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Social Science Research: Principles, Methods, and Practices

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**Theories in Scientific Research**

As we know from previous chapters, science is knowledge represented as a collection of “theories” derived using the scientific method. In this chapter, we will examine what is a theory, why do we need theories in research, what are the building blocks of a theory, how to evaluate theories, how can we apply theories in research, and also presents illustrative examples of five theories frequently used in social science research.

**Theories**

Theories are explanations of a natural or social behavior, event, or phenomenon. More formally, a scientific theory is a system of constructs (concepts) and propositions (relationships between those constructs) that collectively presents a logical, systematic, and coherent explanation of a phenomenon of interest within some assumptions and boundary conditions (Bacharach 1989).

Theories should explain why things happen, rather than just describe or predict. Note that it is possible to predict events or behaviors using a set of predictors, without necessarily explaining why such events are taking place. For instance, market analysts predict fluctuations in the stock market based on market announcements, earnings reports of major companies, and new data from the Federal Reserve and other agencies, based on previously observed *correlations*. Prediction requires only correlations. In contrast, explanations require *causations*,or understanding of cause-effect relationships. Establishing causation requires three conditions: (1) correlations between two constructs, (2) temporal precedence (the cause must precede the effect in time), and (3) rejection of alternative hypotheses (through testing). Scientific theories are different from theological, philosophical, or other explanations in that scientific theories can be empirically tested using scientific methods.

Explanations can be idiographic or nomothetic. **Idiographic explanations** are those that explain a single situation or event in idiosyncratic detail. For example, you did poorly on an exam because: (1) you forgot that you had an exam on that day, (2) you arrived late to the exam due to a traffic jam, (3) you panicked midway through the exam, (4) you had to work late the previous evening and could not study for the exam, or even (5) your dog ate your text book. The explanations may be detailed, accurate, and valid, but they may not apply to other similar situations, even involving the same person, and are hence not generalizable.

**nomothetic explanations** seek to explain a class of situations or events rather than a specificsituation or event. For example, students who do poorly in exams do so because they did not spend adequate time preparing for exams or that they suffer from nervousness, attention-deficit, or some other medical disorder. Because nomothetic explanations are designed to be generalizable across situations, events, or people, they tend to be less precise, less complete, and less detailed. However, they explain economically, using only a few explanatory variables. Because theories are also intended to serve as generalized explanations for patterns of events, behaviors, or phenomena, theoretical explanations are generally nomothetic in nature.

While understanding theories, it is also important to understand what theory is not. Theory is not data, facts, typologies, taxonomies, or empirical findings. A collection of facts is not a theory, just as a pile of stones is not a house. Likewise, a collection of constructs (e.g., a typology of constructs) is not a theory, because theories must go well beyond constructs to include propositions, explanations, and boundary conditions. Data, facts, and findings operate at the empirical or observational level, while theories operate at a conceptual level and are based on logic rather than observations.

There are many benefits to using theories in research. First, theories provide the underlying logic of the occurrence of natural or social phenomenon by explaining what are the key drivers and key outcomes of the target phenomenon and why, and what underlying processes are responsible driving that phenomenon. Second, they aid in sense-making by helping us synthesize prior empirical findings within a theoretical framework and reconcile contradictory findings by discovering contingent factors influencing the relationship between two constructs in different studies. Third, theories provide guidance for future research by helping identify constructs and relationships that are worthy of further research. Fourth, theories can contribute to cumulative knowledge building by bridging gaps between other theories and by causing existing theories to be reevaluated in a new light.

However, theories can also have their own share of limitations. As simplified explanations of reality, theories may not always provide adequate explanations of the phenomenon of interest based on a limited set of constructs and relationships. Theories are designed to be simple and parsimonious explanations, while reality may be significantly more complex. Furthermore, theories may impose blinders or limit researchers’ “range of vision,” causing them to miss out on important concepts that are not defined by the theory.

**Building Blocks of a Theory**

David Whetten (1989) suggests that there are four building blocks of a theory: constructs, propositions, logic, and boundary conditions/assumptions. Constructs capture the “what” of theories (i.e., what concepts are important for explaining a phenomenon), propositions capture the “how” (i.e., how are these concepts related to each other), logic represents the “why” (i.e., why are these concepts related), and boundary conditions/assumptions examines the “who, when, and where” (i.e., under what circumstances will these concepts and relationships work). Though constructs and propositions were previously discussed in Chapter 2, we describe them again here for the sake of completeness.

**Constructs** are abstract concepts specified at a high level of abstraction that are chosenspecifically to explain the phenomenon of interest. Recall from Chapter 2 that constructs may be unidimensional (i.e., embody a single concept), such as weight or age, or multi-dimensional (i.e., embody multiple constructs, such as age, education, and firm size, are easy to understand, others, such as creativity, prejudice, and organizational agility, may be more complex and abstruse, and still others such as trust, attitude, and learning, may represent temporal tendencies rather than steady states. Nevertheless, all constructs must have clear and unambiguous operational definition that should specify exactly how the construct will be measured and at what level of analysis (individual, group, organizational, etc.). Measurable representations of abstract constructs are called **variables**. For instance, intelligence quotient (IQ score) is a variable that is purported to measure an abstract construct called intelligence. As noted earlier, scientific research proceeds along two planes: a theoretical plane and an empirical plane. Constructs are conceptualized at the theoretical plane, while variables are operationalized and measured at the empirical (observational) plane. Furthermore, variables may be independent, dependent, mediating, or moderating, as discussed in Chapter 2. The distinction between constructs (conceptualized at the theoretical level) and variables (measured at the empirical level) is shown in Figure 4.1.



Figure 4.1. Distinction between theoretical and empirical concepts

**Propositions** are associations postulated between constructs based on deductive logic.Propositions are stated in declarative form and should ideally indicate a cause-effect relationship (e.g., if X occurs, then Y will follow). Note that propositions may be conjectural but MUST be testable, and should be rejected if they are not supported by empirical observations. However, like constructs, propositions are stated at the theoretical level, and they can only be tested by examining the corresponding relationship between measurable variables of those constructs. The empirical formulation of propositions, stated as relationships between variables, is called **hypotheses**. The distinction between propositions (formulated at the theoretical level) and hypotheses (tested at the empirical level) is depicted in Figure 4.1.

The third building block of a theory is the **logic** that provides the basis for justifying the propositions as postulated. Logic acts like a “glue” that connects the theoretical constructs and provides meaning and relevance to the relationships between these constructs. Logic also represents the “explanation” that lies at the core of a theory. Without logic, propositions will be ad hoc, arbitrary, and meaningless, and cannot be tied into a cohesive “system of propositions” that is the heart of any theory.

Finally, all theories are constrained by **assumptions** about values, time, and space, and **boundary conditions** that govern where the theory can be applied and where it cannot be

boundedly rational) and employ utility maximization based on cost and benefit expectations as a way of understand human behavior. In contrast, political science theories assume that people are more political than rational, and try to position themselves in their professional or personal environment in a way that maximizes their power and control over others. Given the nature of their underlying assumptions, economic and political theories are not directly comparable, and researchers should not use economic theories if their objective is to understand the power structure or its evolution in a organization. Likewise, theories may have implicit cultural assumptions (e.g., whether they apply to individualistic or collective cultures), temporal assumptions (e.g., whether they apply to early stages or later stages of human behavior), and spatial assumptions (e.g., whether they apply to certain localities but not to others). If a theory is to be properly used or tested, all of its implicit assumptions that form the boundaries of that theory must be properly understood. Unfortunately, theorists rarely state their implicit assumptions clearly, which leads to frequent misapplications of theories to problem situations in research.

**Attributes of a Good Theory**

Theories are simplified and often partial explanations of complex social reality. As such, there can be good explanations or poor explanations, and consequently, there can be good theories or poor theories. How can we evaluate the “goodness” of a given theory? Different criteria have been proposed by different researchers, the more important of which are listed below:

* **Logical consistency:** Are the theoretical constructs, propositions, boundary conditions,and assumptions logically consistent with each other? If some of these “building blocks” of a theory are inconsistent with each other (e.g., a theory assumes rationality, but some constructs represent non-rational concepts), then the theory is a poor theory.
* **Explanatory power:** How much does a given theory explain (or predict) reality? Goodtheories obviously explain the target phenomenon better than rival theories, as often measured by variance explained (R-square) value in regression equations.
* **Falsifiability:** British philosopher Karl Popper stated in the 1940’s that for theories tobe valid, they must be falsifiable. Falsifiability ensures that the theory is potentially disprovable, if empirical data does not match with theoretical propositions, which allows for their empirical testing by researchers. In other words, theories cannot be theories unless they can be empirically testable. Tautological statements, such as “a day with high temperatures is a hot day” are not empirically testable because a hot day is defined (and measured) as a day with high temperatures, and hence, such statements cannot be viewed as a theoretical proposition. Falsifiability requires presence of rival explanations it ensures that the constructs are adequately measurable, and so forth. However, note that saying that a theory is falsifiable is not the same as saying that a theory should be falsified. If a theory is indeed falsified based on empirical evidence, then it was probably a poor theory to begin with!
* **Parsimony:** Parsimony examines how much of a phenomenon is explained with howfew variables. The concept is attributed to 14th century English logician Father William of Ockham (and hence called “Ockham’s razor” or “Occam’s razor), which states that among competing explanations that sufficiently explain the observed evidence, the simplest theory (i.e., one that uses the smallest number of variables or makes the fewest

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assumptions) is the best. Explanation of a complex social phenomenon can always be increased by adding more and more constructs. However, such approach defeats the purpose of having a theory, which are intended to be “simplified” and generalizable explanations of reality. Parsimony relates to the degrees of freedom in a given theory. Parsimonious theories have higher degrees of freedom, which allow them to be more easily generalized to other contexts, settings, and populations.

**Approaches to Theorizing**

How do researchers build theories? Steinfeld and Fulk (1990)2 recommend four such approaches. The first approach is to build theories inductively based on observed patterns of events or behaviors. Such approach is often called “grounded theory building”, because the theory is grounded in empirical observations. This technique is heavily dependent on the observational and interpretive abilities of the researcher, and the resulting theory may be subjective and non -confirmable. Furthermore, observing certain patterns of events will not necessarily make a theory, unless the researcher is able to provide consistent explanations for the observed patterns. We will discuss the grounded theory approach in a later chapter on qualitative research.

The second approach to theory building is to conduct a bottom-up conceptual analysis to identify different sets of predictors relevant to the phenomenon of interest using a predefined framework. One such framework may be a simple input-process-output framework, where the researcher may look for different categories of inputs, such as individual, organizational, and/or technological factors potentially related to the phenomenon of interest (the output), and describe the underlying processes that link these factors to the target phenomenon. This is also an inductive approach that relies heavily on the inductive abilities of the researcher, and interpretation may be biased by researcher’s prior knowledge of the phenomenon being studied.

The third approach to theorizing is to extend or modify existing theories to explain a new context, such as by extending theories of individual learning to explain organizational learning. While making such an extension, certain concepts, propositions, and/or boundary conditions of the old theory may be retained and others modified to fit the new context. This deductive approach leverages the rich inventory of social science theories developed by prior theoreticians, and is an efficient way of building new theories by building on existing ones.

The fourth approach is to apply existing theories in entirely new contexts by drawing upon the structural similarities between the two contexts. This approach relies on reasoning by analogy, and is probably the most creative way of theorizing using a deductive approach. For instance, Markus (1987)3 used analogic similarities between a nuclear explosion and uncontrolled growth of networks or network-based businesses to propose a critical mass theory of network growth. Just as a nuclear explosion requires a critical mass of radioactive material to sustain a nuclear explosion, Markus suggested that a network requires a critical mass of users to sustain its growth, and without such critical mass, users may leave the network, causing an eventual demise of the network.

1. Steinfield, C.W. and Fulk, J. (1990). “The Theory Imperative," in *Organizations and Communications* *Technology*, J. Fulk and C. W. Steinfield (eds.), Newbury Park, CA: Sage Publications.
2. Markus, M. L. (1987). “Toward a ‘Critical Mass’ Theory of Interactive Media: Universal Access, Interdependence, and Diffusion,” *Communication Research* (14:5), 491-511.

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**Examples of Social Science Theories**

In this section, we present brief overviews of a few illustrative theories from different social science disciplines. These theories explain different types of social behaviors, using a set of constructs, propositions, boundary conditions, assumptions, and underlying logic. Note that the following represents just a simplistic introduction to these theories; readers are advised to consult the original sources of these theories for more details and insights on each theory.

**Agency Theory.** Agency theory (also called principal-agent theory), a classic theory inthe organizational economics literature, was originally proposed by Ross (1973)4 to explain two-party relationships (such as those between an employer and its employees, between organizational executives and shareholders, and between buyers and sellers) whose goals are not congruent with each other. The goal of agency theory is to specify optimal contracts and the conditions under which such contracts may help minimize the effect of goal incongruence. The core assumptions of this theory are that human beings are self-interested individuals, boundedly rational, and risk-averse, and the theory can be applied at the individual or organizational level.

The two parties in this theory are the principal and the agent; the principal employs the agent to perform certain tasks on its behalf. While the principal’s goal is quick and effective completion of the assigned task, the agent’s goal may be working at its own pace, avoiding risks, and seeking self-interest (such as personal pay) over corporate interests. Hence, the goal incongruence. Compounding the nature of the problem may be information asymmetry problems caused by the principal’s inability to adequately observe the agent’s behavior or accurately evaluate the agent’s skill sets. Such asymmetry may lead to agency problems where the agent may not put forth the effort needed to get the task done (the *moral hazard* problem) or may misrepresent its expertise or skills to get the job but not perform as expected (the *adverse selection* problem). Typical contracts that are behavior-based, such as a monthly salary,cannot overcome these problems. Hence, agency theory recommends using outcome-based contracts, such as a commissions or a fee payable upon task completion, or mixed contracts that combine behavior-based and outcome-based incentives. An employee stock option plans are is an example of an outcome-based contract while employee pay is a behavior-based contract. Agency theory also recommends tools that principals may employ to improve the efficacy of behavior-based contracts, such as investing in monitoring mechanisms (such as hiring supervisors) to counter the information asymmetry caused by moral hazard, designing renewable contracts contingent on agent’s performance (performance assessment makes the contract partially outcome-based), or by improving the structure of the assigned task to make it more programmable and therefore more observable.

**Theory of Planned Behavior.** Postulated by Azjen (1991)5, the theory of plannedbehavior (TPB) is a generalized theory of human behavior in the social psychology literature that can be used to study a wide range of individual behaviors. It presumes that individual behavior represents conscious reasoned choice, and is shaped by cognitive thinking and social pressures. The theory postulates that behaviors are based on one’s intention regarding that behavior, which in turn is a function of the person’s attitude toward the behavior, subjective

1. Ross, S. A. (1973). “The Economic Theory of Agency: The Principal’s Problem,” *American Economic* *Review* (63:2), 134-139.
2. Ajzen, I. (1991). “The Theory of Planned Behavior,” *Organizational Behavior and Human Decision* *Processes* (50), 179-211.

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norm regarding that behavior, and perception of control over that behavior (see Figure 4.2). Attitude is defined as the individual's overall positive or negative feelings about performing the behavior in question, which may be assessed as a summation of one's beliefs regarding the different consequences of that behavior, weighted by the desirability of those consequences. Subjective norm refers to one’s perception of whether people important to that person expect the person to perform the intended behavior, and represented as a weighted combination of the expected norms of different referent groups such as friends, colleagues, or supervisors at work. Behavioral control is one's perception of internal or external controls constraining the behavior in question. Internal controls may include the person’s ability to perform the intended behavior (self-efficacy), while external control refers to the availability of external resources needed to perform that behavior (facilitating conditions). TPB also suggests that sometimes people may intend to perform a given behavior but lack the resources needed to do so, and therefore suggests that posits that behavioral control can have a direct effect on behavior, in addition to the indirect effect mediated by intention.

TPB is an extension of an earlier theory called the theory of reasoned action, which included attitude and subjective norm as key drivers of intention, but not behavioral control. The latter construct was added by Ajzen in TPB to account for circumstances when people may have incomplete control over their own behaviors (such as not having high-speed Internet access for web surfing).



Figure 4.2. Theory of planned behavior

**Innovation diffusion theory.** Innovation diffusion theory (IDT) is a seminal theory inthe communications literature that explains how innovations are adopted within a population of potential adopters. The concept was first studied by French sociologist Gabriel Tarde, but the theory was developed by Everett Rogers in 1962 based on observations of 508 diffusion studies. The four key elements in this theory are: innovation, communication channels, time, and social system. Innovations may include new technologies, new practices, or new ideas, and adopters may be individuals or organizations. At the macro (population) level, IDT views innovation diffusion as a process of communication where people in a social system learn about a new innovation and its potential benefits through communication channels (such as mass media or prior adopters) and are persuaded to adopt it. Diffusion is a temporal process; the diffusion process starts off slow among a few early adopters, then picks up speed as the innovation is adopted by the mainstream population, and finally slows down as the adopter population reaches saturation. The cumulative adoption pattern therefore an S-shaped curve, as shown in Figure 4.3, and the adopter distribution represents a normal distribution. All adopters are not identical, and adopters can be classified into innovators, early adopters, early majority, late majority, and laggards based on their time of their adoption. The rate of diffusion

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also depends on characteristics of the social system such as the presence of opinion leaders (experts whose opinions are valued by others) and change agents (people who influence others’ behaviors).

At the micro (adopter) level, Rogers (1995)6 suggests that innovation adoption is a process consisting of five stages: (1) knowledge: when adopters first learn about an innovation from mass-media or interpersonal channels, (2) persuasion: when they are persuaded by prior adopters to try the innovation, (3) decision: their decision to accept or reject the innovation, (4) implementation: their initial utilization of the innovation, and (5) confirmation: their decision to continue using it to its fullest potential (see Figure 4.4). Five innovation characteristics are presumed to shape adopters’ innovation adoption decisions: (1) relative advantage: the expected benefits of an innovation relative to prior innovations, (2) compatibility: the extent to which the innovation fits with the adopter’s work habits, beliefs, and values, (3) complexity: the extent to which the innovation is difficult to learn and use, (4) trialability: the extent to which the innovation can be tested on a trial basis, and (5) observability: the extent to which the results of using the innovation can be clearly observed. The last two characteristics have since been dropped from many innovation studies. Complexity is negatively correlated to innovation adoption, while the other four factors are positively correlated. Innovation adoption also depends on personal factors such as the adopter’s risk- taking propensity, education level, cosmopolitanism, and communication influence. Early adopters are venturesome, well educated, and rely more on mass media for information about the innovation, while later adopters rely more on interpersonal sources (such as friends and family) as their primary source of information. IDT has been criticized for having a “pro-innovation bias,” that is for presuming that all innovations are beneficial and will be eventually diffused across the entire population, and because it does not allow for inefficient innovations such as fads or fashions to die off quickly without being adopted by the entire population or being replaced by better innovations.

#### Research and Theory

##### Meaning of theory:

Research is closely related to theory. Theory provides a conceptual model for research. Research in turn contributes to theory. It is important to distinguish the modern scientific usage of the word theory from other meanings the word may have. In common parlance, theory is frequently identified with speculations, what is theoretical is unrealistic, visionary. This is a wrong notion; theory is the accumulated stored facts. It may define as a set of systematically interrelated concepts, definitions and propositions that are advanced to explain and predict phenomena (facts). **Arnold Rose defines theory as “an integrated body of definitions, assumptions and general propositions covering a given subject matter from which a comprehensive and consistent set of specific and testable principles can be deducted logically”.**

##### Criteria of Theory:

Theories start out as ideas. How much these ideas conform to the basic demands of proposition formulation that determines whether or not they will assume the status of theory. The criteria to be met by the set of ideas are,

* 1. They must be logically consistent.
	2. They must be interrelated.
	3. The propositions should be mutually exclusive.
	4. They must be capable of being tested through research.

##### Theory and Facts:

Theory and facts are interrelated. Facts are empirically verifiable observation and theories establish relationship between facts and order them in meaningful way. Theory summaries facts in to empirical generalizations; and it predict facts. Facts in turn, help to initiate theories; facts lead to the reformulation of an existing theory and modify them.

##### Role of Theory in Research

Theory helps research in several useful ways. Following are the major contributions of theory to research.

###### Theory delimits the study.

Theory narrows the range of facts to be studied. It helps to select a few relevant aspects of a phenomenon. Any phenomenon may be studied from different angles. Theory helps the researcher to work with in framework is science.

###### Theory provides conceptual model.

Theory provides a conceptual framework for a study. It helps a researcher to develop conceptual structure for the proper formulation of the selected problems.

###### Theory summarizes.

Theory summarizes what is already known about the object of study. From time to time in any science there will be changes in the structure of relationship between propositions. In each area, scientist move from older systems of theory towards a more acceptable new system.

###### Theory states universal law.

Theory states a general uniformity beyond the immediate observation. E.g. A person sitting under mango tree, observe mangoes falling on ground. But beyond this observation there is a general law of gravitation.

###### Prediction.

Theory helps to predict further facts. For example we may observe low birth rate in modern societies. From this, we can predict that if modern way of life is introduced into a traditional rural or tribal community, its birth rate would decline.

###### Theory fills gap in knowledge.

Theory also points to areas which have not been explored. The gaps in knowledge are brought to light through the questions arising out of theory.

##### Contribution of research to theory

The relationship between theory and research is contributory. Research contributes to the development of theory. Let us discuss major contributions of research to theory.

###### Research initiate theory.

The findings of research may lead to the formulation of theories. Scientific experiment have led to the development of various theories in physics, chemistry etc,. Similarly research in social sciences has contributed to the development of several theories.

###### Research tests an existing theory.

One major function of empirical research is to test hypotheses deduced from existing theories. If a hypothesis is not conformed by research, the theory from which the hypothesis is deduced in re-examined and tested.

###### Reformulation of an existing theory.

When a theory does not fit in to new findings of research, it is rejected and reformulated to encompass the new findings.

###### Research refocuses theory.

Empirical research may give a new focus to the existing theory.

###### Research clarifies theory.

Concepts are drawn from theory. But researcher cannot proceed on the basis of their theoretical meaning. For research purpose the concepts must be operationalized and defined especially with concrete empirical indications. Such clarifications and redefinitions lead to the discovery of new hypotheses.

In short, theory and research are inseparable complementary components of scientific endeavor.