

Initial Research Methodology Issues

Concepts, Constructs, Operational Definitions
& Variables

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Concept:

An abstraction encompassing observed events; a word that represents the similarities or common aspects of objects or events that are otherwise quite different from one another. The purpose of a concept is to simplify thinking by including a number of events (or the common aspects of otherwise diverse things) under one general heading (Ary 1985).

Example of a Concept:

Chair, dog, tree, liquid, a doughnut, etc...

Can you think of more?

Construct:

Constructs are the “highest-level abstractions” of complicated objects and events, created by combining concepts and less complex constructs. – used to account for observed regularities and relationships, and to summarize observations and explanations (Ary 1985).

A concept with added meaning of having been deliberately and consciously invented or adopted for a special scientific purpose. (1) it enters into theoretical schemes and is related in various ways to other constructs. (2) it is defined and specified so that it may be observed or measured (Kerlinger 1986).

Scientists measure things in three classes: direct observables, indirect observables (not experienced or observed first hand), and constructs. These constructs are defined as theoretical creations based on observations but cannot be observed directly or indirectly (Kaplan 1964).

Example of a Construct:

Motivation, visual acuity, justice, problem-solving ability, ...not a doughnut, ...but hunger.

Case Study:

Can you determine which county was “*hardest hit?*”

	Marin	Santa Cruz
People Killed:	5	22
People Injured:	379	50
People Displaced:	370	400
Homes Destroyed:	28	135
Homes Damaged:	2900	300
Businesses Destroyed:	25	10
Businesses Damaged:	800	35
Private Damages:	\$65.1 million	\$50.0 million
Public Damages:	\$15.0 million	\$56.5 million

Operational Definition:

It ascribes meaning to a concept or construct by specifying the operations that must be performed in order to measure or manipulate the concept, as the data collected during research is in terms of observable events (Ary 1985).

It defines or gives meaning to a variable by spelling out what the investigator must do to measure it (Kerlinger 1986).

“Operational definitions are essential to research because they permit investigators to measure abstract concepts and constructs and permit scientists to move from the level of constructs and theory to the level of observation” (Ary 1985).

Two Types of Operational Definitions:

Measured Operational Definition: Operations by which investigators may measure a concept.

Experimental Operational Definition: Steps taken by a researcher to produce certain experimental conditions.

Examples of an Operational Definition:

Measured Operational Definition: An actual (score) value from a test or questionnaire the researchers would develop to measure “*hunger.*”

Experimental Operational Definition: A manipulated scenario to produce the condition of “*hunger.*” (such as preventing the subject from consuming anything for x-number of hours)

Variable:

Characteristics or attributes of an object, individual or organization that can be measured or observed, and that varies among those objects or individuals being studied (Creswell 2002).

They possess values and levels (the dimensions on which they vary) (Sommer 1997).

“The concepts that are of interest in a study become the variables for investigation (Ary 1985).”

Different Kinds of Variables:

Dichotomous: Two-valued variables. **Example:** Sex (male/female)

Polytomous: Multiple values for variables. **Example:** Religion (Catholicism, Islam, Judaism, Hinduism, Buddhism, etc...)

Continuous: A variable that takes on an infinite number of values within a range. **Example:** Height & Weight

More Kinds of Variables:

Independent: The variable manipulated by the experimenter (also: Experimental, Predictor, Manipulated, Antecedent, Treatment).

- Active: Any variable that is manipulated by the researcher
- Attribute: Any variable that cannot be manipulated by the researcher. For example, all human characteristics are attribute variables: intelligence, sex, socioeconomic status etc.

Dependent: The dependent variable is the phenomenon that is the object of study and investigation (also: Outcome, Response, Criterion, Effect).

...And More Kinds of Variables:

Categorical: Referred to as nominal measurements. One creates ‘categories,’ and classifies all variables that fall under this definition without rank order. All variables under the same category are considered of equal value, and not differentiated.

Latent: An unobserved ‘entity’ that “stands between” the independent variable and the dependent variable, and mediates the effect of the independent variable on the dependent variable. It is dependent on the independent variable as well as other constructs, yet still plays a role in determining the outcome (possibly: Intervening, Mediating, Hypothetical construct).

...And Still More Kinds of Variables:

Control: An independent variable that is measured in a study because they potentially influence the dependent variable. It is a more clearly defined independent variable in attempts to eliminate all bias in regards to its effects on the dependent variable. (Keeps the study in check).

Confounding: Variables not actually measured or observed in a study, yet they exist, and its influence cannot be directly detected or understood in a study. One becomes aware of a confounding variable at the end of a study, they realize that there is an effect that was not measured or accounted for, but should be addressed (also: Spurious).

References:

- Ary, D., Jacobs, L.C., & Razavieh, A. (1985). *Introduction to research in education* (3rd ed.). New York: Holt Rinehart and Winston.
- Babbie, E.R. (1992). *The practice of social research* (5th ed.). Belmont, Calif.: Wadsworth Pub. Co.
- Berg, B.L. (1989). *Qualitative research methods for the social sciences*. Boston: Allyn and Bacon.
- Kerlinger, F.N. (1986). *Foundations of behavioral research* (3rd ed.). Fort Worth: Holt Rinehart and Winston.
- Sommer, B. & Sommer, R. (1997). *A practical guide to behavioral research* (4th ed.). New York: Oxford University Press.