

Issues and Concepts in the Study of Social Systems

INTELLECTUAL STYLES

Martin A. Kozloff

According to William James (in *Pragmatism*), there are two main intellectual styles, or ways of making sense of the world--empiricism and rationalism. Each style is regarded by many "believers" as the **only** road to the truth. This helps to explain feuds, misunderstandings, and persecutions in philosophy, science, religion and politics. Each style begins and ends in a different place, and uses a different form of logic (inductive vs deductive) to get there. Let us examine each style in detail. Perhaps we can find a way to **combine** them when we are thinking about, studying, and working to improve organizations.

A. Empiricism and Induction

Empiricism is represented by the methods of Aristotle and David Hume. For empiricists, **one solid bit of data provided by the senses is worth a train load of unsubstantiated ideas** (e.g., hypotheses). Therefore, empirical research and theorizing often have the following features.

General Features of Empiricism

First, empiricism is **inductive**. One begins by collecting (e.g., observing and recording) **specific events** or incidents (e.g., individual actions and social activities). Next, one looks for **connections** among these specific events. Through a process of induction or "intellectual synthesis," one gradually creates a **larger picture** of the phenomenon of interest. The picture consists of two sorts of **general** statements: 1) the identification and definition of "**empirical concepts**" (i.e., certain events are now seen as members of larger types or categories), and 2) "**empirical generalizations**" (*propositions*) about relationships among the empirical concepts.

A second feature of empiricism is that it tends to be **descriptive** and **idiographic**. This means that the researcher or theorist is *not* so much interested in *testing* general propositions or hypotheses (e.g., answering the question "Why?" or answering the question "Is it true that...?"). Instead, he or she is interested in discovering **how** members in a particular setting *accomplish* social life as a seamless, dynamic process. Let us examine empiricism as a method in more detail.

Steps in Empirical (Inductive) Research and Theorizing

Issues and Concepts in the Study of Social Systems

The inductive (empirical) style is a process of **discovery**--in contrast to the deductive, rationalist style, which is typically part of a process of **verification** and testing. It begins with observations of specific events or incidents and then moves to the development of more general conceptions of how things are organized. The researcher scans a dark landscape and discovers particular things, then types of things, and then relationships among types of things. The **inductive** process can be described by the following sequence. [See Lofland & Lofland, Chapters 6 through 9, for a description of how one moves from specific episodes to the big picture, or from events at a low level of abstraction to propositions and other formulations at a higher level of abstraction.]

1. Begin with observations. These observations are guided by: a) an interest or question (e.g., "How do teachers become attached to a school?"), and b) basic concepts or guidelines (e.g., "Keep in mind that social events have an objective, subjective, and intersubjective side."). For example, in answering the question, "How do teachers become attached to a school?" we would look for events that **may** be examples of attachment. Later we determine the conditions in which these events ("attachment") seem to occur vs do not occur, and are stronger vs weaker. Notice that I said "may be examples." This is because we do not yet have a definition of attachment. Therefore, we cannot say that the identified events are **to be seen as** examples of attachment. In step 2, however, we create a definition.

2. Examine the identified events and discover how some events share certain features. After identifying common features, *group the events*. The group is a **category** and may be called an "**empirical concept**." In other words, the empirical concept is like a "family." The similarities among the events are "family resemblances." (See Ludwig Wittgenstein's *Philosophical investigations*.)

Next, develop an "**empirical definition**" for the concept/family. For example, guided by an interest in teachers' attachment to schools, we have collected hundreds of events ("doings") through interviews, observations, and teachers' journals. Events that appear to have something in common include: 1) staying late after school to prepare for the next days' classes; 2) spending time at home most evenings evaluating one's performance; 3) telephoning colleagues to discuss ways to improve the curriculum; and 4) reading about how to involve families in school programs. How do these events resemble one another; what do they have in common? They all

Issues and Concepts in the Study of Social Systems

involve behavior that is above and beyond the stipulations in a teacher's contract; they all seem to contain or to reveal an emotional connection or commitment to a school, the craft of teaching, or to students. In other words, they might be seen as **examples of (members of the category or family) "attachment."**

However, consider the following events: 1) calling in sick when one is not sick; 2) leaving school soon after the final bell rings; 3) frequently looking forward to the end of each week and school year; and 4) watching TV rather than thinking about the next days' teaching. What do these have in common, and in what ways do they **differ** from examples of "attachment"? These latter items involve behavior that avoids or escapes from teaching and from a school; they suggest disconnection from or disaffection for a school, profession, and/or students. In other words, they might be seen as **examples of (members of the *contrasting category*) "alienation."** Reviewing the examples of attachment vs alienation we now develop ***empirical definitions*** for these two empirical concepts.

EXERCISE 3. Complete the following definition. [See Lofland & Lofland, pp. 128-129.]

"Attachment is a (state the genus or larger category)

that involves (state the common features)

3. *Continue collecting events and incidents---at different times, in different places, and with different persons.* This enables us to fill in, and to determine the limits of, the empirical concepts. For example, in what *other ways* might teachers reveal attachment vs alienation? In what ways does alienation in teachers differ from alienation in students, administrators, specialists, and families?

Based on new information, we may *revise earlier definitions* to include the newly discovered features of alienation and attachment. For example, additional interviews reveal that some teachers imagine how their school might change, have positive feelings for the subjects they teach, and have negative feelings about lazy colleagues. Recall that the examples

Issues and Concepts in the Study of Social Systems

of attachment in #2 above were actions. These new items are images and feelings. Can we revise the earlier definition of attachment to include these?

EXERCISE 4. Complete the revised definition of attachment.

"Attachment is a (state the genus)

that involves (state the common features)

Sometimes, however, we create **categories and definitions that are too broad; they lump together events which differ in important ways.** For example, alligators and concrete walls could be put in the category of "things with rough surfaces." But alligators and concrete walls are different in so many ways (living vs not living; organic vs inorganic; growing vs constructed) that putting them in the same category--and in one category only--obscures these differences. Therefore, instead of creating more-inclusive definitions of alienation and attachment (as we did above), we might develop **typologies**; i.e., a set of different kinds of attachment and alienation. In other words, we **divide the original (too large) concept into several smaller ones.**

Note that there are many possible typologies of the **same** set of things. It all depends on the **dimensions** along which we are making distinctions between the things. For example, there can be separate typologies of fruits along the dimensions of size, shape, color, sweetness, nutritional content, whether they come singly or in bunches, etc. We have to **select dimensions that are relevant to our interests or questions.** [See Lofland & Lofland, pp. 124-126 and 197 bottom-198.]

EXERCISE 5. Create three typologies of fruits using the above-noted dimensions. Notice how items that go together in one typology do not go together in another typology.

Fruits, based on...
on...

Fruits, based on...

Fruits, based

Issues and Concepts in the Study of Social Systems

EXERCISE 6. List some dimensions along which we can create typologies of organizations.

- 1.
- 2.
- 3.
- 4.
- 5.

Issues and Concepts in the Study of Social Systems

Now create typologies of organizations using two of the dimensions.

Organizations, based on...

Organizations, based on...

EXERCISE 7. List at least three dimensions along which we can categorize examples of (create typologies of) attachment or alienation.

- 1.
- 2.
- 3.

Now create a typology using one the dimensions.

Types of Attachment, Along the Dimension of...

1. e.g., (relevant behaviors)
2. e.g.,
3. e.g.,

Issues and Concepts in the Study of Social Systems

4. e.g.,

4. Create empirical generalizations (propositions) that summarize what we have discovered so far. That is, we move to an even higher level of generality. We can assert empirical generalizations about many things; for example: a) quantitative features of a social system; b) simple (e.g., two-variable) causal or functional relationships; c) sequences; d) configurations; and e) more general categories and relationships. [See Lofland & Lofland, pp. 156-157, 182-186, 197-200.] Let us examine each kind of empirical generalization.

a. Propositions about quantitative features of a social system.

Examples include the following.

- (1) *How often* do instances of attachment vs alienation occur? For example, how many sick days per semester do teachers take? [See Lofland & Lofland, pp. 127-128.]
- (2) What *percentage* of teachers could be considered strongly attached, moderately attached, or strongly unattached?
- (3) *How much* time per day do teachers spend trying to improve their teaching?

EXERCISE 8. List at least two more **quantifiable** features of alienation or attachment.

- 1.
- 2.
- 3.

b. Propositions about simple (e.g., two-variable) causal or functional relationships. To assert a causal or a functional relationship is to state that one variable or set of variables (dependent variables) follows, changes as a consequence of, or somehow depends upon another variable or set of variables (independent variables, as antecedent and concurrent conditions, predictors, or causes).

Issues and Concepts in the Study of Social Systems

For example, we may discover that alienation and attachment occur *under certain antecedent and concurrent conditions* and not under other conditions; or that alienation and attachment occur in certain forms, frequencies, and strengths under certain conditions. [See Lofland & Lofland, pp. 136-140.] These "causal" conditions might include the subject matter that teachers teach, the size of classes, the amount and quality of positive supervision, and skill at teaching.

EXERCISE 9. List at least two more conditions that might predict or "govern" attachment vs alienation.

- 1.
- 2.

Also, we may discover certain *consequences* of strong vs weak attachment. [See Lofland & Lofland, pp. 141-144.] For example,

- (1) As teachers' attachment weakens, performance in the classroom weakens. (Can you make a case for this assertion in the sequence regarding teacher burn-out in c., below?)
- (2) As teachers' attachment increases, the solidarity of the group increases.

EXERCISE 10. List at least two more examples of the consequences of strengthening or weakening attachment vs alienation.

- 1.
- 2.
- 3.

Following are more examples of empirical generalizations that assert (in **propositional form**) causal or functional relationships.

- (1) "The greater the complexity of a task, the more the division of labor will be specialized." ["Complexity of tasks" (the independent

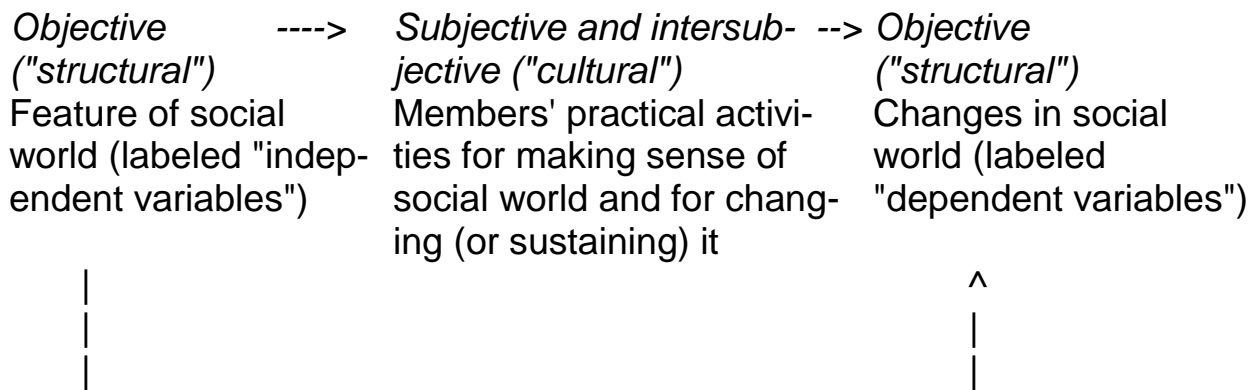
Issues and Concepts in the Study of Social Systems

variable) may be a **sufficient condition** for the "degree of specialization" (the dependent variable).]

- (2) "Empowerment decreases alienation, but only if teachers *want* to be empowered." ["Wanting empowerment" would be an **intervening variable**.]
- (3) "Punishment produces a faster decrease in the rate of a behavior if person's have *opportunities* to perform alternate behavior." ["Opportunities to perform alternate behavior" would be a **contributing condition**.]

Caution! The idea of causation used in natural sciences (i.e., independent [antecedent] variables are something like *forces* that *make* dependent [consequent] variables change), is probably not appropriate to human activities. For instance, regarding #1 above, the complexity of a task is not a force that makes managers and workers divide jobs into smaller work units which are then performed by separate workers. In a human system, the complexity of a task is a **feature** of the work environment that (given a certain degree of specialization) affects the quality and rate of production, and therefore the feelings (e.g., fatigue, job satisfaction) of managers and workers, who then *think* of ways to improve the situation. Increasing specialization is not a mechanical effect; it is an adaptive **choice**.

In summary, asserting a causal or functional relationship between two variables in a social system implies merely that change in one variable **somehow** depends upon or is fostered by prior change in another variable. The "somehow" includes all of the perceptions, feelings, evaluations, planning, and decision-making done by individuals and groups; i.e., the subjective and intersubjective sides of a social system. This is shown in the following diagram.



Issues and Concepts in the Study of Social Systems

[Simplistic depiction of relationship. It ignores consciousness and praxis of members.]

In other words, the relationship between the independent and dependent variables is neither magical nor mechanical; it is **produced** by the practical activities of members. Therefore, it seems that even "simple" (e.g., two-variable) "causal" or functional relationships are actually more complex.

EXERCISE 11. List at least two more empirically-discovered causal relationships in social systems. Suggest how change in dependent variables is the ongoing result of members' practical activities.

- 1.

- 2.

As stated, causal or functional relationships usually involve more than two variables. Unless these are added to our depiction of relationships, efforts to improve a social system may fail, and we will not know why. In summary, we need to consider more complex interrelationships, such as sequences and configurations.

c. Propositions about **sequences**, temporal relationships, or steps in a process. [See Lofland & Lofland, pp. 134-136.] Following are examples.

- (1) "There are five stages of teacher burn-out: 1) *strain* (an empirical concept); 2) *decreased competence of performance*; 3) *pessimism*; 4) *alienation*; and 5) *disengagement*."
- (2) "There are four stages in the practice of special education: 1) assessment; 2) program planning; 3) instruction; and 4) program evaluation." (See Figure 1 below.)
- (3) "One of the first difficulties that parents of children with disabilities may encounter is *distancing reactions* (an empirical concept) from relatives, strangers, and even professionals. Later, families may *isolate themselves* from relatives, neighbors, and community activities.

Issues and Concepts in the Study of Social Systems

- (4) "There are three phases in behavior therapy applied to phobias: 1) clients describe problems and goals; 2) therapists and clients discuss ways to change behavior; and 3) clients suggest changes for themselves."

Figure 1 is an example of the general *sequence* identified in c.2, above. It organizes and summarizes events and relationships in the process of special education in many schools; i.e., the conceptualization of stages and processes represents a *synthesis* of what was discovered through observation. In other words, special education at the Ferndale Elementary School is simultaneously a unique reality for members and an example of a general process.

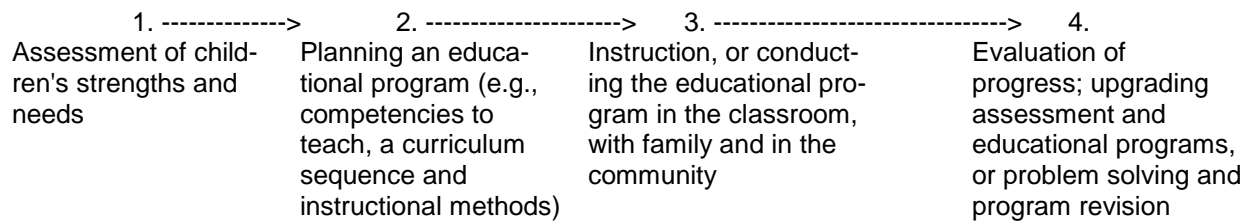


Figure 1. Stages of special education practice. From M.A. Kozloff (1994). *Improving educational outcomes for children with disabilities: Principles for assessment, program planning, and evaluation*. Baltimore: Paul H. Brookes.

EXERCISE 12. List the stages in at least two more empirically-discovered sequences in schools.

d. *Propositions about configurations*. A configuration is a system of interrelationships among many variables (classes of events). These interrelationships may be seen as happening at one point in time [in cross-section] or through time [longitudinally]. Examples of configurations include the following.

- (1) stable **channels** of communication in a decision making process (e.g., portrayed as a cross-section at any point in time by interconnected lines).

Issues and Concepts in the Study of Social Systems

- (2) a person's or a group's **network** of social support (a *changing assembly* of individuals and groups which provide emotional and financial support, advice, and hands-on help). We could depict interconnections among persons and groups at any point in time; and we could depict changes in these interconnections through time.
- (3) changes in **competencies** (e.g., communication, locomotion, activities of daily living) and in the **relationships** among competencies in a person's behavioral repertoire over the **course** of psychosocial development. (See Figure 2 below.)

Area A: Interest in, attention and orientation to the environment

Area B: Participation in elementary and early forms of social interaction (exchanges)

Area C: Body coordination and locomotion

1. Acquisition of the components of large motor sequences (e.g., locomotion)
2. Acquisition of skill at locomotion and other complex large motor sequences

Area E: Acquisition of common-sense knowledge of how the world works and of the cultural configuration (the conventional version of reality). Examples include causal sequences; associations among objects, persons, and activities; classification; social norms; personal identity

Area D: Simple actions and interactions with objects

1. Acquisition of the components of more complex sequences (tasks)
2. Chaining component actions into simple task sequences

Area F: Increasingly Competent participation in more complex forms of social organization

1. Routine tasks and activities
2. Leisure, play, and games
3. Conversation
4. Community

Figure 2. Model of children's psychosocial development. From M.A. Kozloff (1994). *Improving educational outcomes for children with disabilities: Principles for assessment, program planning, and evaluation*. Baltimore: Paul H. Brookes.

Issues and Concepts in the Study of Social Systems

Figure 2, is an example of a *configuration* identified in d.3, above. Figure 2 organizes and summarizes events and relationships in the empirical histories of many children. Therefore, the life of Sally Jenkins is both her life and an **example of a general course** of children's psychosocial development which involves complex interrelationships among variables. Note that Figure 2 asserts a number of causal/functional relationships. For example, if a child's interest in, attention and orientation to the environment are weak, the child's development in all of the other areas will suffer. In other words, it is asserted that interest, attention, and orientation to the environment are **necessary conditions** for further development.

EXERCISE 13. List and/or diagram at least two more examples of configurations.

All of the asserted relationships above (causal/functional, sequences, and configurations) are simplifications. Hopefully, they may be useful simplifications--suggesting types of events and connections to consider. However, actual relationships involve the consciousness (perception, feelings, classification, reflection, justification, critique, etc.) and praxis (will, energy, choice, action) of persons and groups. **In summary, neither an analysis of a school nor plans for improving a school are adequate unless we consider objective, subjective, and intersubjective features.**

EXERCISE 14. Compare and contrast the following causal/functional relationships, sequences and configurations.

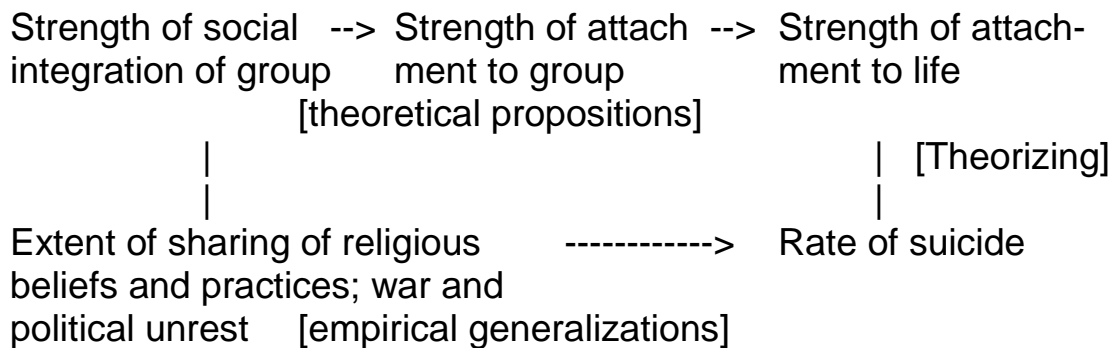
1. Building a house of cards vs the collapsing of a house of cards.
2. Instituting comprehensive school reform vs the "collapsing" of a school reform effort.

Issues and Concepts in the Study of Social Systems

3. Following written steps in a recipe vs "following" one's "practical (tacit) knowledge" of the steps in a recipe.
4. Stages of psychotherapy vs stages of teacher burn-out.
5. Patterns of communication and decision making in a team meeting vs a school system's organizational chart depicting relations of power and authority among units and offices.

*e. Propositions about **more general** categories and relationships.*

We can use raw data (events), empirical concepts (categories of events), and empirical generalizations regarding relationships to create more general formulations. [See Lofland & Lofland, pp. 157 bottom-167.] For example, the research of Emile Durkheim (in *Suicide*) led him to the following empirical generalizations: (1) The more members of a religious "confession" share beliefs and practices, the lower their rates of suicide; and (2) The suicide rate in a society decreases when it is at war. From these, Durkheim **theorized** that the empirical relationships are part of a more general relationship: The more strongly **integrated** a group is, the more strongly its members are **attached** to the group and the more strongly they will be attached to life. The diagram below depicts how Durkheim moved from specific (empirical) relationships to more general (theoretical) relationships.



Another kind of general formulation is an *hypothesis* that what we discovered in a **sample**: 1) applies to a larger circle of people and their activities, or 2) enables us to predict what will happen if independent variables change. For example:

"Alienation and attachment are functionally related to social conditions. Therefore, altering certain of these social conditions ought to foster a decrease in alienation and an increase in attachment. These conditions might include increasing the amount of positive contact with principals,

Issues and Concepts in the Study of Social Systems

increasing peer assistance, and increasing teacher empowerment over decisions regarding curriculum and instruction."

B. Rationalism and Deduction

The second intellectual style is **rationalism**, represented by the work of Plato and Thomas Hobbes. For rationalists, **one plausible theoretical proposition is worth a silo filled with "mere" facts**. Rationalists want to believe that the world is orderly--describable, predictable, explainable, and perhaps even governed by laws. Therefore, work in the rationalist (theory first) style generally has the following features.

General Features of Rationalism

First, rationalism tends to be **deductive**. We begin by asserting hypotheses (propositions about general relationships). **[Note that this is where the empirical-inductive process ended.]** Then we deduce what we expect to find in a particular case. In other words, we deduce things that are expected to be examples of (particulars contained in) the general categories hypothesized about. **[In other words, deduction is like unpacking the concepts.]** Next, we might test the hypothesis by collecting evidence (particulars) that will either support or falsify the hypothesis.

Second rationalism is often **explanatory** and **nomothetic**. This means that the researcher or theorist regards observed patterns as important *not* because they reveal how people (idiographically) create and sustain social life, but because the patterns (nomothetically) signify, symbolize, or document more universal, enduring, and general patterns (ideas, truths, laws). [See the allegory of the cave in Plato's *Republic*; Book VII, 514.]

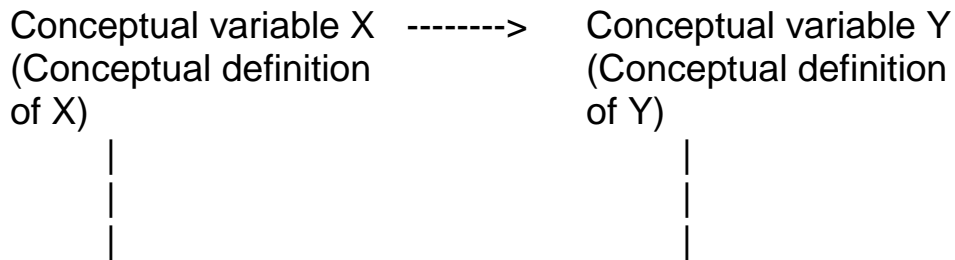
Steps in Rationalist (Deductive) Research and Theorizing

The rationalist-deductive style of research and theorizing can begin where the inductive style ends. The deductive researcher or theorist could treat the inductive researcher's empirical generalizations or theoretical propositions as **hypotheses** to test. Therefore, deductive work is not so much a process of discovery as it is a process of **verifying, testing, or trying to falsify** what one thinks has been discovered. For example, will the empirical generalizations stated earlier hold up in other settings. Would the same "causal" variables and stages of teacher alienation be found in small, medium and large schools; public vs parochial schools; highly

Issues and Concepts in the Study of Social Systems

centralized vs decentralized schools? In summary, deductive work begins with generals (propositions stated as hypotheses about what one expects to find) and moves to specifics (observations of the things hypothesized about). The following diagram depicts the mechanics of deductive research.

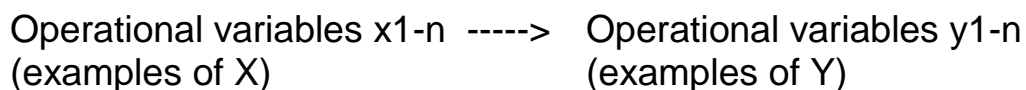
- a. Assert conceptual hypothesis:



- b. Deduce operational definition of X
- Deduce operational definition of Y

[Notice that the earlier diagram of Durkheim's theorizing depicted his induction of a more general relationship; the arrows pointed upward. The diagram above depicts deduction--from generals to specifics.]

- c. Assert operational hypotheses:



- d. Collect data on the operationalized variables. Interpret findings as supporting vs falsifying the hypothesized relationships among the operational and conceptual variables.

Now let us examine the steps in more detail.

1. We begin with hypotheses (general theoretical propositions).

For example,

"Vulnerability regarding place (position or status) in a social system (Y, dependent variable) is an inverse (indirect) function of the extent to which other members validate a person's claims to place (X, independent variable)." Or, "The more (often, genuinely, intensely)

Issues and Concepts in the Study of Social Systems

other members validate a person's claims to a social place, the less vulnerable regarding place a person will be."

Notice that this hypothetical proposition asserts a causal relationship **not** between **particular** events, but between classes (families, categories) of events (vulnerability, validation of claims). These categories are called "concepts" or "**conceptual variables**." They are called "variables" because each varies; that is, there can be more or less vulnerability regarding place, and there can be more or less validation of claims to a place. The hypothesis is called a "**conceptual hypothesis**." If we were asserting an hypothesis about very particular events (e.g., what Jill will do when Jack proposes marriage), that would be an "**empirical hypothesis**."

2. We develop conceptual definitions for each of the concepts (conceptual variables). We will use the method of **genus and difference** in creating definitions. First we state the genus (larger category) of which the phenomenon is a member. Then we state some of the specific features of the things that we are defining, to distinguish them from other things that are **also** in the larger category.

"*Vulnerability* regarding place in a social system is an **experience** (genus) involving: a) fear of loss of opportunities to participate, b) fear of no longer being treated with respect and sensitivity, c) fear of no longer being regarded by others as the person that one wants to see oneself as being, or d) fear of being removed from the social system." (a.-d. indicate the difference between vulnerability regarding social place vs vulnerability regarding other things, such as illness.)

"*Validation* of claims to a place in a social system consists of **actions** of other members (genus) which communicate, or which can be interpreted as communicating, other members' evaluations of the person as being: a) like them, b) competent, and c) valuable." (a.-c. indicate the difference between validation of claims to a place vs claims to, say, being owed money.)

It is important to understand that the above **conceptual definitions are not true**. This is because concepts, such as vulnerability and validation, are not objects. We cannot check our definition of vulnerability (or our idea of it) against vulnerability itself, in the same way that we can

Issues and Concepts in the Study of Social Systems

compare our definition of "chair" against tangible chairs. In summary, **stating a conceptual definition is not the same as stating a fact.** A conceptual definition is like a search light; it points out certain aspects of the world. Instead of being true or false, conceptual definitions are better or worse, more useful or less useful search lights. They may be too narrow (i.e., exclude what ought to be considered vulnerability, for instance) or too broad (i.e., include what ought **not** to be considered vulnerability); and they may be more or less precisely worded.

Notice that **conceptual definitions are abstract.** For example, what is meant by "fear of loss of opportunities to participate"? What is "fear"? What is an "opportunity to participate"? Therefore, although conceptual definitions aim our attention at what might be meant by "fear of loss of opportunities to participate," we **need to be more specific**, as shown in 3., below.

3. Using conceptual definitions as a guide, we derive or deduce operational definitions. Following is an example.

"*Vulnerability* regarding place in a social system means (is signified or manifested by) tension and anxious thoughts (such as "They do not like me," "They do not want me here," and "They will think I'm a failure.") when a person is about to perform or has already performed actions that other members may see as commentary on a person's fitness (e.g., how well one speaks, how one looks, or how well one does a job)."

"*Validation*" of claims to a place in a social system consists of actions of other members, such as praising versus insulting a person, offering versus not offering opportunities to take part in everyday tasks, protecting versus not protecting a person from pain and deprivation, paying attention versus ignoring a person when he or she speaks."

Operationalized as a set of specific examples, "vulnerability" and "validation" are now "**operational variables**" or "operational concepts."

Notice that the above two operational definitions were **derived** from the conceptual definitions. If the conceptual definitions are like circles of light that shine on portions of a dark landscape, the **operational definitions state what is inside the circles of light.** However, the operational definitions given above must be made **larger** and more

Issues and Concepts in the Study of Social Systems

precise. What is meant by "anxious thoughts"? Also, "vulnerability" implies more than the three "anxious thoughts" stated. What are "praising" and "protecting"?

EXERCISE 15. Using the conceptual definition of "validation" in #2 above, and the partial operational definition of "validation" in #3 above, develop a revised operational definition that contains enough precise examples to "cover" the concept.

4. We restate the original conceptual hypothesis as an operational hypothesis. We have transformed the concepts in our original conceptual hypothesis into events that we can observe. Now we state that we expect to find a relationship between the operationalized variables. Following is an example of an **operational hypotheses**.

"The more often people receive insults (such as 'We don't like you' or 'Your clothes are ugly'); the less often people are protected from pain and deprivation (for example, are made to wait a long time before they receive care in an emergency room); and the less they are given the chance to participate (e.g., to have a conversation), then the more persons will experience tension and will engage in anxious thinking before, during, and after they interact with other persons."

5. Next, we test the operational hypothesis (and by inference the conceptual hypothesis from which it was derived). We do this by **observing** the operational variables (described above) to determine whether they are associated as hypothesized. For example, we might conduct an **experiment** in which the participants in one experimental condition receive much validation while those in another condition receive little. At the same time, we measure participants' tension and anxiety about their place in the experimentally-created social system. Or, we might conduct a **survey**, using interviews or questionnaires that ask people about their experiences of validation and vulnerability (as we have

Issues and Concepts in the Study of Social Systems

operationalized them). Some questions ask how often persons have received praise versus insults, how sensitively they feel others have treated them, and how much tension they feel about the way they look and act. Or we might do **field research** similar to the inductive work described earlier, and observe how people treat one another and at how vulnerable people seem to be under different conditions of validation.

6. We use methods of inductive inference to see whether the two sets of variables are connected as hypothesized. For example, even if vulnerability is high when validation is low (as predicted), the degree of vulnerability could be the result of something else, such as poor health, childhood experiences, or even errors in our measurements. Several forms of inductive reasoning (described later) enable us to separate causal/functional relationships from coincidental relationships.

7. If the findings agree with our prediction (from the operational hypothesis), we tentatively accept the conceptual hypothesis from which the operational hypothesis was deduced. For example, if persons in the experimental condition involving a lot of validation experienced less vulnerability than persons in the condition involving a lot of *invalidation*, then the theoretical proposition (conceptual hypothesis) about the **general** relationship between vulnerability in a social system and validation of place in the social system has withstood the test; at least it is **not false** (this time). To strengthen the proposition, we would test it in other places (i.e., replicate the research).

However, if the findings do not support the operational hypothesis, we check our measurements, redefine the variables, determine whether the hypothesis applies better in other situations, or reject the hypothesis as false and admit that the theoretical proposition is not as general as we thought.

* * * * *

Some individuals and teams confine themselves to one or the other style of work. However, it is possible to use them both, in a **cycle**. In fact, researchers and theorists who combine both styles of work have done the most powerful work. For instance, we might begin with inductive work. Then we use the deductive style to test propositions about relationships that we discovered in the inductive work. The deductive work might suggest the need to do further inductive work to discover how general the findings are or why certain hypotheses were not supported. Then another round begins.

Issues and Concepts in the Study of Social Systems

Drawing Causal Inferences

Whether it is inductive theorizing and research (looking for empirical relationships) or deductive theorizing and research (testing hypotheses), we are likely to assert causal/functional propositions (i.e., to make causal inferences). However, as David Hume shows in *A treatise on human nature*, we cannot see causation directly. **We only infer causal connection.** Somehow, we feel more comfortable with the proposition "X causes Y" when the inference has been drawn under certain evidentiary conditions, which are as follows: 1) evidence that the alleged cause preceded the alleged effect ("temporal priority"); 2) empirical evidence that the alleged cause and effect occur together ("contiguity"); 3) logical evidence that ties them together ("constant conjunction"); and 4) evidence that alternative explanations are implausible. Let us examine each of these criteria.

Alleged Cause Precedes Alleged Effect

Consider the following assertion. "An increase in teachers' authority to make curricular decisions (independent variable) fosters an increase in teachers' attachment to their school." This proposition (it could be an empirical generalization from research) seems plausible only if there is evidence that teachers' authority to make curricular decisions preceded an increase in teachers' attachment to their school. Evidence of temporal priority might be supplied by observation, experimental control, and/or commonsense reasoning (e.g., it is not likely that a house burned down and then someone smoked in bed).

Empirical Evidence of Association

The inference that an increase in teachers' authority to make curricular decisions fosters an increase in teachers' attachment to their school, is more compelling if we have **data** showing that these two variables changed in close succession ($V \rightarrow Y$: a proximal relationship) or in a sequence of variables that changed in close succession ($V \rightarrow W \rightarrow X \rightarrow Y$: a distal relationship), and in the order asserted. Similarly, we can conclude that a family training program produced beneficial effects only if we have evidence of change in families **and** evidence that family members attended meetings, understood what was presented during meetings, and read and understood materials.

Issues and Concepts in the Study of Social Systems

Evidence Provided by Inductive Logic

Logical evidence is obtained by designing research, analyzing data, and interpreting findings such that we can apply one or more of John Stuart Mill's methods of inductive inference. These methods include: concomitant variation, agreement, difference, joint agreement and difference, and residues.

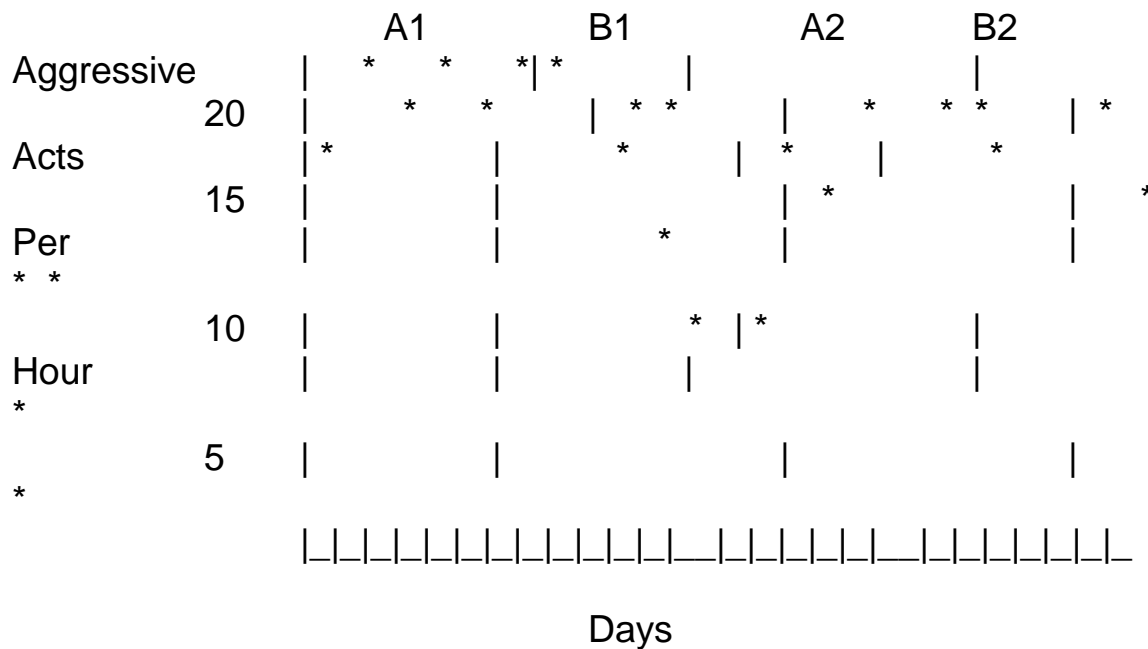
1. The method of concomitant variation If two variables are changing with respect to one another (e.g., both are increasing, both are decreasing, or one is increasing and the other is decreasing) while everything else remains at about the same level, then we have logical evidence that one variable is a cause or an effect of the other (or they are both being changed by a third variable.)

For instance, an experiment in a class of 20 grade school children was conducted to identify what affects the rate of children's aggression. During the first experimental period (A1 or Baseline), the teacher was asked to go about her business and handle the children's aggression (operationally defined as hitting, kicking, insulting, etc.) in her usual way. Prior observation showed that her usual way involved staring at the "offender," reminding the offender of the rules, telling the offender to stop, or even giving the offender an enjoyable activity to "distract him" or "settle him down." In the next period (B1), the teacher was coached to ignore an offender's aggression and, instead, to reinforce other children who were engaging in nonaggressive behavior at that time. In the third experimental period (A2), called a "reversal," the teacher was asked to do what she used to do during A1 (which, again, meant that she tried to stop aggression). And during the final period (B2), she was asked to go back to ignoring aggression and reinforcing nonaggression.

The graph below shows that when the children received a lot of teacher contact following aggression (A1 and A2), the rate of aggression was high, and when the amount of teacher contact following aggression decreased (B1 and B2), the rate of aggression decreased. Since nothing else in the classroom was changing along with changes in the teacher's responses to aggression, it is plausible to infer that changes in the teacher's responses somehow caused changes in the children's rate of aggression. [Note that it would be important to try to determine how the teacher and the children made sense of what was happening--the subjective and intersubjective sides of the social system.]

Issues and Concepts in the Study of Social Systems

Issues and Concepts in the Study of Social Systems



2. The method of agreement Imagine that we study twenty school reform efforts that failed. Each school and each reform effort was a **different** configuration of variables (e.g., size, socioeconomic status, location, teacher-student ratio, speed of reform). Despite their differences, however, all of the schools and reform efforts had one thing in **common**-- staff did not fully understand and were not fully committed to the mission or the reform plans. Since nothing else in the schools and plans was common across the schools, it is reasonable to infer that *the way in which they "agreed"* (i.e., were the same) *was the cause of the failed reform efforts.*

3. The method of difference Mill's method of difference is the form of inductive logic used in the typical pre-test, post-test, experimental-group, control-group study. Let us say that we have a pool of 50 families whom we randomly assign to two comparison groups. One group receives written materials, ten weekly group meetings, and weekly home visits aimed at improving family interaction and home teaching. The second group receives written materials only. We compare pre-test and post-test scores on the quality of family interaction and home teaching. Families in the first group have significantly larger pre-post-test differences.

What can we infer? Since we **randomly** assigned families to the groups, **any** personal and family differences that might have accounted for improvement or lack of improvement (e.g., religion, support network,

Issues and Concepts in the Study of Social Systems

expectations of success, initial teaching skill) had an **equal chance** of being in each group. Therefore, we can assume that the groups were fairly similar on these **extraneous factors**. (Of course, we could also measure those factors that we think are important and see how similar the two groups actually are.) Since the only other systematic difference between the two groups (which we know about) was group meetings and home visits, *it seems likely that these two features of the training made the difference in the amounts of improvement.*

4. The joint method of agreement and difference This method combines the methods of agreement and difference. Let us take the above research on family training one step farther. We compared pre-post-test scores of families in the two groups which systematically differed **only** on whether they received written materials or received materials, meetings, and home visits. We used the method of difference to infer that the meetings and home visits accounted for the difference in improvement.

Now imagine that, in addition, we obtain a large sample of families who **differ in many ways** (income, ethnicity, education, etc.). In each family we examine the quality of family interaction and teaching (dependent variables). We also examine whether each family reads materials on interaction and teaching (e.g., books, magazines), is part of some kind of group in which family interaction and teaching are discussed, or receives any in-home assistance or support (e.g., from relatives or other families) (independent variables). If we find that families who attend family-oriented meetings and receive home assistance also have higher quality family interaction and teaching, then we have logical evidence through the method of **agreement** that these variables make a difference. In summary, the combined use of the methods of agreement and difference provides compelling evidence.

5. The method of residues Imagine a situation in which some phenomenon (Y) might be explained by four factors. We may be able to arrive at the one that is the cause through a process of elimination. If we know that factor 1 is a cause of Q, factor 2 is a cause of R, and factor 3 is a cause of S, then factor 4, the only one left, is likely to be the cause of Y. As Sherlock Holmes used to tell Dr. Watson, when you have eliminated all of the other possible explanations, the one that remains, improbable though it may seem, must be the correct explanation.

Ruling Out Rival Hypotheses

Issues and Concepts in the Study of Social Systems

Let us say that we have satisfied the first three criteria for drawing a plausible and compelling causal inference. We have evidence that the alleged causes preceded the alleged effects; we have empirical evidence (data) that the two variables changed, and in the way that was asserted; and we have used Mill's methods to provide logical evidence of a causal connection. We now need to show that rival explanations are implausible.

Consider the inference that children's rate of aggression changed as a function of change in teacher's responses to aggression and nonaggression. Surely it is possible that other variables caused some or all of the change in children's behavior. We must identify as many of these extraneous variables as we can and see if they provide plausible "rival" explanations. Below are some possibilities.

1. There were changes in some children's diets during the experiment (e.g., less sugar and less food additives). [Our data show that there were no such changes.]
2. There were changes in some children's participation in sports after school. Increased exercise calmed the children. [Our data show that only two children increased their amount of exercise. This could not have accounted for more than a small amount of change in the rate of aggression for the class.]
3. Maturation accounted for change in aggression and nonaggression. [It is unlikely that the children matured in the B1 period, regressed in the A2 period, and matured again in the B2 period--all coincidental with changes in the behavior of the teacher.]
4. During the A1 and A2 periods (when rates of aggression were high), the children were given harder tasks. Frustration was the cause of their aggression. [Our data show that the tasks were the same across all four periods.]
5. Some children were put on medication during the experiment. This caused a decrease in aggression. [Our data show that four children were put on medication during the experiment. However, two of these children were on medication during the A1 period (when the rate of aggression was high), and all four of the children were on medication during the A2 (reversal) phase, when aggression rose again. If we cannot say that medication decreased aggression during the A1 and A2

Issues and Concepts in the Study of Social Systems

periods, it is unreasonable to think that medication worked during the B1 and B2 periods.]

6. The children's rates of behavior were really the same across the four experimental periods. The apparent changes were the result of measurement error or bias. [In fact, observers were trained to high levels of reliability before the experiment began. Their reliability was checked periodically during the experiment and was high. Moreover, observers were "blind" to the experimental periods and did not know what the hypotheses were.]

By showing that rival explanations are either false or implausible, it is likely that our explanation is correct.