

I. Variables & Units of Analysis.

A. Variables describe units of analysis.

B. A variable is a dimension along which units of analysis differ or vary. A variable is a set of **exhaustive** and **mutually exclusive** attributes into which all of the units of analysis in question may be classified.

C. Examples.

UNIT OF ANALYSIS	VARIABLE	CATEGORIES OF VARIABLE
individual	income	exact income to nearest dollar or categories, e.g. < \$10,000 \$10,000 - \$24,999 \$25,000 - \$34,999 etc
individual	eye color	blue, brown, green, hazel, etc
household	size (number of people residing together)	1, 2, 3, 4, 5, 6, . . .
Organization	sex composition (% female)	percentage to nearest whole percent, or categorize: <20% female 20-50% female 51-80% female >80% female
Census tract	average income	mean to nearest dollar

D. Level of measurement.

1. nominal. Exhaustive & mutually exclusive categories. E.g. Eye color, major, sex/gender.

2. ordinal. Nominal + ranks. Course grade (A, AB, B etc.); course level (E, I, A)

3. Interval. Ordinal plus meaningful metric so distance between 1 & 2 = distance between 23 & 24. Few examples: temperature scales.

4. Ratio. Interval + true zero. Height in inches, income in dollars, number people enrolled in a class.

Notes: Nominal + ordinal = qualitative. Can do frequencies, percentages, proportions, mode. Interval + ratio = quantitative. Can do qualitative + means, standard deviations, correlations, all other statistics. Very few statistics especially for ordinal. Ordinal variables with 5+ categories can usually be assigned numbers and treated as interval.

## II. Propositions

1. A proposition is a statement about variables.

A) Univariate proposition is a statement about one variable at a time. "Most UW students drink beer at least once a week." Variable: frequency of beer drinking. UOA: individual, UW students. Statement: "most" drink once a week or more.

B) Bivariate proposition is a statement about the relation between two variables. "Males drink beer more often than females." Variables: 1) sex, 2) frequency of beer drinking. Statement: gives relation between them.

C) Multivariate proposition states a complex relation among three or more variables. "Among non-depressed students, males drink beer more often than females, but among clinically depressed students, males and females drink beer equally often." Variables: 1) sex, 2) frequency of beer drinking, 3) whether clinically depressed or not.

2. A Hypothesis is a type of proposition. Some use as synonyms. I used it to mean the proposition being tested in a particular research project. (Stern uses it for the finding of the project, even if it is an after-the-fact result, and limits it to bivariate.)

3. An assumption is a proposition that is taken or assumed to be true within the context of a particular research project. You always need to make some assumptions to study something else. Important types of assumptions:

A) Measurement assumption. The assumption that a particular operationalized variable is an adequate representation of a particular concept. All research has measurement assumptions.

B) Theoretical assumptions. Assumptions about how things generally work, apart from the specific thing being studied.

## III. Relationships.

1. Qualitative: e.g. A) Blacks are more likely to be Democrats than whites are. Variables: race, party choice. UOA: people. Percentage tables.

2. Quantitative. Positive relation: Height is positively correlated with weight = On the average, taller people weigh more.

Negative relation: The speed with which a task is performed is negatively related to the accuracy with which the task is performed = the faster you work, the more mistakes you make.

Curvilinear relation: The level of stress is curvilinearly related to age, with the highest levels of stress occurring in middle age and lower levels of stress occurring among those younger and older.

## IV. General form of a proposition:

Conceptual: For population P in condition C independent variable X causes dependent variable Y.

Operational: For sample p in condition c independent variable x has a statistical association with dependent variable y.

V. Operationalization=Measurement=defining the procedures you will use for deciding what category of a variable each unit of analysis belongs in.