing the incidence of dental caries, Blayney & Hill, 1976; or the fact that trained paraprofessionals can provide certain services as effectively as professionals, Durlak, 1979; Pezzino, 1986; Shortinghuis & Frohman, 1974).

Objections to the Use of the Scientific Method in Evaluating Social Programs

In spite of the historically demonstrated value of randomized experiments, they are seldom used by advocates for various social programs and many people believe that such designs are inappropriate for drawing conclusions about the value and benefits of interventions designed to address societal problems. The most frequently cited arguments can be summarized in three broad and somewhat overlapping categories.

The first argument suggests that randomized experiments are **unnecessary** because the information needed to decide whether a particular approach is beneficial is more easily available from other sources. The second argument is that randomized experiments are **impractical** due to a wide variety of logistical, political, and technical difficulties. And, finally, it is argued that randomized experiments are **unethical** and probably illegal because the process of randomization requires that needy people be denied treatment or assigned to an undesirable treatment.

I will argue that each such objection to the use of randomized experiments in evaluating the value of social programs is incorrect. Such designs are valuable and should be more widely used. The absence of such experiments has been a serious impediment to the advancement of knowledge about how societal needs should be addressed. Such designs are feasible to implement and, if properly conducted, are neither unethical nor illegal. Furthermore, if such designs were used more frequently, the advocate's dilemma referred to earlier would be substantially lessened.

Are Randomized Experiments Necessary?

Even though opponents agree that randomized experiments would provide good information about which program is most effective, they argue that there are other ways of knowing which are adequate, and easier to implement. Obviously, there are many instances where causal inferences can be made confidently without data from a randomized experiment: A particularly strong wind topples a tree, an earthquake causes a building to crumble, modeling causes a young child to learn to speak English instead of German. Because there are no plausible alternative explanations in these instances, it would be foolish to argue with the validity of the causal inference. However, in determining which type of intervention is most effective in addressing a particular societal need, alternative explanations abound and serious mistakes are sometimes made.

Professional judgment or common sense is probably the most frequently used basis for arguing that a particular approach is best for addressing a given need. Whitehead (1911) noted that common sense can be a bad master. "Its sole criterion for judgment is that the new ideas shall look like the old ones." For example, it was common sense to many educators of the nineteenth century that punishment was the most effective way to motivate children to learn. We now have evidence that reward is actually a much more powerful way to motivate children.

Of course, professional judgment is often correct and has led to significant advances. Occasionally, however, over reliance on professional judgment leads to serious mistakes. One dramatic example comes from the late 1940's, when technological advances in incubators for low birth-weight babies made it possible to systematically monitor the amount of oxygen provided to such infants. Because respiratory distress was the highest cause of morbidity and mortality among such infants, it was reasoned that increasing the concentration of oxygen would result in better outcomes. Encouraged by anecdotal reports and their own common sense, physicians across the country began the practice.

Within a short time, the incidence of retrolental fibroplasia (which leads to blindness) increased dramatically among such infants. Some suggested that the increased exposure to oxygen was responsible. However, the notion was initially rejected because it was counterintuitive that something as essential as oxygen--particularly when it was needed to treat respiratory distress--could be harmful. Eventually, randomized experiments were conducted and it was conclusively demonstrated that oxygen was the culprit (Godron, 1954).

Such errors are not isolated occurrences. Gilbert, McPeck, and Mosteller (1977), using INDEX MEDICUS as a source, analyzed all randomized experiments of major surgical and anesthetic innovations conducted between 1964 and 1973. Because of the life-threatening nature of the problems being treated, all 36 of the innovations they examined were supported by a great deal of professional judgment, anecdotal evidence, and correlational data prior to implementation of the randomized experi-

ment. Nevertheless, the results of the trials indicated that more than half of the innovations were actually worse than the standard technique to which they were compared. Eleven percent were equally as good and thus provided an alternative approach that might be useful in specific circumstances, while only 33% were actually better. From these examples, it is clear that professional judgment should not be the sole means of deciding which treatment is best.

The use of correlational research is sometimes suggested as another alternative to randomized experiments and there are many examples of important causal relationships which have been established on the basis of such research (e.g., the relationship between cholesterol and heart disease). However, before deciding that correlational research is preferable to randomized experiments for a given issue, one should consider the tedious and time consuming exclusion of alternative explanations required to make causal inferences from correlational data. Unless such work is done, correlational research can lead to seriously inaccurate conclusions.

For example, a study of the correlation between amount of psychotherapy and measures of psychological well-being might conclude that psychotherapy is harmful because those patients who receive the most psychotherapy are least healthy. A more plausible explanation is that those people who only have minor problems are "cured" relatively quickly and thus receive very little psychotherapy. The more severe cases are likely to receive extended therapy, and those cases are least likely to show dramatic progress because the disease is so far advanced. Similar examples abound. Sick people are most often found in hospitals, but not necessarily because hospitals cause sickness; police officers are found near the scene of the crime more frequently, but not because police officers commit more crimes than anybody; and students who receive tutoring generally receive lower grades than untutored students because it's generally only the students who are already receiving failing grades who seek out tutoring.

Are Randomized Experiments Practical?

A frequent argument against the use of randomized experiments is that even though they would provide useful information, administrators, service providers, and parents would never allow such experiments to be conducted in evaluations of social programs. The alleged opposition to randomization would occur because nobody would agree to participate in a study in which they knew that some people would be denied services or that some would be receiving less effective services. Both logic and experience suggest that such opposition is more imagined than real.

Consider the question of what types of services are best for young handicapped children. At the present time, such children are arbitrarily provided with varying amounts and types of early intervention based primarily on what is popular and/or affordable in that particular area or

where the administrator of the program received his or her training. In any large metropolitan city, some handicapped preschool children will be receiving home-based intervention, some will receive center-based intervention, and some will receive a combination of center- and home-based intervention. Some will be provided with a highly structured teacher-directed curriculum, while others will be given a more child-directed humanistic curriculum. Some children will attend intervention for five days a week, others will be visited as little as once a month. These variations are not explained to any substantial degree by on the type and severity of the handicap, the age of the child, or preferences of the parents. In other words, the type of intervention provided to children is constantly varied as a function of the experiences, biases, and resources of individual service providers.

It is difficult to imagine a situation which is more ideal for randomized experiments. Furthermore, the fact that there are not enough early intervention services to go around, coupled with the absence of certainty about what type of program is most effective, creates a situation in which randomized experiments are clearly feasible and, therefore, probably the best way for deciding who gets what. Unfortunately, such experiments are seldom done.

One of the easiest situations for randomized experiments is where there is not enough of the treatment for everybody to participate. Consider the Salk poliomyelitis vaccine trials in which some children were given the vaccine, while others were given an inert saline placebo. All children could not be given the vaccine because it was physically and technologically impossible to produce enough vaccine during the first year. Some argued that the vaccine should be distributed on a first-come first-serve basis. However, such an allocation would have discriminated against less well-educated families, because they would not have been aware of the availability of the vaccine. Thus, the creation of randomized experimental and control groups was not only a highly moral allocation of a scarce resource, but it also provided definitive information about the efficacy of the vaccine.

Program administrators often argue that parents will not agree to participate in randomized trials. Our experience is much different. In over 20 studies conducted during the last five years at the Early Intervention Research Institute, acceptance rates by parents to the condition of random assignment has ranged from 85% to 98%. Similar figures are reported by Ramey (1985) for his Abecedarian and CARE projects and by Gross (1985) for the Infant Health and Development Project, both of which are treatment versus no treatment studies. Such high acceptance rates suggest that randomized experiments can be conducted in a way which is acceptable to administrators, service providers, and consumers.

Are Randomized Experiments Legal/Ethical?

Random assignment of children to treatment versus no treatment groups or to comparative treatment groups would be unethical in those situations

where there is proof that one treatment is superior and sufficient resources for that particular treatment are generally available in similar circumstances. Neither of these conditions are present in most situations where decisions concerning social programs must be made.

The most important condition is that unequivocal information is available about what works best. At the present time, most people rely on professional judgment for making such decisions. However, professional judgment is sometimes incorrect about what is best in a given circumstance. The example described earlier about high concentrations of oxygen for premature low birth weight babies is one of the most obvious, but it is not an isolated occurrence. Consider the following two examples; one from medicine, and one from early childhood education.

Gilbert, Light, and Mosteller (1975) described an experiment to determine if a major contributor to skyrocketing medical costs was the fact that insurers would only pay for work done in the hospital. It was hypothesized that inpatient services (which were relatively more expensive), were being used in instances where outpatient services would have been just as good; and that substantial saving would result if insurers would pay for outpatient services in cases where it could be appropriately substituted for inpatient services. An experiment was conducted in which 15,000 people were randomly assigned to a group in which the outpatient benefits were added on a trial basis, or to a group in which the regular program remained in effect. A year later, the results were completely contrary to expectations. Medical costs for the group with the added outpatient benefits rose by 16% while that for the group with regular benefits increased by only 3%. Both logic and professional judgment were incorrect.

Another example where common sense was incorrect is from a study of programs for early childhood special education. In a study conducted in Great Britain (Sandow & Clarke, 1978; Sandow, Clarke, Cox, & Stewart, 1981) children were divided into matched groups in which the first group received a home-based intervention program with individual visits at two-week intervals. The second received a similar home-based intervention program but were only visited once every eight weeks, and the third group received no intervention. It was hypothesized that the more-frequently visited group would make the greatest gains. Contrary to expectations, the group visited least frequently did the best. Although these differences faded out in follow-up analysis (Sandow et al., 1981), the fact remains that the more intensive treatment was worse in the short run and no better in the long run.

Standards for what constitutes adequate intervention are generally based on intuition, collective wisdom, and/or clinical judgment; some of which is correct, some of which is probably not. Consider the situation in which half-day center-based programs are provided to 3- to 5-year old handicapped children, but there are not enough resources to serve all handicapped children in the catchment area. Consequently, services are provided to those who sign up first and others are put on a waiting list. Unfortunately, the position that a certain minimal level of services must

be provided (in this case five half-days each week) is seldom based on any sound empirical data. It may be that a three-day-a-week intervention program or a home-based program in which visits are made to each family once a week would be just as effective and more cost effective. If the more limited program were just as effective, additional children could be served. Consequently, some children may be going without services because the service provider is insisting on meeting a "standard" for which there is no real proof.

This problem is graphically demonstrated by the way in which school aged children with handicaps are currently served. Before 1970, the collective wisdom of professionals was that it would be unethical to place a child with a moderate to severe handicap in a regular education classroom. The reason was because it was believed that such a child needed specialized services which could best be provided in a separate classroom with special teachers, using specialized equipment and curricula. With the passage of P.L. 94-142, it was suddenly unethical, as well as illegal, to keep such a child in a separate classroom. Now it was maintained that such a separate class isolated the handicapped child, prevented social development, damaged self-concept, and did not prepare the child for the real world. Thus, the law required that, to the extent possible, children with handicaps be educated with their non-handicapped peers.

The point is not whether "mainstreaming" is good or bad. The point is that decisions about what constitutes ethical practice are often made without sufficient data. Parallels in all types of social programs are painfully obvious. A wide variety of programs are currently used to treat alcoholism, reduce teenage pregnancy, rehabilitate criminals, etc. Yet, very few people are willing to submit their program to the type of systematic analysis which would occur in randomized experiments. Their objections are often based on the fact that such experiments would be unethical. In fact, they are not, because in most cases, we do not yet know which type of program works best.

When sufficient resources are not available to provide services to all eligible people, programs are typically provided on either first-come first-served, or to those people who are "most in need of help." Generally, once the available slots are filled, no further effort is made to identify people in need of services because it is argued that it would be unethical to identify the people and not provide them with services.

As an example of the problems with this type of an approach, consider a state which has virtually no publicly-funded prenatal programs for poor women. The state estimates that there are at least 1,000 women each year who would be eligible for and benefit from such services if the right type of service could be designed. Consequently, they offer to provide enough money to develop and implement a pilot program for 100 women. If it can be demonstrated that the program is effective, they promise that the budget will be expanded. From a historical perspective, we can predict what would happen. Most people would take the money, identify the first 100 women, collect pretest and post-test data, and on the basis of that data, argue that the program had been effective.

Not only is such an approach bad science, but it is no more ethical than to identify 200 women, randomly assign 100 to receive services and use the other 100 as a control group. Those who argue that such a design would deny services to the 100 women in the control group seem to forget that those same women would have gone unserved using the first approach. In fact, by participating in the randomized experiment, they actually receive more services since they receive more extensive medical tests as a result of being in the experiment. Furthermore, if subjects are served on a first-come first-served basis, the acquisition of services is biased towards those women who are better-educated, more active in the community, and better informed. In fact, Campbell (1969) argues that the random allocation of services is the most democratic and moral means of allocating scarce resources, since a "first-come, first-served" policy perpetuates social inequality.

The other argument which is used in allocating scarce resources is that those who are most in need should receive the resources first. This argument was used by Hainsworth (n.d.) in a study designed to provide early intervention services to children with severe handicaps. Twenty-three children who met the criteria for receiving services were identified, but the project only had enough resources to serve half of them. Thus, the 12 children who were most severely handicapped were selected to receive the services. Such an approach ignores the fact that very little is known about what type of children benefit most from early intervention services. Perhaps with this particular program, the more severely handicapped children would make no progress and children with less severe handicaps would make great progress. If that were true, it is difficult to argue that the severely handicapped children should be served while the moderately handicapped children are left unserved. The best way to determine which children profit most from services is to conduct randomized experiments, rather than to argue that the most needy children should be served first based on logical and ethical grounds. Unfortunately, very little such work has been done.

How Much Do Policy Makers Depend on Scientific Data?

Another reason that the scientific method is used so seldom in advocating for social programs is that the advocates have learned that although policy makers frequently demand data, they seldom actually use it to make decisions. Since any old set of data will probably be good enough to clear this hurdle, why go to all the expense and trouble of collecting good data? Unfortunately, it is incorrect to assume that if research findings can be used to demonstrate the value of a program, additional money will be available for operation and expansion. In fact, research is only one of several factors (often a relatively insignificant one) which contribute to decisions of whether to fund or continue a particular program.

A common misperception is that decisions about the development, implementation, and continuation of programs designed to address social needs are based on a rational scientific approach to problem solving. In other words, many people believe that politicians and government officials

objectively appraise available data about needs, select those that are most urgent, review the various strategies for addressing a particular need, select the strategy with the highest probability of success based on results of previous research, and then allocate sufficient funds to develop, implement, and evaluate the success of the program. In these times of tight budgets, there seems to be the additional belief that only those programs will be funded which can demonstrate a "profitable return on the original investment". In other words, in order to receive continued support, programs must be able to demonstrate earnings or savings at least as great as the cost of development, implementation, and operation.

Unfortunately, this view of policy formulation is overly simplistic and substantially inaccurate. In reality, policy formulation is usually a convoluted and ever-changing web of special interests, historical accidents, politics, imperfect data, and personalities. In an excellent analysis of how policies for children are made by the federal government, a panel convened under the direction of the National Academy of Sciences (Hayes, 1982) concluded that the formation of policy is affected by at least the following six factors:

1. **Contextual factors**, including those social, economic, demographic, political, and ideological factors that shape the overall context of decision-making.
2. **Constituency activities**, including direct and indirect pressure, exerted by both organized and unorganized constituencies.
3. **Principles and ideas** that shape a participant's vision or policy goal.
4. **Actors and institutions**, including those that participate directly in the decision-making process in the legislative, executive, and judicial branches of government, and in the private sector.
5. **Media** presentations, including television, radio, and the popular print media.
6. **Research** including both basic and applied studies; evaluations of existing programs; and data describing the demography or status of certain groups.

These factors continually interact, to greater or lesser degrees, in the formulation of any given policy. For example, in the late 1960's, a CBS documentary on hunger in America (media) generated immense public concern (constituency pressure) about the prevalence of malnutrition in the United States. The documentary coincided serendipitously with Hubert Humphrey's efforts (actors and institutions), following defeat in the Senate committee, to take his battle for enactment of the Special

Supplemental Food Program for Women, Infants, and Children (WIC) to the floor of the Senate. Using pictures of malnourished infants, Humphrey touched a humanitarian chord among his colleagues (principles and ideas) and was able to convince them that it was both morally and politically wise to enact a relatively modest \$20 million dollar a year program via an amendment to another bill (Nelson, 1982). Funding for the WIC program has since grown to over \$1 billion per year (Select Committee on Children, Youth, and Families, 1984).

Even though research findings were of very minor importance in the WIC legislation, it is possible to find situations where research findings are highly visible in decisions about whether to fund or continue social programs. For example, findings of the Westinghouse evaluation of Headstart (Circirelli, 1969) were used extensively by the Nixon Administration in efforts to dramatically decrease Headstart funding. These efforts were countered by proponents of Headstart who cited the benefits attributed to Headstart type programs by the Consortium for Longitudinal Studies (Lazar and Darlington, 1982).

On both sides of the Headstart issue, however, a careful analysis reveals there were factors other than research that drove the debate. Research findings were used by both sides to buttress a position that had evolved because of contextual factors, constituency pressure, principles, key individuals, and/or media attention. For example, there is ample evidence that the Nixon Administration used the Westinghouse report as ammunition in a battle plan that had been decided on other factors--a rapidly deteriorating economy and a politically motivated belief that there was too much "government interference" in the lives of families. On the other side of the debate, contextual factors (e.g., high unemployment, increasing poverty, declining test scores) and very strong constituency pressures by parents and child development specialists, made use of the Consortium findings to preserve Headstart in spite of the efforts by the Nixon Administration. It is interesting to note that the research data used by both sides in this debate were not particularly compelling.

The primary point is not that research is a completely ineffective contribution to the process of policy formulation, but rather to argue against the widely held belief that if a position can be "proven" by research, then its enactment as public policy will follow simply as a *fait accompli*. In order to make an effective contribution to the policy process, researchers and advocates must realize that research findings are only one part of a complex set of factors which contribute to the formation of public policy. At times, research findings will lead the debate, but in most instances research will be used in a supporting role. As a colleague of mine once remarked, "I use research like a drunk uses a lamp pole--I use it for support, not for illumination".

Another reason that the scientific approach is not used more frequently stems from the way in which resources are allocated for social programs. Typically, state and federal agencies provide money to develop and implement a particular form of intervention. However, continuation funding is based on whether the program provider can "prove" that the

program was effective. With so much personal investment and so many people's jobs dependent on the continuation of the funding, it is of little surprise that people generally find that whatever program they are operating is the best program of all. As Campbell and Boruch (1975) pointed out, "Experiments are feared because in most settings they evaluate not only the program alternative, but also the administrators, teachers, or students involved." Because so much has been promised in order to win support for the program in the first place, it is difficult to subject the program to systematic, unbiased examination. Consequently, people resort to methods of advocacy to gain support for the continuation of the program. Such methods are closely related to tenacity, authority, and intuition because those methods are more readily available, as well as more flexible in their application. In other words, it is easier to get the results to come out in a way that your program will be supported.

Advocacy Masquerading as Science

Properly used, the scientific method can also contribute to advocacy efforts but such is seldom the case. Most often advocacy masquerades as science because there is the perception that arguments presented as scientific data will carry more weight and the advocates are already convinced that their cause is just. Thus, scientific data is not used to illuminate the issue, it is used because of the belief that it will make for a more compelling case. All too often, the data presented has all the trappings of scientific data, but it is not.

As an example of how advocacy masquerades as science, consider a widely cited, actual example from the mid 1970's in which a program for seriously emotionally disturbed children was seeking additional support from the state legislature. Services for such children are very expensive, and in an era of limited resources for human services, such as we've experienced in the United States for the last 25 years, money for such services is hard to obtain. The needs of children with serious emotional disturbances are obvious, but it is not always obvious that their needs are any more urgent than dozens of other needs. Furthermore, since it is expensive to address the needs of children with severe emotional disturbances, such services are scarce and many children go without adequate services.

In an effort to convince others of the importance of providing such services to emotionally disturbed children, the people at this particular program (the Regional Intervention Program) decided to do a cost-benefit analysis of their program. Although they had worked for years trying to convince legislators and agency administrators of the value and benefits of the Regional Intervention Program (i.e., they had advocated for their program based on tenacity, authority, and intuition), they had not used scientific data to convince legislators that more money should be appropriated. The classic scientific approach would have been to conduct the kind of comparative experiment used 2,000 years earlier by Daniel of Lions' Den fame. In other words, identify two comparable groups of children needing the services, provide the services to one group of children

with the other group of children serving as a control group, wait a sufficient amount of time for the benefits of the program to become evident, collect data on the costs of delivery and the effects of the program for children, and then make a comparison between those children who had participated in the program and those who had not.

Since the most important effects of the Regional Intervention Program were expected to become evident after the children reached adulthood, it would have been necessary to wait 20 or more years for the data to have been available. Because the data were needed more quickly, the people conducting the study decided to collect the data somewhat differently. They also wanted to make as strong a case as possible since future funding for the Regional Intervention Program might depend on the results of their analysis. Therefore from the 158 children who were admitted to the program during the previous 3-year period, they selected a total of 64 children who they believed were candidates for institutional psychiatric care based on the severity of their handicaps. From these 64 cases they identified 10 representative children, and for each of these children, depending on whether or not they participated in the Regional Intervention Program, the director of the program made a projection concerning the probable date of admission to an institutional psychiatric care facility and the probable length of stay in such a facility. The judgments of the director were then corroborated by another special education professional at the program. In each case, these two experts predicted that if it weren't for the services of their program, these children would lead truly miserable lives--all of them would be institutionalized and become steadily worse. With the program, however, it was predicted that none of them would need such institutional care.

Are their predictions surprising? Not at all. Think of the last time someone tried to sell you something, whether it was a vacuum cleaner, a life insurance policy, or a ticket to the weekend dance. You were probably told of how difficult, even catastrophic, your life would be unless you bought this particular product. Usually the consequences of failing to buy the product are not nearly as bad as projected. However, in the case of the Regional Intervention Program, there was no way of knowing whether the predictions were true, since there was not comparison group.

The conclusion of this cost-benefit analysis was that society saved almost \$8 in future costs for every dollar spent on the Regional Intervention Program. Similar conclusions have been reached by other early intervention programs. With such incredibly positive results, one would expect such treatment programs to be springing up all over the country. In fact, early childhood special education programs are increasing, but not dramatically. Why not? Partly because the people who make decisions about funding such programs know that the numbers given to them by advocates about cost-benefit are fallacious. Decision makers know such numbers are fallacious because they've collected and presented similar data themselves. The numbers have many of the trappings of science, but they are really pseudo-scientific data. In this particular case we really don't know how many of the children were institutionalized, there is no

similar group of children to whom comparisons can be made, and the people making these judgements obviously had a vested interest. In other words, the conclusions are not at all credible. Instead of science, this is really advocacy masquerading as science.

The way in which advocacy masquerades as science was pointed out dramatically to me during 1984/85, when I spent a sabbatical year in Washington, D.C., working as a staff member for the U.S. Senate Subcommittee on the Handicapped. I received the position as a function of having been awarded a Congressional Science Fellowship from the American Association for the Advancement of Science. The stated purpose of the Congressional Science Fellowships was to provide an opportunity for scientists to become better informed about the policy-making process; and, for policy makers to become better informed about the contribution science can make to the formulation of public policy. I soon learned that only half of this purpose would be fulfilled. More specifically, although I learned a great deal about how policy was formulated, policy makers were not very interested in how science could be used to make decisions about the selection or continuation of social programs. Like the drunk and the lamp pole, they were interested in finding research which could be used to support an already established position, but they were not interested in how research could be used to illuminate the debate about social issues. They were not interested in illumination because they had already made up their mind about what their position would be. They certainly didn't need data to establish a position. Because the concept of research is highly valued by the general public, politicians want to have research data, but such data is used to legitimize political views which are already established. It is not used to select from among competing alternatives.

Because politicians and government administrators are so accustomed to using research to support their pre-established positions, they are skeptical of all research data. In other words, they know that other people are probably doing the same thing they always do--selectively finding those data which support their position and ignoring data which does not. Consider the issue of whether the incidence of serious crime is increasing or decreasing. One can defend either position depending on which reputable source of data is used. The Federal Bureau of Investigation (FBI) compiles an annual report based on a compilation of crimes reported to local police. The Bureau of Justice statistics, another federal agency, compiles data about crime based on a random sample of people living in the United States. In the early 1980's both sources of information showed that crime was going down, and according to a report published in U.S. News and World Report (1989), the administration took credit with Attorney General Edwin Meese proudly proclaiming, "Crime has dropped sharply for the first time in years. Our firm stand against criminal activity is a crucial factor."

Unfortunately for the political agenda of the Reagan administration, the two sources of data showed different results beginning in 1986. The FBI's data set showed that crime was increasing sharply while the infor-

mation from the Bureau of Justice statistics showed that the crime rate had plateaued. Now people could take their pick. By referring to the earlier figures, they could demonstrate that crime was decreasing; by referring to the figures from the Bureau of Justice Statistics, it could be demonstrated that the crime rate was remaining steady; and by referring to the FBI numbers, it could be demonstrated that crime was increasing dramatically. Depending on the political persuasion and agenda of the person using the numbers, all three sets of figures have been used.

Another example is the contention that homelessness in America has reached epidemic proportions. Before approving funding for programs to address such a problem, politicians and government administrators tend to want something more specific than a statement that we now have an epidemic of homelessness. The most frequently cited estimate is that there are approximately 3,000,000 homeless people in the United States.

While this number is vigorously defended by homeless advocates, its origins are of a somewhat questionable nature. According to U.S. News and World Report (1989), homeless advocate Mitch Snyder interviewed local government agencies in 1980 and provided estimates of the number of homeless people in 14 cities. These estimates ranged from a few hundredths of one percent in some cities up to one percent in a few cases. Even though no estimate of the national incidence was made at that time, by 1982 Snyder was claiming that his 1980 survey had found that "One percent of the population, or 2.2 million people lacked shelter." He went on to say that that number could reach 3 million by 1983.

As the plight of homeless people received increased media attention, Snyder's estimate of 3 million was frequently repeated until it became a credible estimate. Other, supposedly more scientific, surveys have been conducted and have concluded that the estimate attributed to Snyder is eight to ten times too large. In fact, some years later Snyder told a Congressional Hearing, "These numbers are in fact, meaningless. We have tried to satisfy your gnawing curiosity for a number because we . . . have to quantify everything in sight, whether we can or not."

Particularly alarming to the advocates for the homeless is the fact that the U.S. Census Bureau recently undertook a comprehensive effort to count homeless people. On March 21, 1990, data collectors set out to count all of the people living on the streets or in shelters for the homeless. Such an undertaking created serious concerns among advocates since the estimate of the number of homeless people is used to make funding decisions and to decide how serious the problem really is. According to one advocate, "[The homeless] are mobile; and many don't want to be seen. It will be a gross undercount. If we treat those numbers as gospel, funding for social service programs may be cut. That could seriously hurt the homeless." On the other hand, government officials argue that they have no idea whether estimates made by such people as Mitch Snyder are at all accurate and cite conflicting estimates based on other surveys.

Conclusion

During the time I worked on the staff of the United States Senate Subcommittee for the Handicapped, I experienced first hand the fact that most people use the results of research the way a drunk uses a lamp pole-- they use it for support and not illumination. As long as everyone knows that both policy makers and advocates are using data for support and not illumination, advocates will remain impaled on the horns of a dilemma. If they advocate for a cause or a particular solution without supporting their position with something that has the trappings of scientific data, decision makers will tell them to come back later when they have more scientific data to justify their request. Such a response is usually a stalling tactic since the decision makers really are not that interested in the data. If the advocates present scientific data, it will largely be ignored by the decision makers since they know from personal experience the way in which such data is collected and used. Thus, the advocates are punished for not having enough data, but the data is largely ignored when they do have it.

Is there a way out of this conundrum? I believe there is, but it will not happen quickly. Even the most zealous advocate would not support a cause in which he or she did not believe. People who believe that prenatal care should be more widely available are convinced that there are positive benefits associated with such care in the same way that people who advocate for the availability of Laetrile to treat cancer are convinced that it will be beneficial. The problem with the type of pseudo-scientific data that is too often used by advocates and policy makers is that sometimes programs are advocated and implemented which are not effective and may even be harmful. Good science--science which is conducted in a way that is fair and honest-- can illuminate such issues in a way that will be convincing to people on both sides of the issue. The problem which has placed us on the horns of this dilemma is that most of what masquerades as science in addressing the types of social issues outlined at the beginning of the paper is really so sloppily done, so poorly controlled, and so obviously biased that it is not surprising that the results are not believed.

The solution is for everyone to begin using social science for illumination and not support. We now have hundreds of examples, of which I have cited a few, of where such an approach has resulted in significant progress in ameliorating or solving social problems. To make the change will require a major shift in the way people view the social sciences, as well as an awareness of the benefits which are possible. It will also require a long-term commitment in both funding and patience. Good science, whether it be putting a man on the moon or deciding how to best address the needs of handicapped preschoolers and their families, requires time and financial commitment. Unless we are willing to make such commitments, the very real needs of the homeless, single parents, handicapped children, alcoholics, and dozens of others will not be addressed as successfully as they should be.

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