

RESEARCH IN ORGANIZATIONAL BEHAVIOR

A few years back, a friend was all excited because he had read about the findings from a research study that finally, once and for all, resolved the question of what it takes to make it to the top in a large corporation. I doubted there was any simple answer to this question but, not wanting to dampen his enthusiasm, I asked him to tell me of what he had read.

The answer, according to my friend, was *participation in college athletics*. To say I was skeptical of his claim is a gross understatement, so I asked him to tell me more.

The study encompassed 1,700 successful senior executives at the 500 largest U.S. corporations. The researchers found that half of these executives had played varsity-level col-

lege sports.¹ My friend, who happens to be good with statistics, informed me that since fewer than 2 percent of all college students participate in intercollegiate athletics, the probability of this finding occurring by mere chance is less than one in 10 million! He concluded his analysis by telling me that, based on this research, I should encourage my management students to get into shape and to make one of the varsity teams.

My friend was somewhat perturbed when I suggested that his conclusions were likely to be flawed. These executives were all males who attended college in the 1940s and 1950s. Would his advice be meaningful to females in the 1990s? These executives also weren't your typical college students. For the most part, they had attended elite private colleges like Princeton and Lehigh, where a large proportion of the student body participates in intercollegiate sports. And these "jocks" hadn't necessarily played football or basketball; many had participated in golf, tennis, baseball, cross-country

running, crew, rugby, and similar minor sports. Moreover, maybe the researchers had confused the direction of causality. That is, maybe individuals with the motivation and ability to make it to the top of a large corporation are drawn to competitive activities like college athletics.

My friend was guilty of misusing research data. Of course, he is not alone. We are all continually bombarded with reports of experiments that link certain substances to cancer in mice and surveys that show changing attitudes toward sex among college students, for example. Many of these studies are carefully designed, with great caution taken to note the implications and limitations of the findings. But some studies are poorly designed, making their conclusions at best suspect, and at worst meaningless.

Rather than attempting to make you a researcher, the purpose of this appendix is to increase your awareness as a consumer of behavioral research. A knowledge of research methods will allow you to appreci-

ate more fully the care in data collection that underlies the information and conclusions presented in this text. Moreover, an understanding of research methods will make you a more skilled evaluator of those OB studies you will encounter in business and professional journals. So an appreciation of behavioral research is important because (1) it's the foundation upon which the theories in this text are built, and (2) it will benefit you in future years when you read reports of research and attempt to assess their value.

Purpose of Research

Research is concerned with the systematic gathering of information. Its purpose is to help us in our search for the truth. While we will never find ultimate truth—in our case, that would be to know precisely how any person would behave in any organizational context—ongoing research adds to our body of OB knowledge by supporting some

theories, contradicting others, and suggesting new theories to replace those that fail to gain support.

Research Terminology

Researchers have their own vocabulary for communicating among themselves and with outsiders. The following briefly defines some of the more popular terms you're likely to encounter in behavioral science studies.²

VARIABLE A *variable* is any general characteristic that can be measured and that changes in either amplitude, intensity, or both. Some examples of OB variables found in this text are job satisfaction, employee productivity, work stress, ability, personality, and group norms.

HYPOTHESIS A tentative explanation of the relationship between two or more variables is called a *hypothesis*. My friend's statement that participation in college athletics

leads to a top executive position in a large corporation is an example of a hypothesis. Until confirmed by empirical research, a hypothesis remains only a *tentative* explanation.

DEPENDENT VARIABLE A *dependent variable* is a response that is affected by an independent variable. In terms of the hypothesis, it is the variable that the researcher is interested in explaining. Referring back to our opening example, the dependent variable in my friend's hypothesis was executive succession. In organizational behavior research, the most popular dependent variables are productivity, absenteeism, turnover, job satisfaction, and organizational commitment.³

INDEPENDENT VARIABLE An *independent variable* is the presumed cause of some change in the dependent variable. Participating in varsity athletics was the independent variable in my friend's hypothesis. Popular independent variables studied by OB researchers include intelligence, person-

ality, job satisfaction, experience, motivation, reinforcement patterns, leadership style, reward allocations, selection methods, and organization design.

You may have noticed we said that job satisfaction is frequently used by OB researchers as both a dependent and an independent variable. This is not an error. It merely reflects that the label given to a variable depends on its place in the hypothesis. In the statement "Increases in job satisfaction lead to reduced turnover," job satisfaction is an independent variable. However, in the statement "Increases in money lead to higher job satisfaction," job satisfaction becomes a dependent variable.

MODERATING VARIABLE A *moderating variable* abates the effect of the independent variable on the dependent variable. It might also be thought of as the contingency variable: If X (independent variable), then Y (dependent variable) will occur, but only under conditions Z (moderating vari-

able). To translate this into a real-life example, we might say that if we increase the amount of direct supervision in the work area (X), then there will be a change in worker productivity (Y), but this effect will be moderated by the complexity of the tasks being performed (Z).

CAUSALITY A hypothesis, by definition, implies a relationship. That is, it implies a presumed cause and effect. This direction of cause and effect is called *causality*. Changes in the independent variable are assumed to *cause* changes in the dependent variable. However, in behavioral research, it's possible to make an incorrect assumption of causality when relationships are found. For example, early behavioral scientists found a relationship between employee satisfaction and productivity. They concluded that a happy worker was a productive worker. Follow-up research has supported the relationship, but disconfirmed the direction of the arrow. The evidence more correctly sug-

gests that high productivity leads to satisfaction rather than the other way around.

CORRELATION COEFFICIENT It's one thing to know that there is a relationship between two or more variables. It's another to know the *strength* of that relationship. The term *correlation coefficient* is used to indicate that strength, and is expressed as a number between -1.00 (a perfect negative relationship) to $+1.00$ (a perfect positive correlation).

When two variables vary directly with one another, the correlation will be expressed as a positive number. When they vary inversely—that is, one increases as the other decreases—the correlation will be expressed as a negative number. If the two variables vary independently of each other, we say that the correlation between them is zero.

For example, a researcher might survey a group of employees to determine the satisfaction of each with his or her job. Then, using company absenteeism reports, the researcher could correlate the job satisfaction scores

against individual attendance records to determine whether employees who are more satisfied with their jobs have better attendance records than their counterparts who indicated lower job satisfaction. Let's suppose the researcher found a correlation coefficient between satisfaction and attendance of +0.50. Would that be a strong association? There is, unfortunately, no precise numerical cutoff separating strong and weak relationships. A standard statistical test would need to be applied to determine whether or not the relationship was a significant one.

A final point needs to be made before we move on: A correlation coefficient measures only the strength of association between two variables. A high value does *not* imply causality. The length of women's skirts and stock market prices, for instance, have long been noted to be highly correlated, but one should be careful not to infer that a causal relationship between the two exists. In this instance, the high correlation is more happenstance than predictive.

THEORY The final term we introduce in this section is *theory*. Theory describes a set of systematically interrelated concepts or hypotheses that purports to explain and predict phenomena. In OB, theories are also frequently referred to as *models*. We use the two terms interchangeably.

There are no shortages of theories in OB. For instance, we have theories to describe what motivates people, the most effective leadership styles, the best way to resolve conflicts, and how people acquire power. In some cases, we have half a dozen or more separate theories that purport to explain and predict a given phenomenon. In such cases, is one right and the others wrong? No! They tend to reflect science at work—researchers testing previous theories, modifying them, and, when appropriate, proposing new models that may prove to have higher explanatory and predictive powers. Multiple theories attempting to explain common phenomena merely attest that OB is an active discipline, still growing and evolving.

Evaluating Research

As a potential consumer of behavioral research, you should follow the dictum of *caveat emptor*—let the buyer beware! In evaluating any research study, you need to ask three questions.⁴

Is it valid? Is the study actually measuring what it claims to be measuring? Many psychological tests have been discarded by employers in recent years because they have not been found to be valid measures of the applicants' ability to successfully do a given job. But the validity issue is relevant to all research studies. So, if you find a study that links cohesive work teams with higher productivity, you want to know how each of these variables was measured and whether it is actually measuring what it is supposed to be measuring.

Is it reliable? Reliability refers to consistency of measurement. If you were to have your height measured every day with a wooden yardstick, you'd get highly reliable

results. On the other hand, if you were measured each day by an elastic tape measure, there would probably be considerable disparity between your height measurements from one day to the next. Your height, of course, doesn't change from day to day. The variability is due to the unreliability of the measuring device. So if a company asked a group of its employees to complete a reliable job satisfaction questionnaire, and then repeat the questionnaire six months later, we'd expect the results to be very similar—provided nothing changed in the interim that might significantly affect employee satisfaction.

Is it generalizable? Are the results of the research study generalizable to groups of individuals other than those who participated in the original study? Be aware, for example, of the limitations that might exist in research that uses college students as subjects. Are the findings in such studies generalizable to full-time employees in real jobs? Similarly, how generalizable to the overall work population are the results from a study

that assesses job stress among ten nuclear power plant engineers in the hamlet of Mahone Bay, Nova Scotia?

Research Design

Doing research is an exercise in trade-offs. Richness of information typically comes with reduced generalizability. The more a researcher seeks to control for confounding variables, the less realistic his or her results are likely to be. High precision, generalizability, and control almost always translate into higher costs. When researchers make choices about whom they'll study, where their research will be done, the methods they'll use to collect data, and so on, they must make some concessions. Good research designs are not perfect, but they do carefully reflect the questions being addressed. Keep these facts in mind as we review the strengths and weaknesses of five popular research designs: case studies, field

surveys, laboratory experiments, field experiments, and aggregate quantitative reviews.

CASE STUDY You pick up a copy of Soichiro Honda's autobiography. In it he describes his impoverished childhood; his decisions to open a small garage, assemble motorcycles, and eventually build automobiles; and how this led to the creation of one of the largest and most successful corporations in the world. Or you're in a business class and the instructor distributes a 50-page handout covering two companies: Compaq Computer and Digital Equipment Corporation (DEC). The handout details the two firms' histories, describes their product lines, production facilities, management philosophies, and marketing strategies, and includes copies of their recent balance sheets and income statements. The instructor asks the class members to read the handout, analyze the data, and determine why Compaq has been more successful in recent years than DEC.

Soichiro Honda's autobiography and the Compaq and DEC handouts are case studies. Drawn from real-life situations, case studies present an in-depth analysis of one setting. They are thorough descriptions, rich in details about an individual, a group, or an organization. The primary source of information in case studies is obtained through observation, occasionally backed up by interviews and a review of records and documents.

Case studies have their drawbacks. They're open to the perceptual bias and subjective interpretations of the observer. The reader of a case is captive to what the observer/case writer chooses to include and exclude. Cases also trade off generalizability for depth of information and richness of detail. Since it's always dangerous to generalize from a sample of one, case studies make it difficult to prove or reject a hypothesis. On the other hand, you can't ignore the in-depth analysis that cases often provide. They are an excellent device for

initial exploratory research and for evaluating real-life problems in organizations.

FIELD SURVEY A questionnaire made up of approximately a dozen items sought to examine the content of supervisory training programs in billion-dollar corporations. Copies of the questionnaire, with a cover letter explaining the nature of the study, were mailed to the corporate training officers at 250 corporations randomly selected from the *Fortune* 500 list; 155 officers responded to it. The results of this survey found, among other things, that the most common training topic was providing performance evaluation feedback to employees (92 percent of the surveyed companies selected this topic as the most common aspect of their program). This was closely followed by developing effective delegation skills (90 percent) and listening skills (83 percent).⁵

The preceding study illustrates a typical field survey. A sample of respondents (in this case, 250 corporate training officers) was

selected to represent a larger group that was under examination (corporate training officers in *Fortune* 500 firms). The respondents were then surveyed using a questionnaire or interviewed to collect data on particular characteristics (the content of supervisory training programs) of interest to the researcher. The standardization of response items allows for data to be easily quantified, analyzed, and summarized, and for the researcher to make inferences from the representative sample about the larger population.

The field survey provides economies for doing research. It's less costly to sample a population than to obtain data from every member of that population. Moreover, as the supervisory training program example illustrates, field surveys provide an efficient way to find out how people feel about issues or how they say they behave. These data can then be easily quantified. But the field survey has a number of potential weaknesses. First, mailed questionnaires rarely obtain 100 percent returns. Low response rates call

into question whether conclusions based on respondents' answers are generalizable to nonrespondents. Second, the format is better at tapping respondents' attitudes and perceptions than behaviors. Third, responses can suffer from social desirability; that is, people saying what they think the researcher wants to hear. Fourth, since field surveys are designed to focus on specific issues, they're a relatively poor means of acquiring depth of information. Finally, the quality of the generalizations is largely a factor of the population chosen. Responses from executives at *Fortune* 500 firms, for instance, tell us nothing about small- or medium-sized firms or not-for-profit organizations. In summary, even a well-designed field survey trades off depth of information for breadth, generalizability, and economic efficiencies.

LABORATORY EXPERIMENT The following study is a classic example of the laboratory experiment. A researcher, Stanley Milgram, wondered how far individuals would go in

following commands. If subjects were placed in the role of a teacher in a learning experiment and told by an experimenter to administer a shock to a learner each time that learner made a mistake, would the subjects follow the commands of the experimenter? Would their willingness to comply decrease as the intensity of the shock was increased?

To test these hypotheses, Milgram hired a set of subjects. Each was led to believe that the experiment was to investigate the effect of punishment on memory. Their job was to act as teachers and administer punishment whenever the learner made a mistake on the learning test.

Punishment was administered by an electric shock. The subject sat in front of a shock generator with 30 levels of shock—beginning at zero and progressing in 15-volt increments to a high of 450 volts. The demarcations of these positions ranged from “Slight Shock” at 15 volts to “Danger: Severe Shock” at 450 volts. To increase the realism of the experiment, the subjects

received a sample shock of 45 volts and saw the learner—a pleasant, mild-mannered man about 50 years old—strapped into an “electric chair” in an adjacent room. Of course, the learner was an actor, and the electric shocks were phony, but the subjects didn’t know this.

Taking his seat in front of the shock generator, the subject was directed to begin at the lowest shock level and to increase the shock intensity to the next level each time the learner made a mistake or failed to respond.

When the test began, the shock intensity rose rapidly because the learner made many errors. The subject got verbal feedback from the learner: At 75 volts, the learner began to grunt and moan; at 150 volts, he demanded to be released from the experiment; at 180 volts, he cried out that he could no longer stand the pain; and at 300 volts, he insisted that he be let out, yelled about his heart condition, screamed, and then failed to respond to further questions.

Most subjects protested and, fearful they might kill the learner if the increased shocks were to bring on a heart attack, insisted they could not go on with their job. Hesitations or protests by the subject were met by the experimenter's statement, "You have no choice, you must go on! Your job is to punish the learner's mistakes." Of course, the subjects did have a choice. All they had to do was stand up and walk out.

The majority of the subjects dissented. But dissension isn't synonymous with disobedience. Sixty-two percent of the subjects increased the shock level to the maximum of 450 volts. The average level of shock administered by the remaining 38 percent was nearly 370 volts.⁶

In a laboratory experiment such as that conducted by Milgram, an artificial environment is created by the researcher. Then the researcher manipulates an independent variable under controlled conditions. Finally, since all other things are held equal, the researcher is able to conclude that any

change in the dependent variable is due to the manipulation or change imposed on the independent variable. Note that, because of the controlled conditions, the researcher is able to imply causation between the independent and dependent variables.

The laboratory experiment trades off realism and generalizability for precision and control. It provides a high degree of control over variables and precise measurement of those variables. But findings from laboratory studies are often difficult to generalize to the real world of work. This is because the artificial laboratory rarely duplicates the intricacies and nuances of real organizations. Additionally, many laboratory experiments deal with phenomena that cannot be reproduced or applied to real-life situations.

FIELD EXPERIMENT The following is an example of a field experiment. The management of a large company is interested in determining the impact that a four-day workweek would have on employee absenteeism.

To be more specific, management wants to know if employees working four ten-hour days have lower absence rates than similar employees working the traditional five-day week of eight hours each day. Because the company is large, it has a number of manufacturing plants that employ essentially similar work forces. Two of these are chosen for the experiment, both located in the greater Cleveland area. Obviously, it would not be appropriate to compare two similar-sized plants if one is in rural Mississippi and the other is in urban Copenhagen because factors such as national culture, transportation, and weather might be more likely to explain any differences found than changes in the number of days worked per week.

In one plant, the experiment was put into place—workers began the four-day week. At the other plant, which became the control group, no changes were made in the employees' five-day week. Absence data were gathered from the company's records at both locations for a period of 18 months.

This extended time period lessened the possibility that any results would be distorted by the mere novelty of changes being implemented in the experimental plant. After 18 months, management found that absenteeism had dropped by 40 percent at the experimental plant, and by only 6 percent in the control plant. Because of the design of this study, management believed that the larger drop in absences at the experimental plant was due to the introduction of the compressed workweek.

The field experiment is similar to the laboratory experiment, except it is conducted in a real organization. The natural setting is more realistic than the laboratory setting, and this enhances validity but hinders control. Additionally, unless control groups are maintained, there can be a loss of control if extraneous forces intervene—for example, an employee strike, a major layoff, or a corporate restructuring. Maybe the greatest concern with field studies has to do with organizational selection bias. Not all organizations

are going to allow outside researchers to come in and study their employees and operations. This is especially true of organizations that have serious problems. Therefore, since most published studies in OB are done by outside researchers, the selection bias might work toward publication of studies conducted almost exclusively at successful and well-managed organizations.

Our general conclusion is that, of the four research designs we've discussed, the field experiment typically provides the most valid and generalizable findings and, except for its high cost, trades off the least to get the most.

AGGREGATE QUANTITATIVE REVIEWS What relationship, if any, is there between employee gender and occupational stress? There have been a number of individual field surveys and qualitative reviews of these surveys that have sought to throw light on this question. Unfortunately, these various studies produced conflicting results.

To try to reconcile these conflicts, researchers at Michigan State University identified all published correlations between gender and stress in work-related contexts.⁷ After discarding reports that had inadequate information, nonquantitative data, and failed to include both men and women in their sample, the researchers narrowed their set to 15 studies that included data on 9,439 individuals. Using an aggregating technique called *meta-analysis*, the researchers were able to integrate the studies quantitatively and conclude that there are no differences in experienced stress between men and women in a work setting.

The gender–stress review done by the Michigan State researchers illustrates the use of meta-analysis, a quantitative form of literature review that enables researchers to look at validity findings from a comprehensive set of individual studies, and then apply a formula to them to determine if they consistently produced similar results.⁸ If results prove to be consistent, it allows researchers to conclude

more confidently that validity is generalizable. Meta-analysis is a means for overcoming the potentially imprecise interpretations of qualitative reviews. Additionally, the technique enables researchers to identify potential moderating variables between an independent and a dependent variable.

In the past dozen years, there's been a surge in the popularity of this research method. Why? It appears to offer a more objective means for doing traditional literature reviews. While the use of meta-analysis requires researchers to make a number of judgment calls, which can introduce a considerable amount of subjectivity into the process, there is no arguing that meta-analysis reviews have now become widespread in the OB literature.

Ethics in Research

Researchers are not always tactful or candid with subjects when they do their studies. For instance, questions in field surveys may

be perceived as embarrassing by respondents or as an invasion of privacy. Also, researchers in laboratory studies have been known to deceive participants as to the true purpose of their experiment "because they felt deception was necessary to get honest responses."⁹

The "learning experiments" conducted by Stanley Milgram were widely criticized by psychologists on ethical grounds. He lied to subjects, telling them his study was investigating learning, when, in fact, he was concerned with obedience. The shock machine he used was a fake. Even the "learner" was an accomplice of Milgram's who had been trained to act as if he were hurt and in pain.

Professional associations like the American Psychological Association, the American Sociological Association, and the Academy of Management have published formal guidelines for the conduct of research. Yet the ethical debate continues. On one side are those who argue that strict ethical controls can damage the scientific validity of an

experiment and cripple future research. Deception, for example, is often necessary to avoid contaminating results. Moreover, proponents of minimizing ethical controls note that few subjects have been appreciably harmed by deceptive experiments. Even in Milgram's highly manipulative experiment, only 1.3 percent of the subjects reported negative feelings about their experience. The other side of this debate focuses on the rights of participants. Those favoring strict ethical controls argue that no procedure should ever be emotionally or physically distressing to subjects, and that, as professionals, researchers are obliged to be completely honest with their subjects and to protect the subjects' privacy at all costs.

Now, let's take a look at a sampling of ethical questions relating to research. Do you think Milgram's experiment was unethical? Would you judge it unethical for a company to anonymously survey its employees with mail questionnaires on their intentions to quit their present job?

Would your answer be any different if the company coded the survey responses to identify those who didn't reply so they could send them follow-up questionnaires? Would it be unethical for management to hide a video camera on the production floor to study group interaction patterns (with the goal of using the data to design more effective work teams) without first telling employees that they were subjects of research?

Summary

The subject of organizational behavior is composed of a large number of theories that are research based. Research studies, when cumulatively integrated, become theories, and theories are proposed and followed by research studies designed to validate them. The concepts that make up OB, therefore, are only as valid as the research that supports them.

The topics and issues in this text are for the most part largely research derived. They represent the result of systematic information gathering rather than merely hunch, intuition, or opinion. This doesn't mean, of course, that we have all the answers to OB issues. Many require far more corroborating evidence. The generalizability of others is limited by the research methods used. But new information is being created and published at an accelerated rate. To keep up with the latest findings, we strongly encourage you to regularly review the latest

research in organizational behavior. The more academic work can be found in journals such as the *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Human Relations*, *Journal of Applied Psychology*, *Journal of Management*, and *Leadership Quarterly*. For more practical interpretations of OB research findings, you may want to read the *Academy of Management Executive*, *California Management Review*, *Harvard Business Review*, *Organizational Dynamics*, and the *Sloan Management Review*.