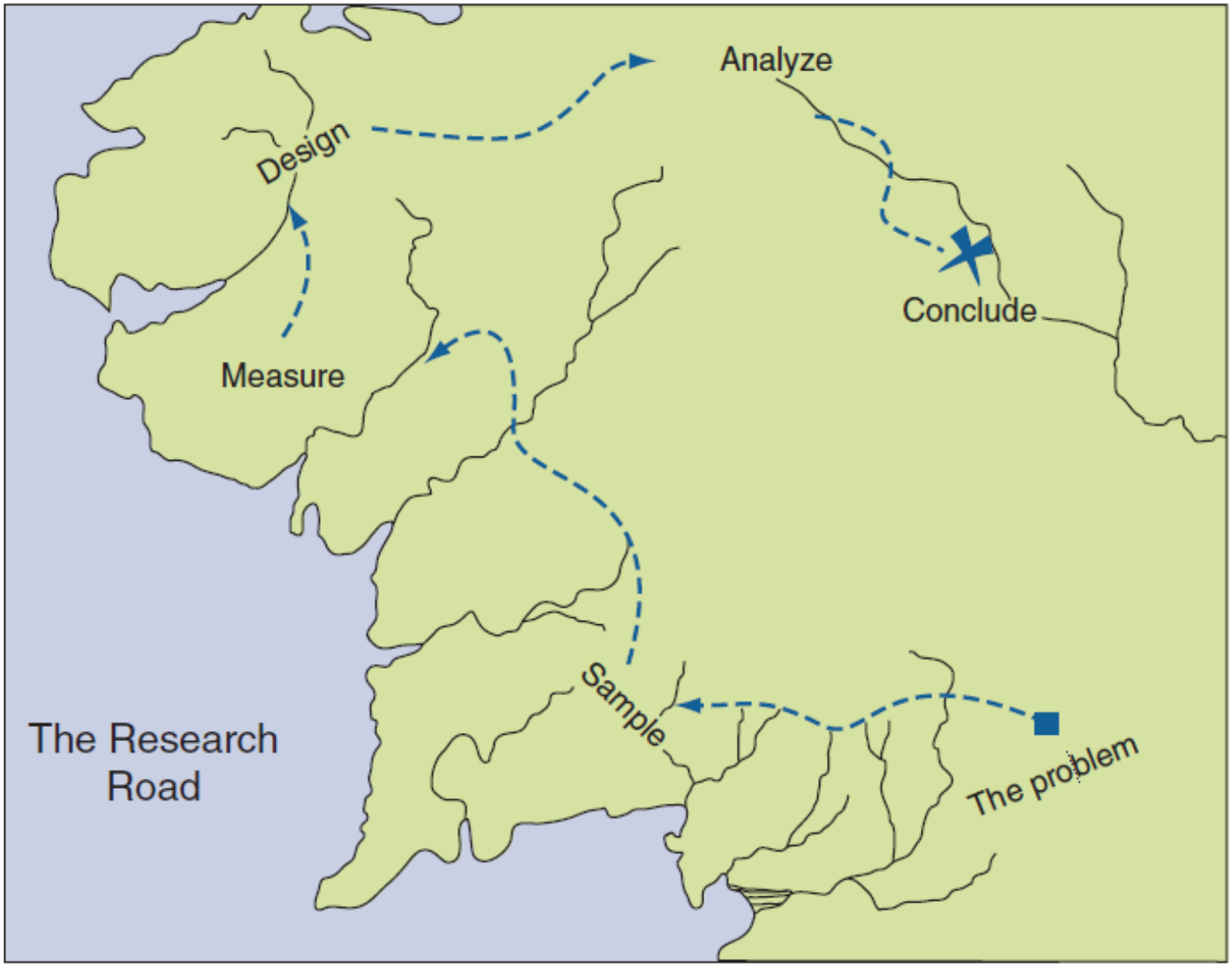
Questions

- What represents the most challenging aspect for me to embark on a research project?
- How does the proposed research contribute to existing knowledge in the field?
- Which research design is considered the most appropriate for a particular area of inquiry?
- Which type of data can be used to answer a research question?
- What statistical or analytical methods will be employed to analyze the data?
- What are the anticipated outcomes of the research?
- What are the estimated costs associated with the research?
- Is the research technically and logistically feasible?
- How will the results be disseminated to the academic community and beyond?

Developing an Effective Research Proposal

Dr. Inayat Ullah
Assistant Professor,
Dept. of Govt & Public Policy, NUST Islamabad
GitHub: www.Inayat.pro

Making "*Well begun is half done*" possible



What is Research?

- **Systematic investigation**
  - It is a conscious effort to concentrate our thinking, to do it in a rational, careful manner.
- **Empirical endeavor**
  - an effort that is based upon systematic observation yielding data that we can use in our decision making
- **Public Good**
  - Research contributes to a broader base of knowledge than just their own.
  - Consequently, it is important that research procedures are described in a way that enables other people to understand them, duplicate them and make judgments about their quality

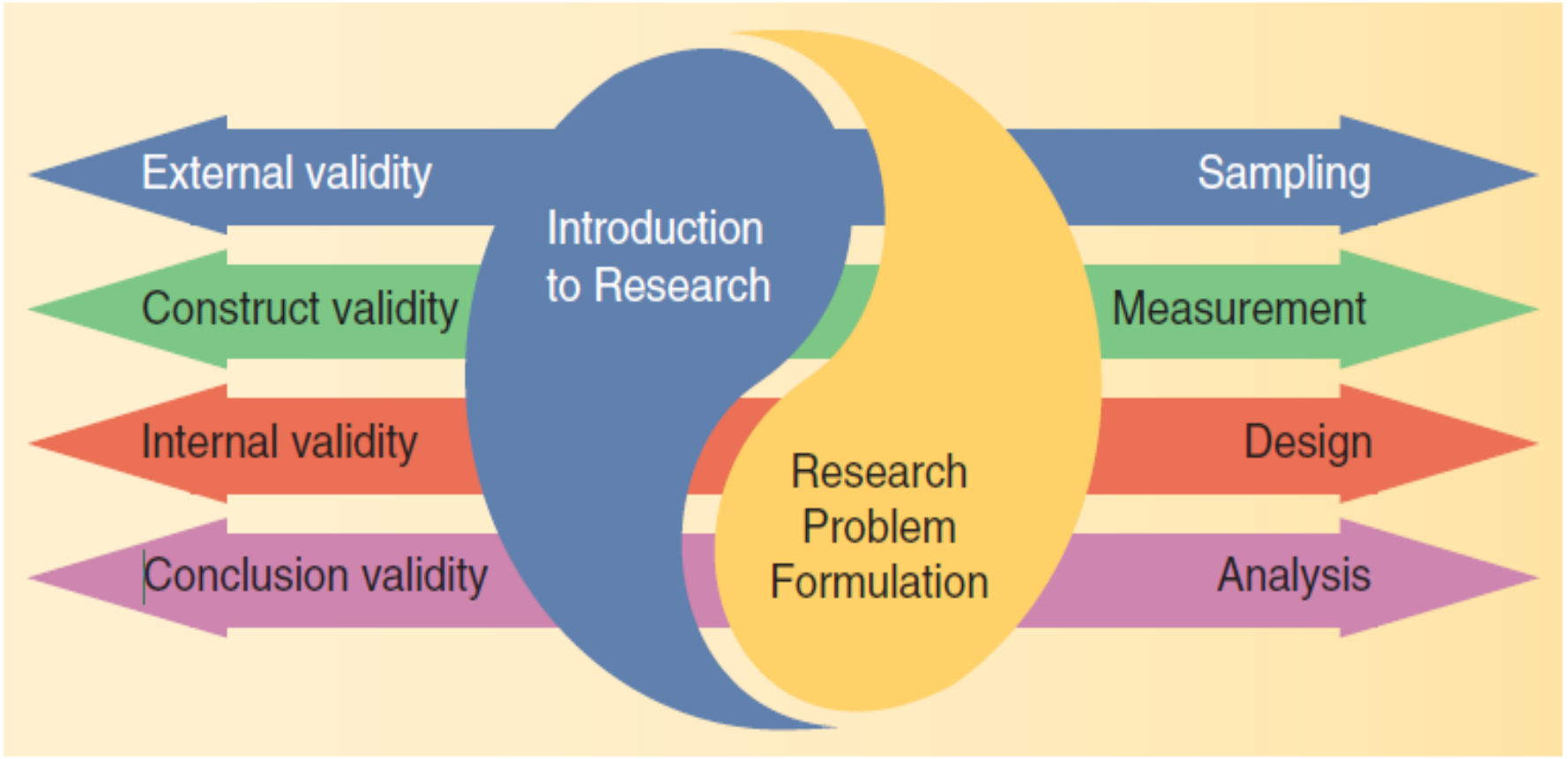
Empirical Research?

- Research based on observation and measurement of phenomena as directly experienced by the researcher.
- Using data and Experiments
- Science, as a method, relies on both ***logic***, as captured by theory, and ***empirical observation*** of the world to determine whether the theory we have developed conforms to what we ***observe***.

The Scientific Method

- We seek to explain the world with our theories.
- And we test our theories by deducing and testing hypotheses.
- When a working hypothesis is supported, we have more confidence in our theory.
- When the null hypothesis is supported, it undermines our proposed theory.

The Interconnection of Theory and Practice of Research



The Research-Practice Continuum

The risk in generalization

- Science seeks a particular kind of knowledge and has certain biases.
- When we are engaging in scientific research, we are interested in reaching generalizations.
- Making generalization underlies the risk of Biases.

Science-vs Non-Science

- We also look for generalizations that are *causal* in nature.
- Scientists actively seek explanations grounded in causation rather than correlation.
- Scientific Knowledge should be replicable- Other scientists should reach the same conclusion in different contexts.

What is Theory?

- Theory broadly is defined as a set of interrelated propositions that seek to explain and, in some cases, predict an observed phenomenon.
- Characteristics of Good Theories:
  - Coherent and internally consistent
  - Causal in nature
  - Generate testable hypotheses

Concepts and Variables

- A concept is a commonality across observed individual events or cases.
- It is a regularity that we find in complex world.
- Concepts are our building blocks to understanding the world and to developing theory that explains the world

Variable

- Once a concept has been quantified, it is employed in modeling as a variable.
- Dependent Variable – Y –the concept we are trying to explain or predict
- Independent Variable- X –The concept that is used to predict the dependent variable

- The expected relationship is called **THEORY**

Measurement

- Measurement is the assignment of numbers to some phenomenon that we are interested in analyzing.

Examples:

- The effectiveness of public officer is measured by having senior officers rate junior officers on various traits.
- Educational attainment may be measured by how well a student scores on standardized achievement tests.
- Good performance by a city bus driver might be measured by the driver's accident record and by his or her record of running on time.
- The success of a nonprofit agency's fund-raising drive might be measured by the amount of money raised.

Thought-Provoking Question!

- The District Police Officer (DPO) of District Mardan reports that the number of arrest of criminals has increase by 20% over a period of one month.

- Does this indicate better performance of police department?

Measurement of a concept

- First, we define concept-Dictionary definition
- Then concepts are measured indirectly through ***indicators*** specified by operational definitions.
- An operational definition is a statement that describes how a concept will be measured.
- An indicator is a variable, or set of observations, that results from applying the operational definition.

Examples of Operational Definition

- Officer effectiveness is defined by subjective evaluations by senior officers using ACRs.

- Education attainment is defined by the scores on a standardized test.

- Clients' satisfaction with the service of the Department of Human Resources is measured according to the response categories that clients check on a questionnaire item (high satisfaction, medium satisfaction, and low satisfaction).

The goodness of Indicators

- Sometimes, an observed indicators may not offer a complete measure of the underlying concepts.

Indicator =concept + error

- A good indicator of a concept contains very little error; a poor indicator is only remotely related to the underlying concept.
- One reason for using ***multiple indicators*** is that a concept may have more than one dimension.

Validity and Reliability of Measurement

- When measuring concepts, the indicators that are used in building and testing theories should be both valid and reliable.
- Validity refers to *how well the measurement captures the concept*.
- Reliability, by contrast, refers to *how consistent the measure is with repeated applications*.
- A measure is reliable if, when applied to the repeated observations in similar settings, the outcomes are consistent.

How important is the Quality of Measurement??

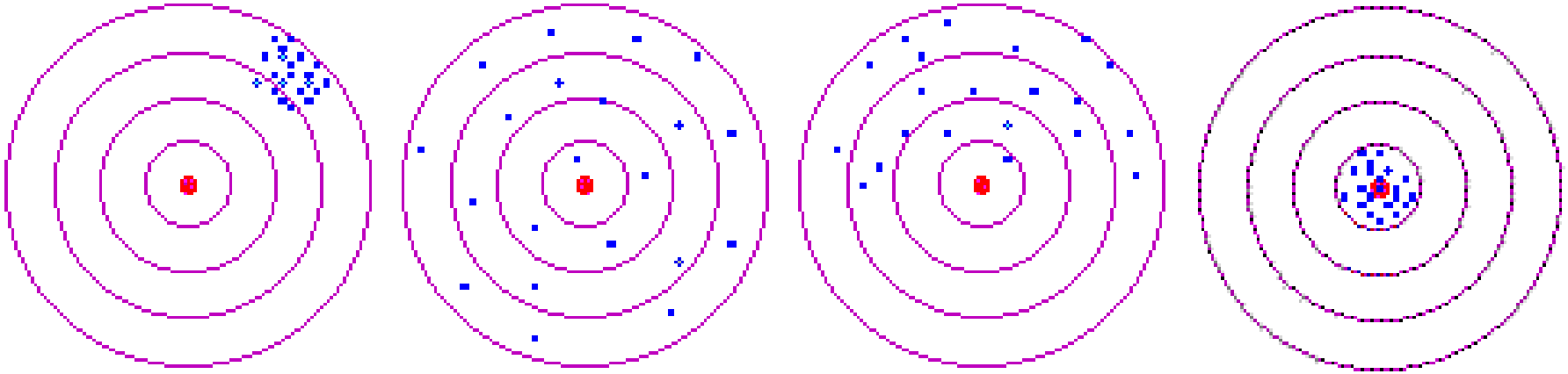
- Measurement is the process of assigning numbers to the phenomenon or concept that you are interested in.
- Measurement is *straight-forward when we can directly observe the phenomenon*.
- Measurement becomes more challenging when you *cannot directly observe the concept of interest*.

Validity of Measurement

- A valid indicator accurately measures the concept it is intended to measure.
- In other words, if the indicator contains very little error, then the indicator is a valid measure of the concept.

- **Question:**
- Is the CSS examinations a valid indicators of on-the-job performance of civil servants?

Validity and Reliability



Reliable
Not Valid

Valid
Not Reliable

Neither Reliable
Nor Valid

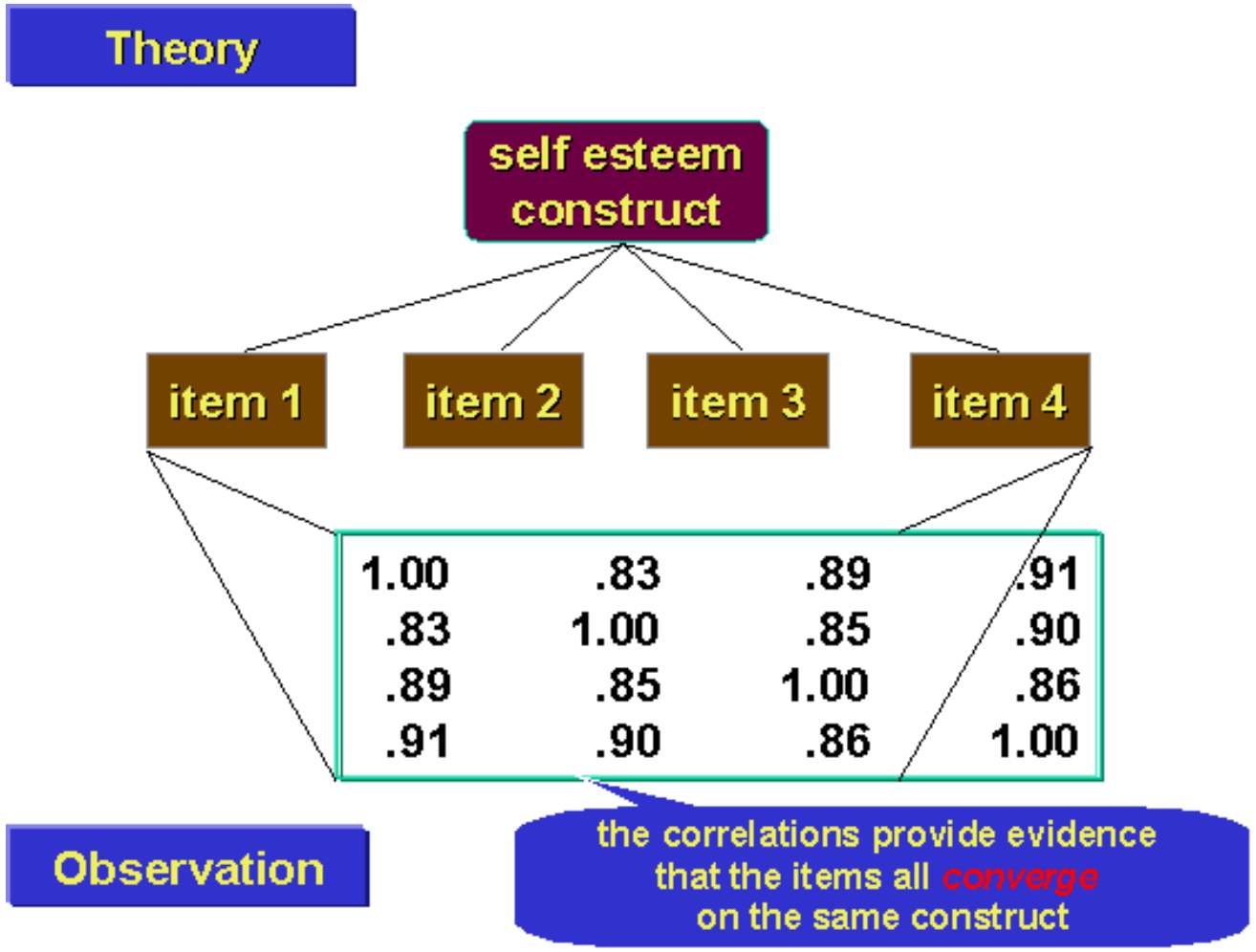
Both Reliable
And Valid

Validity Types

- **Convergent Validity:** Do the indicator and the concept converge?

- Measures of constructs that theoretically should be related to each other are, in fact, observed to be related to each other.
  - E.g. you should be able to show a correspondence or convergence between similar constructs

Convergent Validity

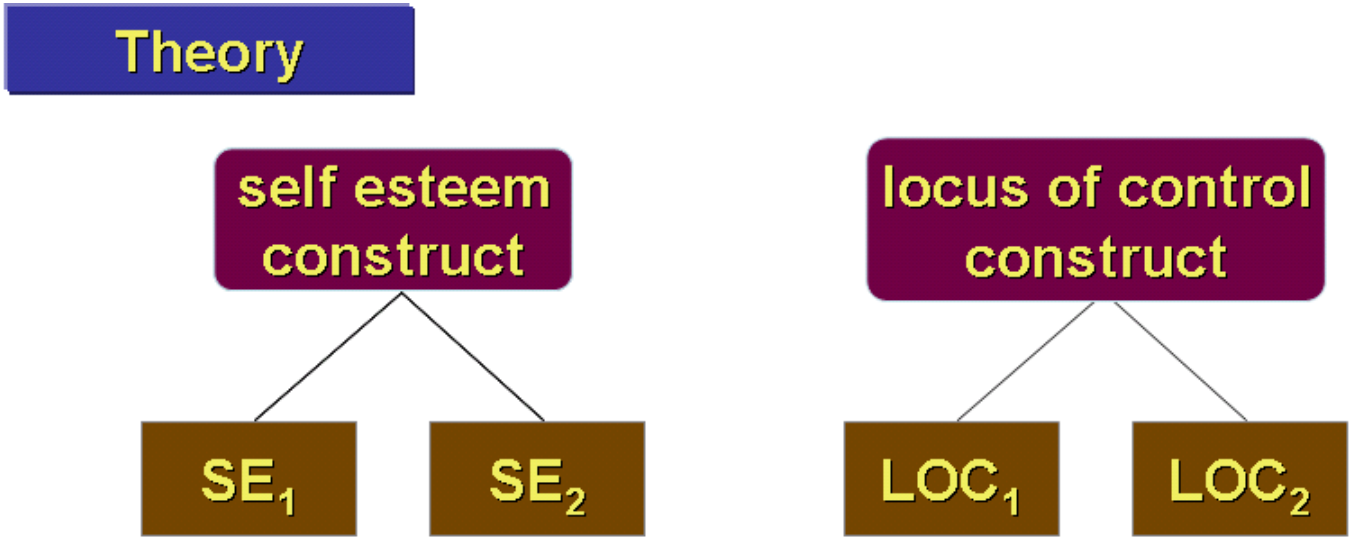


Discriminant Validity

- Discriminant validity asks whether the indicator allows the concept to be distinguished from other similar, but different, concepts.

- Measures of constructs that theoretically ***should not be related*** to each other are, in fact, ***observed to not be related*** to each other
  - e.g. you should be able to discriminate between dissimilar constructs

Discriminant Validity



the correlations provide evidence that the items on the two tests *discriminate*

Observation

$r_{SE_1, LOC_1} = .12$

$r_{SE_1, LOC_2} = .09$

$r_{SE_2, LOC_1} = .04$

$r_{SE_2, LOC_2} = .11$

Construct Validity

Theory

self esteem construct

locus of control construct

SE_1 SE_2 SE_3 LOC_1 LOC_2 LOC_3

	SE_1	SE_2	SE_3	LOC_1	LOC_2	LOC_3
SE_1	1.00	.83	.89	.02	.12	.09
SE_2	.83	1.00	.85	.05	.11	.03
SE_3	.89	.85	1.00	.04	.00	.06
LOC_1	.02	.05	.04	1.00	.84	.93
LOC_2	.12	.11	.00	.84	1.00	.91
LOC_3	.09	.03	.06	.93	.91	1.00

Observation

the correlations support both *convergence* and *discrimination*, and therefore *construct* validity

Dealing with Errors in Measurement

- In reality, there is always some possibility that the number assigned does not reflect the true value for that case, i.e.:
  - Human Error e.g. 100 instead of 10
  - Mistakes in coding,
  - Subjective judgments,
  - Measuring instrument that lacks precision.
- How to overcome?
  - Test-Retest Method
  - Cronbach's alpha or Kuder-Richardson Formula

Levels of Measurement

- **Nominal:** Just name the attributes uniquely
  - E.g , Republican (=1), Democrat (=2), etc.
- **Ordinal:** the attributes can be rank-ordered e.g. Scales of education less than grade 10(=0) , Grade ten (=1) etc.
- **Interval:** the distance between attributes *does* have meaning.
- FE.g. when we measure temperature (in Fahrenheit), the distance from 30-40 is same as distance from 70-80.
- **Ratio:** You can construct a meaningful fraction (or ratio) with a ratio variable.