Letters

Psychology Experiments without Subjects' Consent

On occasion a scientific paper may incidentally, and perhaps unintentionally, reveal information of more significance concerning practices and attitudes of scientists in a given field than it does about the subject under investigation. I refer to the article by Rokeach and Mezei, "Race and shared belief as factors in social choice" (14 Jan., p. 165).

On the basis of this report it appears that in psychology it is considered permissible to experiment upon job applicants without their permission or knowledge. The authors document this by their statement that "[the subjects] were under the impression that the procedures to which they were subjected were an integral part of a normal interview procedure, and they were totally unaware that they were participating in an experiment. . . ."

I protest that this represents an invasion of fundamental human rights, namely the right to privacy and the right not to be subjected to manipulation and experimentation without one's knowledge and consent. These rights are now well recognized in research, and some recent breaches by medical researchers have been heavily censured. . . .

It appears to me that one of the most fundamental aspects of a civilized culture is that the citizen may correctly assume that in ordinary day-to-day activity he will be treated with candor and dignity and that, in general, he can trust the individuals with whom he deals. The business world operates upon these assumptions; and to the degree that they are not observed, business is not civilized. In the practice of the learned professions there should be no place for activity which offends against these ideals. I hope that mine is not the only voice raised in protest against such practices in psychological research.

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It is true that behavioral scientists often engage in research with human subjects without first obtaining their informed consent. But I do not agree with Miller's contention that we invaded our subjects' fundamental human rights in the research we recently reported in *Science*. The moral issue is considerably more complicated than Miller makes it out to be. What is typically involved in making a decision about moral values, whether in or out of science, is not a choice between good and evil but a choice between two or more positive values, or a choice between greater and lesser evils. A person may, for example, have to choose between behaving honestly and behaving compassionately, or between behaving patriotically and behaving truthfully. . . .

Much of the research on behavior would be scientifically worthless if the subject were to be first informed of its purpose. . . . The behavioral scientist faces a moral dilemma arising from the conflict between the high value he places on advancing scientific knowledge for the betterment of human welfare and the high value he places on his subjects' individual rights. I know of no simple moral principle which will resolve in advance this oft-encountered conflict. It is a dilemma which has to be struggled with anew every time it arises. Technical considerations aside, the particular research design the behavioral scientist settles on is the end result of weighing all the complex moral considerations. . . . There are certain lines of research I would like to pursue but which I have not pursued because I felt that the damage to experimental subjects would be too great and thus that the scientific knowledge would be gained at too great a cost.

How does the conscientious behavioral scientist resolve the value conflicts he continually faces? First and foremost, he must necessarily rely on the dictates of his own conscience to avoid experimental procedures which would result in the subject's humiliation or embarrassment, or physical or psychic pain. Second, he must at the same time distrust his own conscience as an infallible guide and check his moral judgments against those of his colleagues and friends. Third, he must adhere to the moral standards of his profession. The American Psychological Association, in 1953, published a booklet, "Ethical Standards of Psychologists," which represents its official policy with respect to psychologists' behavior in research and in other areas of professional conduct. Violators of this code are subject to censure or expulsion from the association.

If Miller's assumption, that prior consent is always the overriding ethical requirement, were to be followed to its logical conclusion, many kinds of important research with human subjects would not be possible. Such a serious consequence should be evaluated within the context of a broader conception than that provided by Miller of the role behavioral science ought to play in advancing human welfare and individual freedom.

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Chemical Warfare in Vietnam

The following petition, prompted by the recent public statement signed by 29 scientists and physicians [see News and Comment, 21 Jan., p. 309], has been sent to the President:

Dear President Johnson,

We, faculty and students of The Rockefeller University, wish to state our agreement with the petition to you, which was printed in the January 21 issue of *Science*, protesting the use of weed killers on Vietnamese rice crops. Most of us are researchers in the Life Sciences and we deeply oppose the use of advances in this field for the purposes of warfare. We call on you to declare the permanent discontinuation of the use of these weapons.

The petition bears 93 signatures.

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Ages of Experimental Animals

In an earlier letter (31 Dec., p. 1771), I suggested that since organisms change rapidly with age, it is desirable in an experiment to use several animals of different ages, and that ideally their ages should be related exponentially, "such that whatever the youngest unit age (A), others would be A^2, A^3, A^4, and so on." G. G. Simpson (4 Feb., p. 517) correctly notes the difficulty that arises if the unit chosen is 1, and observes that if A equals ½ year, or its equivalent, 182 ½ days, the difficulties are "too much to cope with even for a paleontologist"!

The series above is correct for properly chosen values of A, such as 2 weeks or 2 months. Obviously if the unit time is 1 (1 week, 1 month, 1 year), then the series should be A, 2A, $(2A)^2$, $(2A)^3$, and so forth, in time units suitable to the longevity of the animal. [See "Temporal design of geriatric research," *J. Amer. Geriat. Soc.* **13**, 501 (1965).] It is important to note that if the unit chosen leads too soon to unusual ages, then the youngest animal is too old to yield data regarding its early life. The first 10 percent of the life span may give the most definitive information concerning the aging process.

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The many biological changes whose rates are inversely proportional to the age of the organism led Calloway to suggest, essentially, that in appropriate studies the animals employed should be chosen so that their ages are distributed exponentially. Simpson observes that choosing ages A, A^2, A^3, . . . leads to several anomalies. These however are easily resolved.

Time is not measured absolutely but as the difference of two clock readings. Thus it is perfectly reasonable to start our clock at $t = 1$. Letting $t' = \log_a t$ with $a > 1$, we have a reasonable time scale. If t is taken to be the age of an organism when it comes into being, its logarithmic age at that time is 0. At time a its logarithmic age is 1, and at time a^n its logarithmic age is n. Since we started our clocks at $t = 1$ the difficulties involving fractional times do not arise. The logarithmic age and the time are monotone increasing functions of each other.

It might be thought that differing time scales would radically affect the logarithmic age. This is not the case. If a and b are different bases,

$$\log_a t = \frac{\ln b}{\ln a} \log_b t.$$

Hence the times measured on the logarithmic scales are proportional. If we change the linear time scale, that is, if $t' = at$ and have a base time $t = b$,

$$\log_b t = (\log_b a + 1)(\log_{ab} t' - \log_{ab} a),$$

so the time scale is linearly magnified and displaced.

As Simpson observes, the actual age of organisms chosen to be linearly distributed on a logarithmic scale rises very rapidly. But this is as it should be; organisms do change much more rapidly when they are young than when they are older. . . . In order to develop a reasonable time scale the base time may have to be very small. In practical terms, this difficulty is easily overcome by not insisting that the base time be the time of first observation.

Finally, any difficulty involved in calculating $\log_a x$ is resolved by the formula

$$\log_a x = \frac{1}{\log_{10} a} \log_{10} x.$$

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I believe that there is a way of accomplishing what Calloway is wisely getting at but preferable to either his or Levy's approach. One could equate the maximum age, the highest available age, or the highest age desirable or relevant for a particular study with 100 on a graphic log scale. On that scale 1 would then designate the point from which one counts age, normally birth or hatching, as in Levy's approach. Then decide how many steps (stages, samples) one wants and lay them off on the graphic scale at equal distances between 1 and 100. That will give a true and accurate exponential series adjusted to the significant biological cycle of any organism. If one wishes to study or emphasize just part of the cycle, one can select this and put the desired number of equidistant steps within it. This does not depend on the base of the logarithmic scale, so one can ignore the value of Levy's a, or for purposes of calculation set $a = 10$, handiest because of available tables.

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