Quantitative Research Design

We lead

ⓘ ramayah.com/?cat=3

International Entrepr | New Tab | Predicting who will p | About - J. Knowledge | 'Marriages' made in | Business school and

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STUDENT RESOURCES

AEW 125 BUSINESS STATISTICS

APW 302E MANAGEMENT INFORMATION SYSTEM

ATW 202 BUSINESS RESEARCH METHOD

ATU 397 MANAGEMENT RESEARCH

QUICK LINKS

Archive for the 'ATW 202 Business Research Method' Category

Semester 1, Academic Session 2015/2016
Posted in ATW 202 Business Research Method, on July 9th, 2010 | Edit |

ATW 202 BUSINESS RESEARCH METHODS

RESEARCH DESIGN (SOM COLLOQUIUM)

Coursework Marks 40% [download]
Updated 23 December 2016

Course Outline [download]

Introductory Class Notes [download]

Project Guide Examples [download]
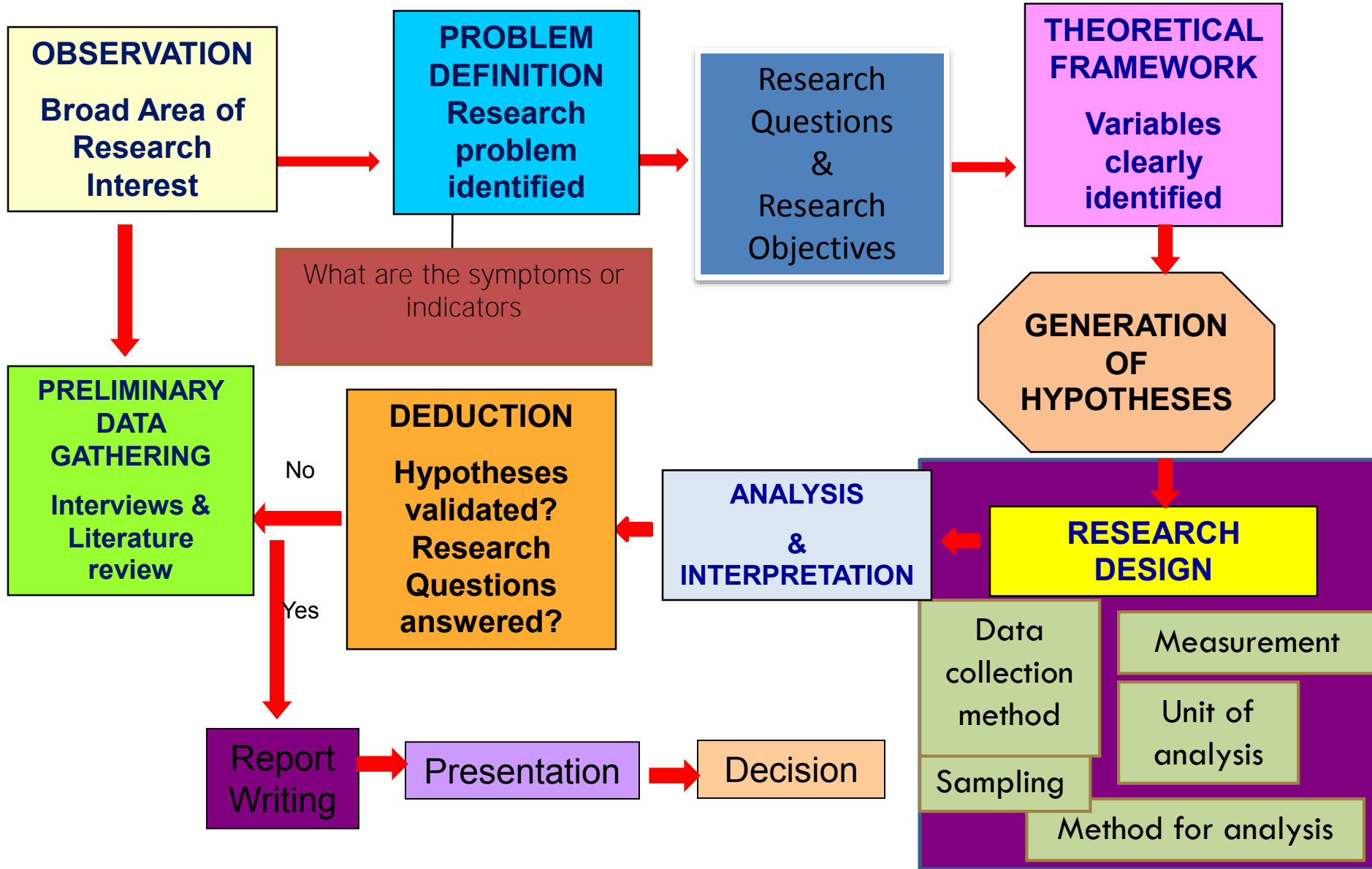
MID TERM GRADES [download]
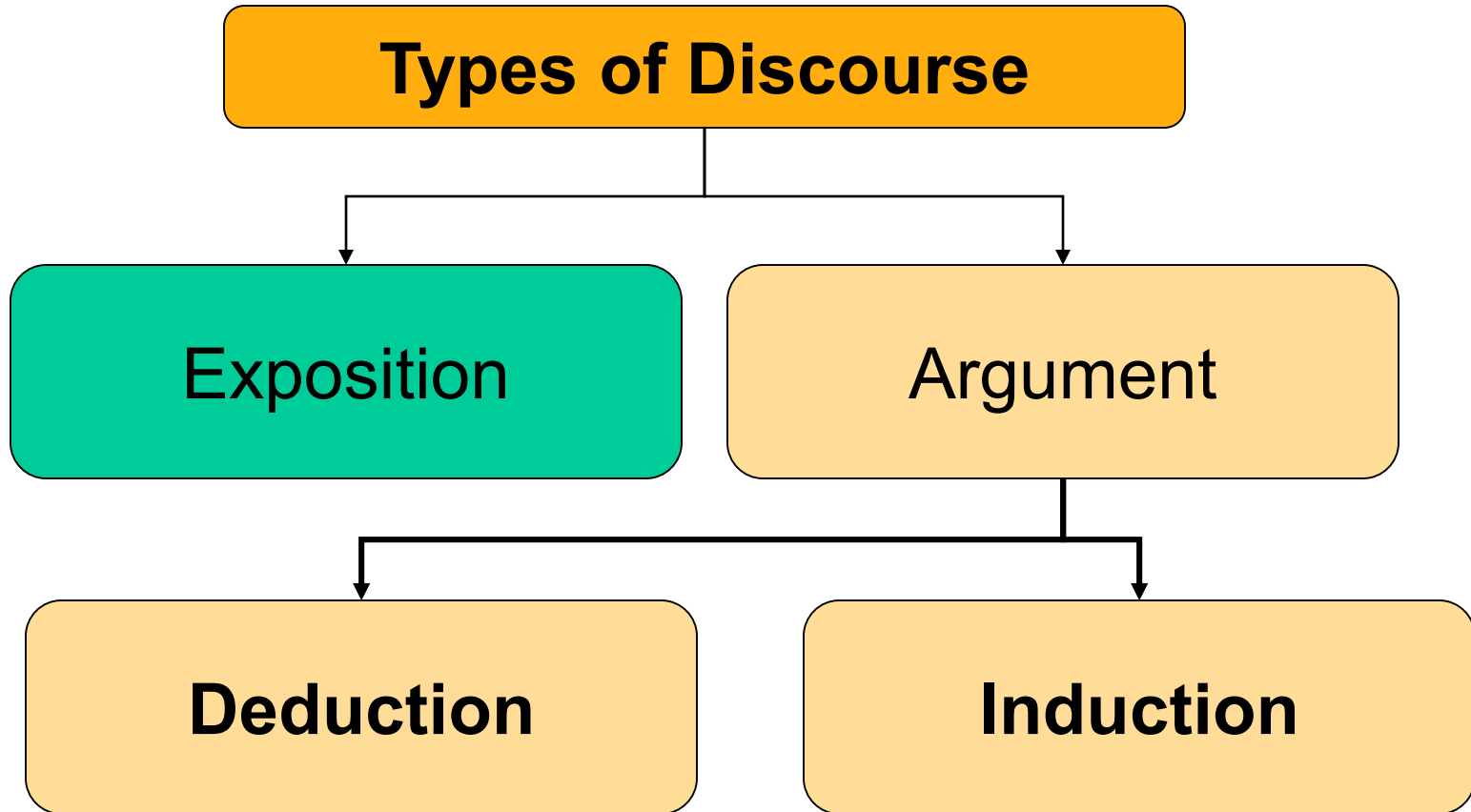## Lecture Notes

- LESSON 1   Research in Business [download]

OVERVIEW OF RESEARCH PROCESS

OBSERVATION

Broad Area of Research Interest

PROBLEM DEFINITION
Research problem identified

What are the symptoms or indicators

Research Questions & Research Objectives

THEORETICAL FRAMEWORK

Variables clearly identified

GENERATION OF HYPOTHESES

PRELIMINARY DATA GATHERING

Interviews & Literature review

No

DEDUCTION

Hypotheses validated? Research Questions answered?

Yes

ANALYSIS & INTERPRETATION

RESEARCH DESIGN

Data collection method

Measurement

Unit of analysis

Sampling

Method for analysis

Report Writing

Presentation

Decision

Laws and Theories

INDUCTIVE

DEDUCTIVE

Facts from Observation

Explanation and Prediction

Deductive

Theory

Develop hypothesis

Collect and Analyze data

Accept/reject hypothesis

Inductive

Develop Theory

Formulate Relationship

Analyze patterns & themes

Observe phenomenon
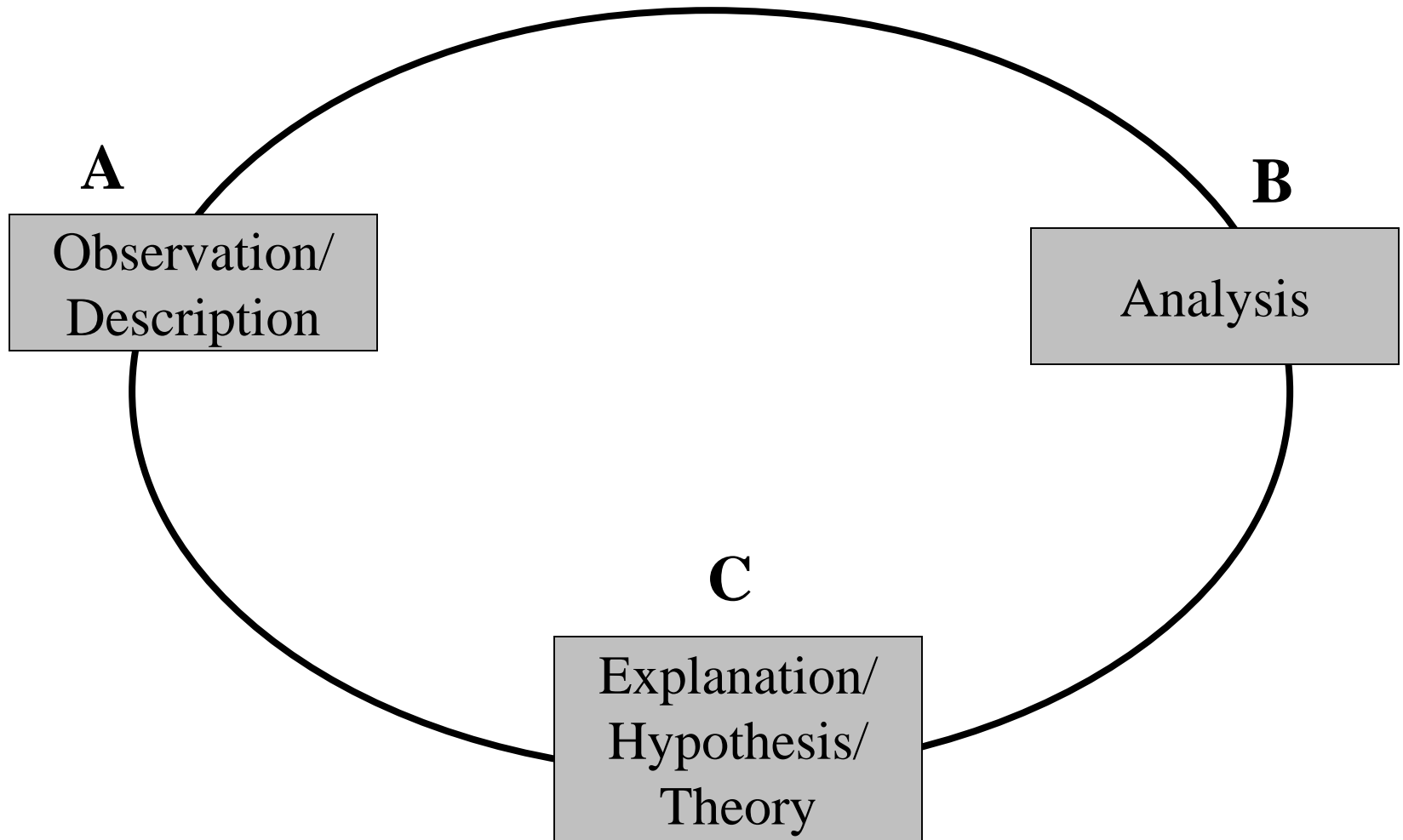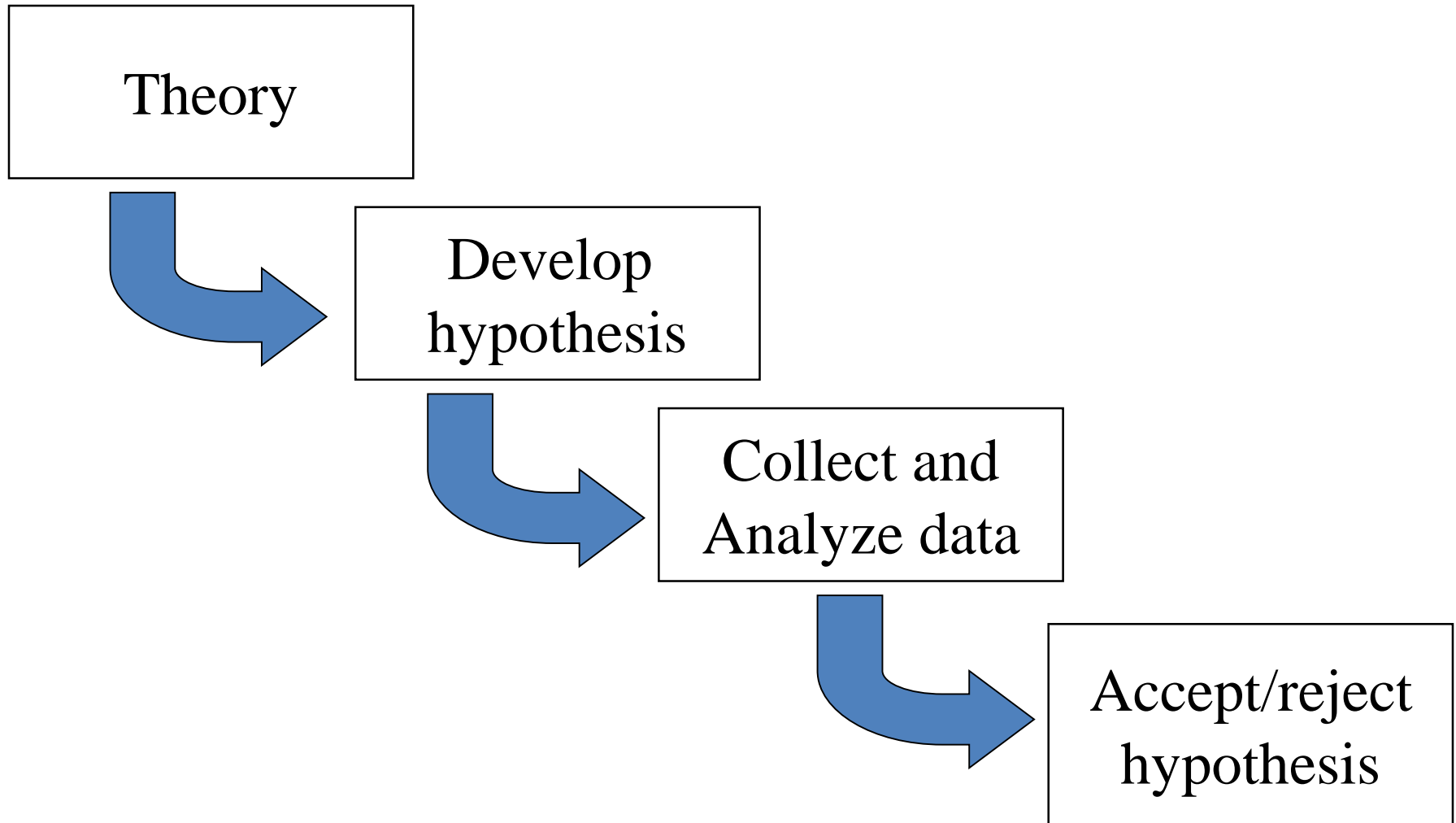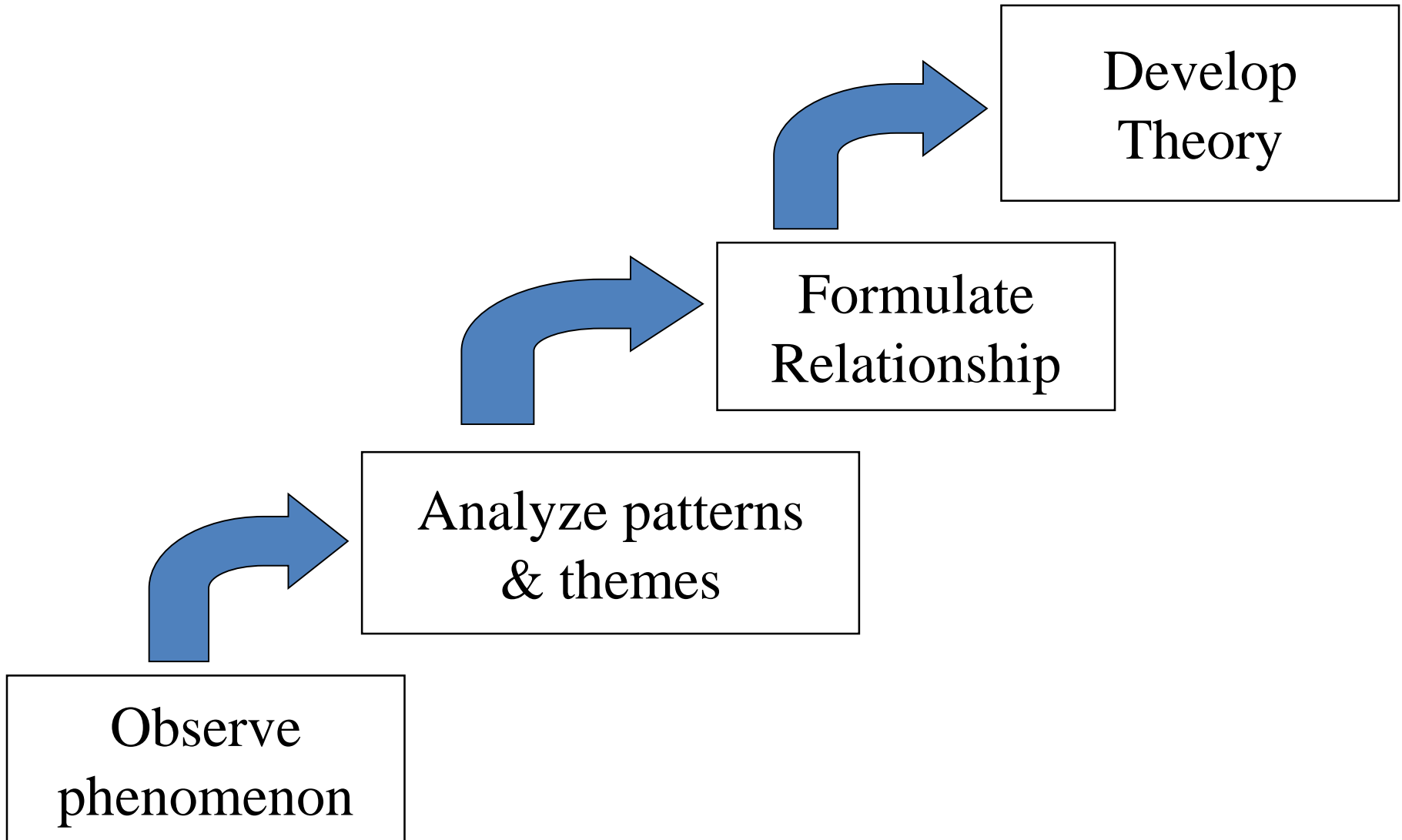
- **Research design:**

  A set of advanced decisions that make up the master plan specifying the methods and procedures for collecting and analyzing the needed information.
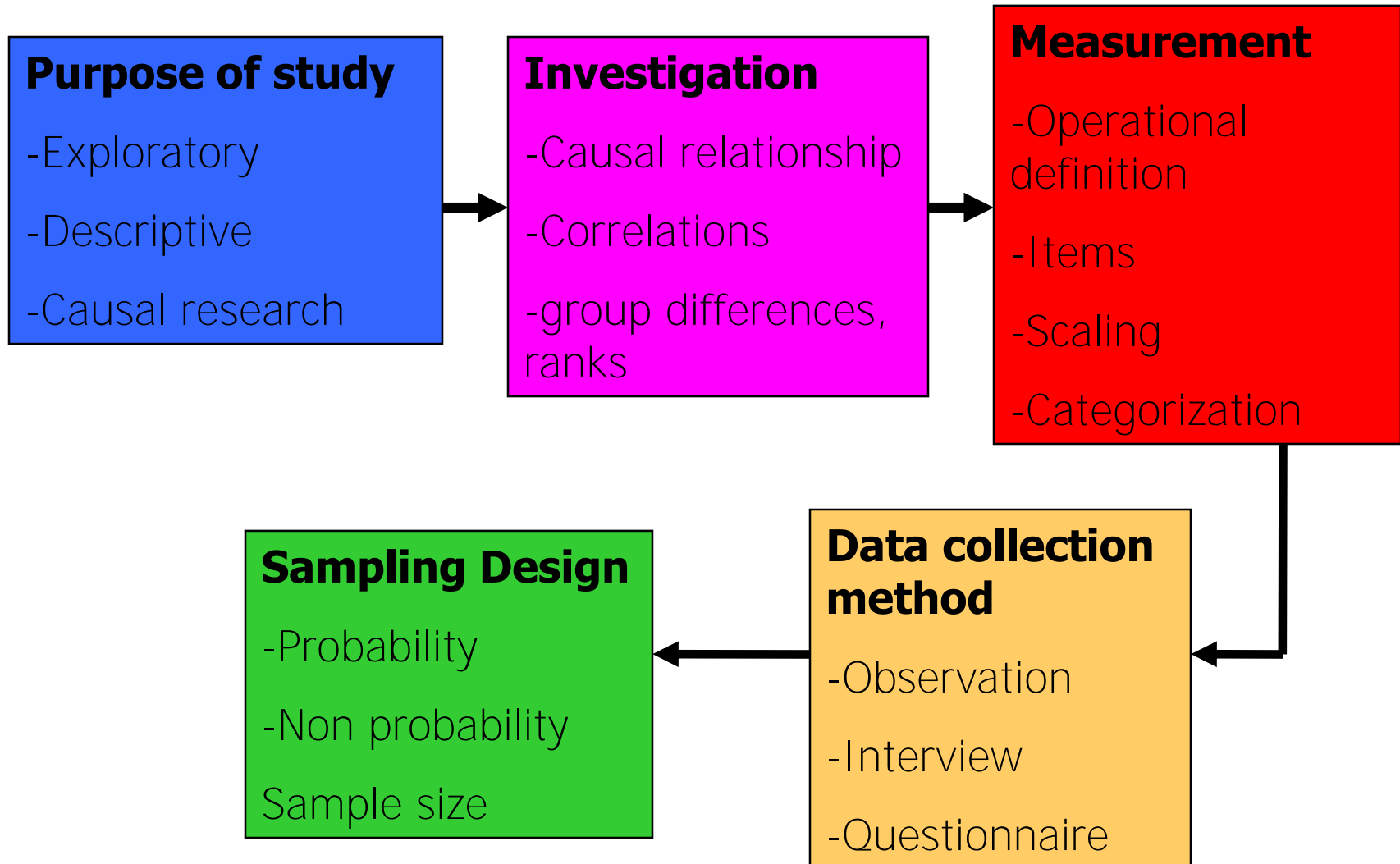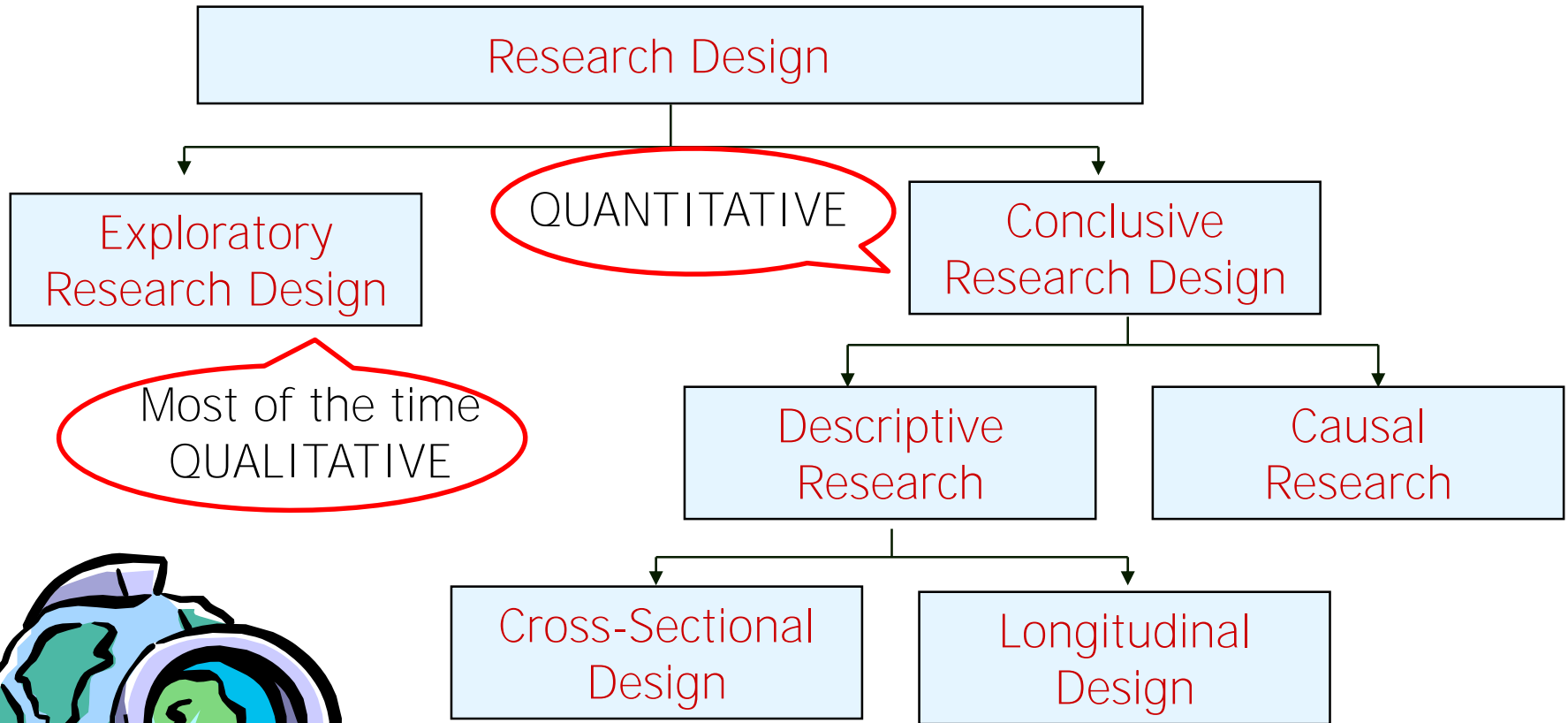
- **Research design is a...**

Blueprint

Plan

Guide

Framework

Research Design

Purpose of study

-Exploratory

-Descriptive

-Causal research

Investigation

-Causal relationship

-Correlations

-group differences, ranks

Measurement

-Operational definition

-Items

-Scaling

-Categorization

Data collection method

-Observation

-Interview

-Questionnaire

Sampling Design

-Probability

-Non probability

Sample size

```
Research Design
```

Exploratory Research Design

QUANTITATIVE

Conclusive Research Design

Most of the time QUALITATIVE

Descriptive Research

Causal Research

Cross-Sectional Design

Longitudinal Design

Comparing

Characteristics	Quantitative research	Qualitative research
Logic of Theory Construction	Deductive	Inductive
Direction of Theory Construction	Begins from theory	Begins from "reality"
Verification	Takes place after theory construction is completed	Data generation, analysis & theory verification take place concurrently
Concept	Defined before research	"Flexible" concepts - begins with orienting, sensitizing concepts
Generalization	Inductive generalizations (use of inferential statistics) or hypothetical-deductive (use of hypothesis testing)	Analytic, exemplar generalizations - i.e. sample units can act as typical representatives of a class or group of phenomena

Exploratory study

- *Exploratory* study is needed when the researcher has no idea about the problem or issue to be studied.

- **EXAMPLES:**

  A manager of an MNC company would like to know the work ethics of a subsidiary in Penang Trade Zone as compared to the Americans.

  A study to understand how students can develop "higher order thinking skills"?

Uses of Exploratory Research

- Formulate a problem or define a problem more precisely

- Preliminary work to gain familiarity

- Isolate key variables and relationships for further examination

- Gain insights for developing an approach to the problem

- Develop/generate hypotheses

- Establish priorities for further research

Descriptive Research

- **Descriptive research** is undertaken to describe answers to questions of who, what, where, when, and how.

- Descriptive research is desirable when we wish to project a study's findings to a larger population, if the study's sample is representative.

- To describe the characteristics of relevant groups, such as consumers, salespeople, or organizations.

- To estimate the percentage of units in a specified population exhibiting a certain behavior.

- To determine the perceptions of product characteristics.

- To determine the degree to which variables are associated.

- To make specific predictions.

- Two basic classifications:
  - Cross-sectional studies
  - Longitudinal studies

Cross-sectional Designs

- Collection of information from any given sample only **once**.

- **Single cross-sectional designs:** only one sample once.

- **Multiple cross-sectional designs:** two or more samples of respondents once.
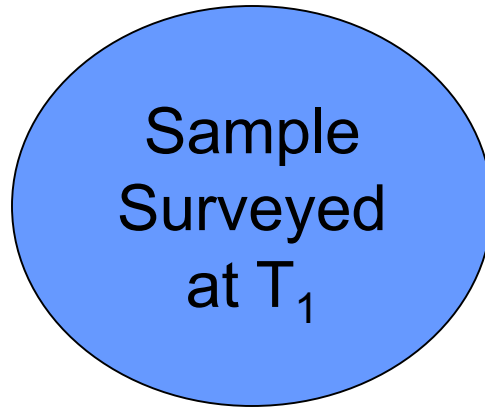

Types of Study Design

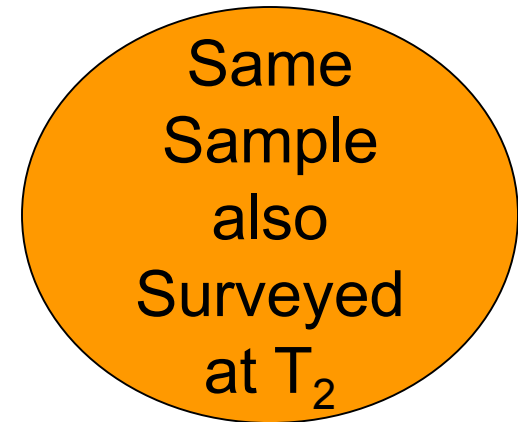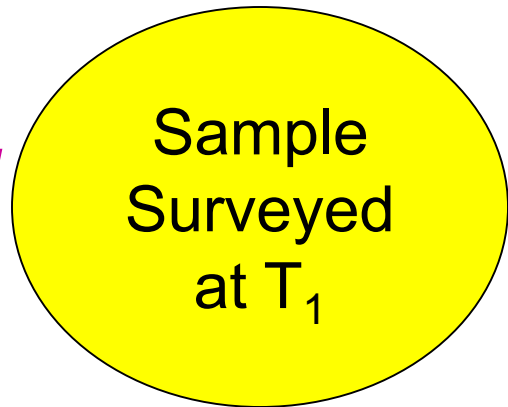Stomp On Step1

By Brian McDaniel

Longitudinal Designs

- A fixed sample (or samples) of population elements is **measured repeatedly** on the same variables.

- Panel samples remain the **same over time.**

- **Cohort analysis:** a series of surveys conducted at appropriate time intervals, where the cohort serves as the basic unit of analysis.

  -A cohort is a group of respondents who experience the same event within the same time interval.

Cross-sectional vs. Longitudinal

USM
We lead

Cross-Sectional Design

Sample Surveyed at T_1

Longitudinal Design

Sample Surveyed at T_1

Same Sample also Surveyed at T_2

Time ⟶ T_1 T_2

Causal Research

- Causality may be thought of as understanding a phenomenon in terms of conditional statements of the form **"If x, then y."** (i.e., explanatory or predictive).

- Causal studies are conducted through the use of **experiments** (i.e., field experiment or lab experiment)

- **An experiment** is defined as manipulating an independent variable to see how it affects a dependent variable, while also controlling the effects of additional extraneous variables.

Comparison

|	Exploratory	Conclusive
Objective:	To provide insights and understanding.	To test specific hypotheses and examine relationships.
Character-istics:	Information needed is defined only loosely. Research process is flexible and unstructured. Sample is small and non-representative. Analysis of primary data is qualitative.	Information needed is clearly defined. Research process is formal and structured. Sample is large and representative. Data analysis is quantitative.
Findings/ Results:	Tentative.	Conclusive.
Outcome:	Generally followed by further exploratory or conclusive research.	Findings used as input into decision making.

Comparison

	Exploratory	**Descriptive**	**Causal**
Objective:	Discovery of ideas and insights	Describe market characteristics or functions	Determine cause and effect
Characteristics:	Flexible, versatile	Marked by the prior formulation of specific hypotheses	Manipulation of one or more independent variables
	Often the front end of total research design	Preplanned and structured design	Control of other mediating variables
Methods:	Expert surveys Pilot surveys Secondary data qualitative analysis Qualitative research	Quantitative analysis Surveys Observation	Experiments
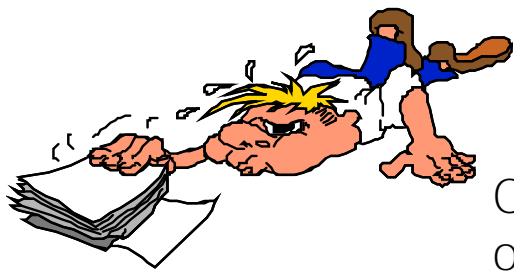
Measurement

"If you can't measure it, you can't manage it."

Bob Donath,
Consultant

Measurement
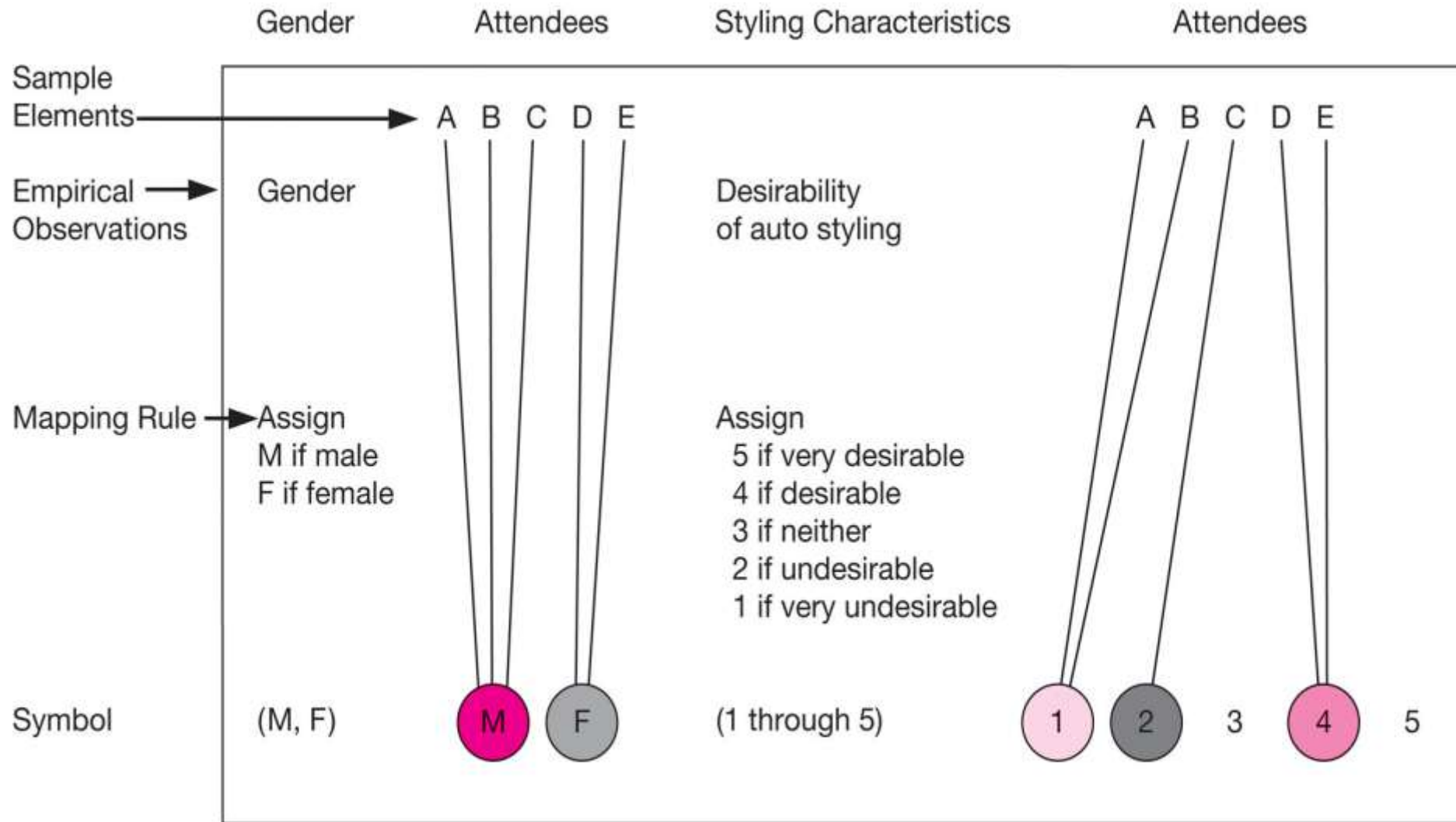
Selecting
measurable phenomena

Developing a set of
mapping rules

Applying the mapping rule
to each phenomenon

Characteristics of Measurement

Attendees A, B, and C are male, and find the auto's styling to be undesirable.
Attendees D and E are female and find the auto's styling desirable.

What is Measured?

- Object-things that is experienced and also those that are not very concrete

- Properties – Characteristics of the object
    - One lends itself to objective and precise measurement;
    - The other is more nebulous and does not lend itself to accurate measurement because of its abstract and subjective nature.

Source of Measures
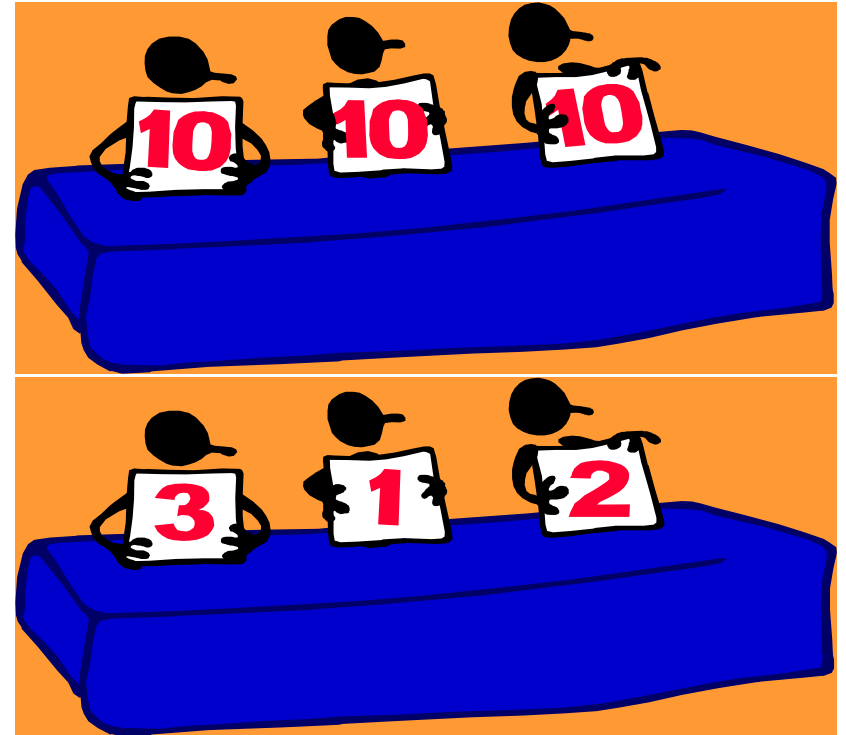
Adopted

Adapted

Self Construct

Response Types

Rating scale

Ranking scale

Categorization

1. Define constructs to be measured

2. Operationalization of the constructs

3. Select scale of measurement (data type)

4. Generate Items/Questions

   ▪ Wording

   ▪ Response format

5. Layout and design questionnaire

6. Pilot Testing/Pretest

7. Refinement

- A construct is an image or abstract idea specifically invented for a given research and/or theory building purpose

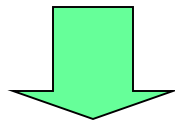- Constructs are built by combining simpler more concrete concepts especially when it is not directly observable

Example:

- *Concrete* – demographics, net profit, purchase quantity, size of firm
- *Abstract* – loyalty, personality, job satisfaction, leadership

- Defined in the literature or dictionary definition

- An operational definition is a definition stated in terms of specific criteria for testing or measurement

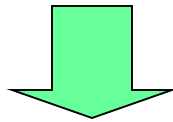- Must specify the characteristic and how they are to be observed

Operationalization

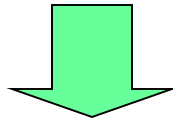| Construct | A generalized idea about a class of objects, attributes, occurrences, or processes e.g. satisfaction, loyalty |

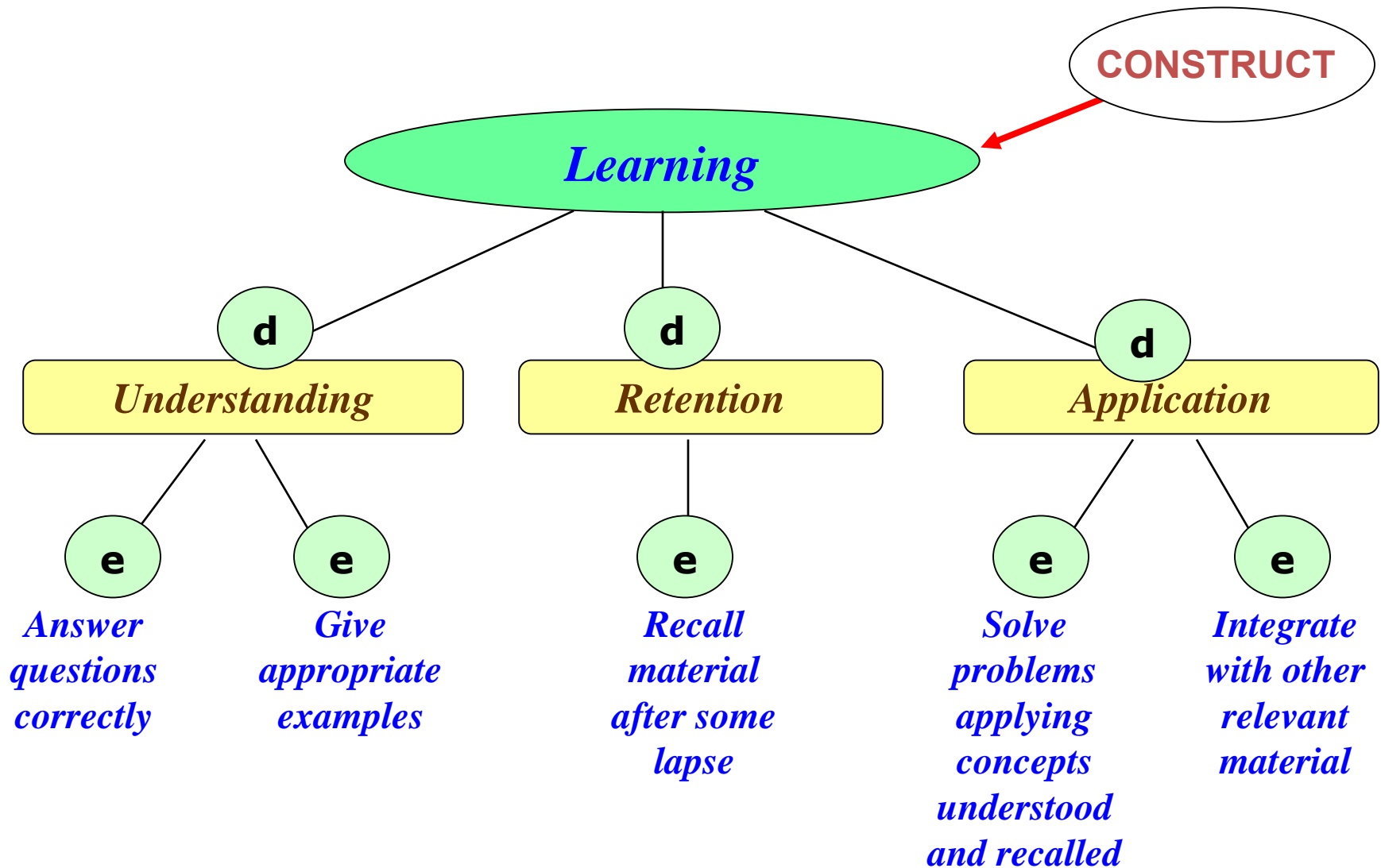| Operational Definition | Gives meaning to a concept by specifying the activities or operations necessary to measure it |

| Dimensions | Broad characteristics to ensure coverage or scope of the concept |

| Elements | Specific items about the identified measurement, which are easily measured |

Operationalizing: Learning

CONSTRUCT

Learning

d — **Understanding**

d — **Retention**

d — **Application**

e — *Answer questions correctly*

e — *Give appropriate examples*

e — *Recall material after some lapse*

e — *Solve problems applying concepts understood and recalled*

e — *Integrate with other relevant material*

Levels of Measurement

Nominal	**Classification**		
Ordinal	**Classification** / **Order**		
interval	**Classification** / **Order**	**Distance**	
Ratio	**Classification** / **Order**	**Distance**	**Natural Origin**

We lead

Educational or cultural background	**Respondent**
	Situation
	On-site, mall-intercept
Incorrect coding, faulty stats calculation	**Measurer**
	Instrument
	Ambiguous, confusing, use of jargon

Evaluating Measurement Tools

Validity

Are we measuring what we are supposed to measure?

Criteria

Is the measurement practical to be used?

Practicality

Is the measurement consistent?

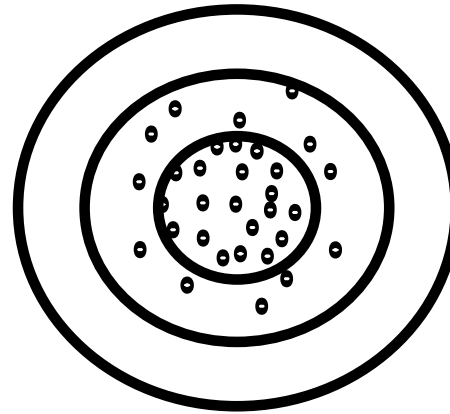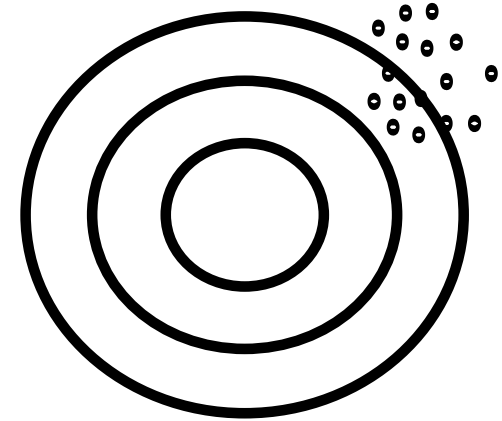**Reliability**

Old Rifle

Low Reliability
Low Validity
(Target A)

New Rifle

High Reliability
Validity ?
(Target B)

New Rifle
Sun glare
High Reliability
Low Validity
(Target C)

Evaluating Measurement Tools

Validity

Are we measuring what we are supposed to measure?

Criteria

Is the measurement practical to be used?

Practicality

Is the measurement consistent?

Reliability
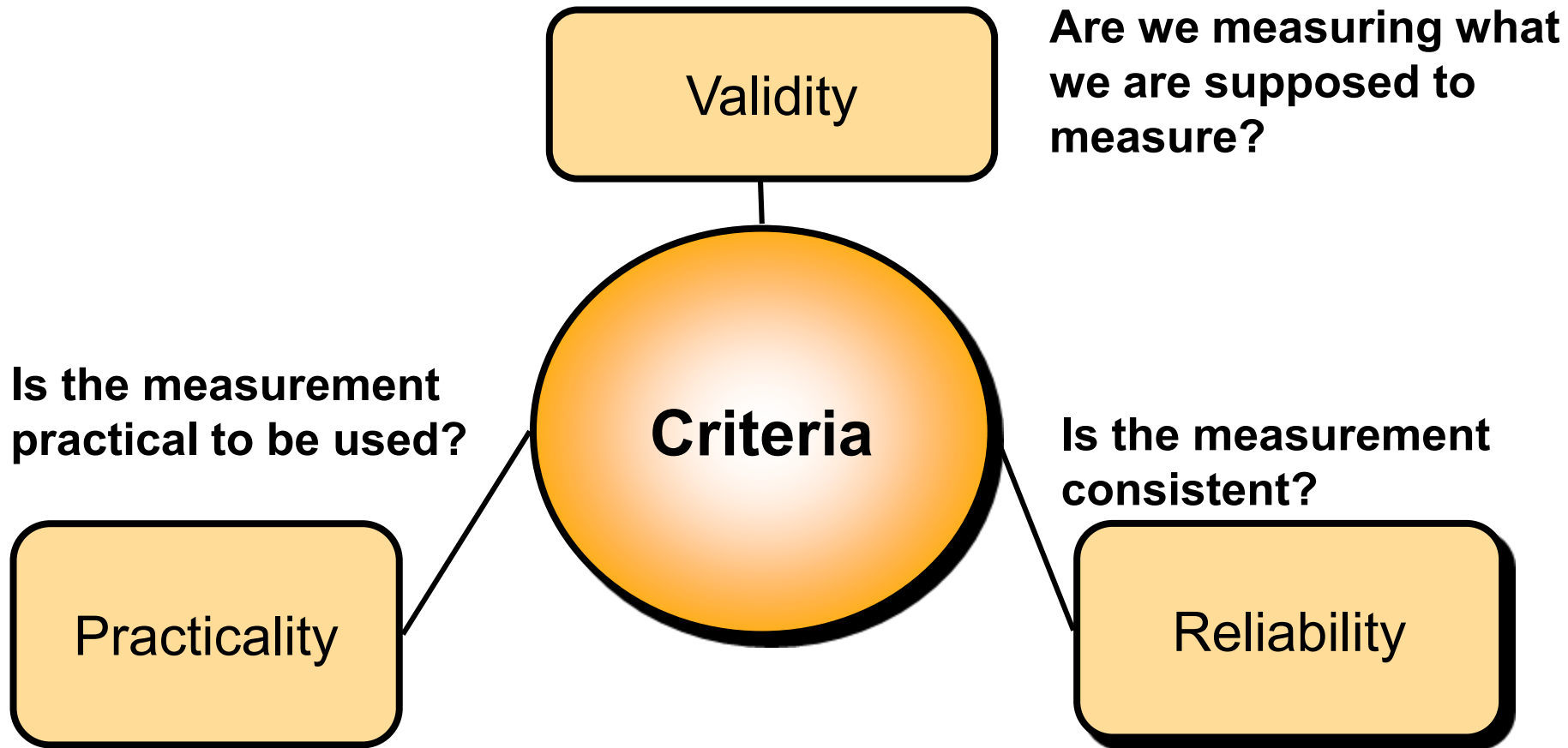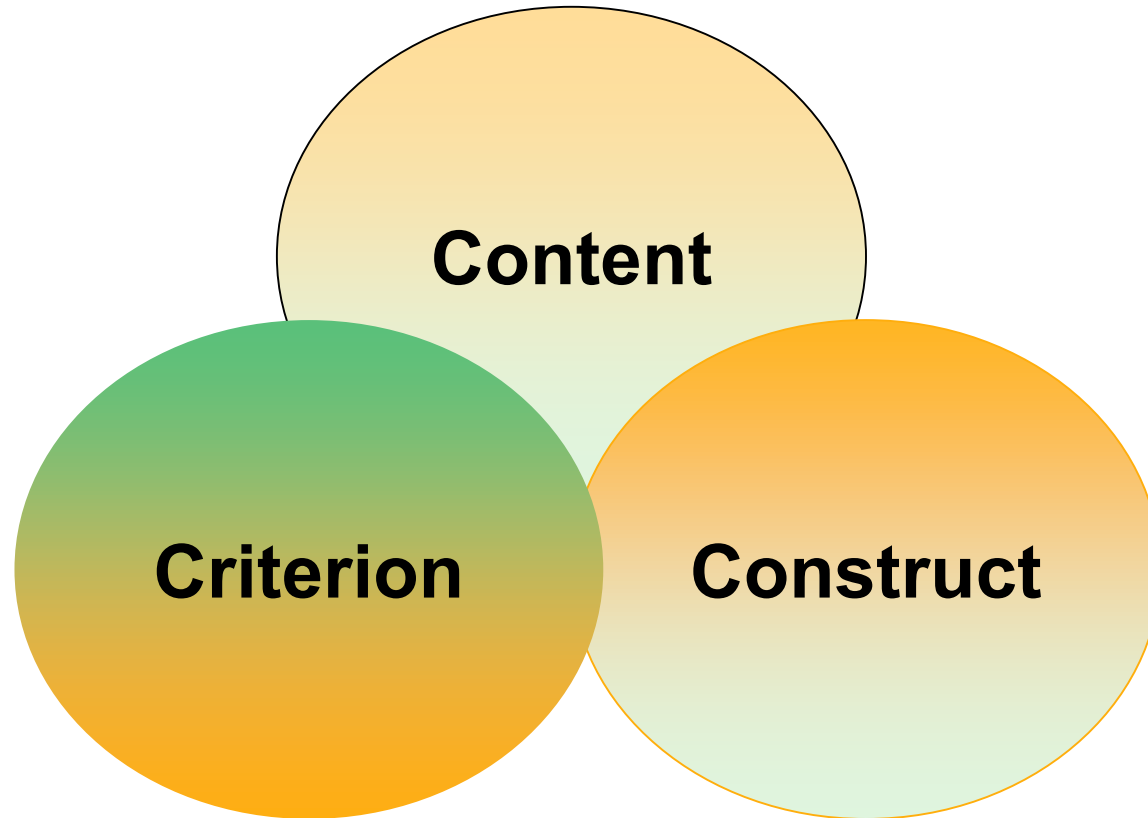
Content Validity

Type	What is Measured	Method
Content	Does the measure adequately measure the concept?	Judgment Literature Review
Face	Do "experts" validate the instrument measures what its name suggest?	Panel Evaluation

Increasing Content Validity

Content

Literature Search

Etc.

Expert Interviews

Question Database

Group Interviews
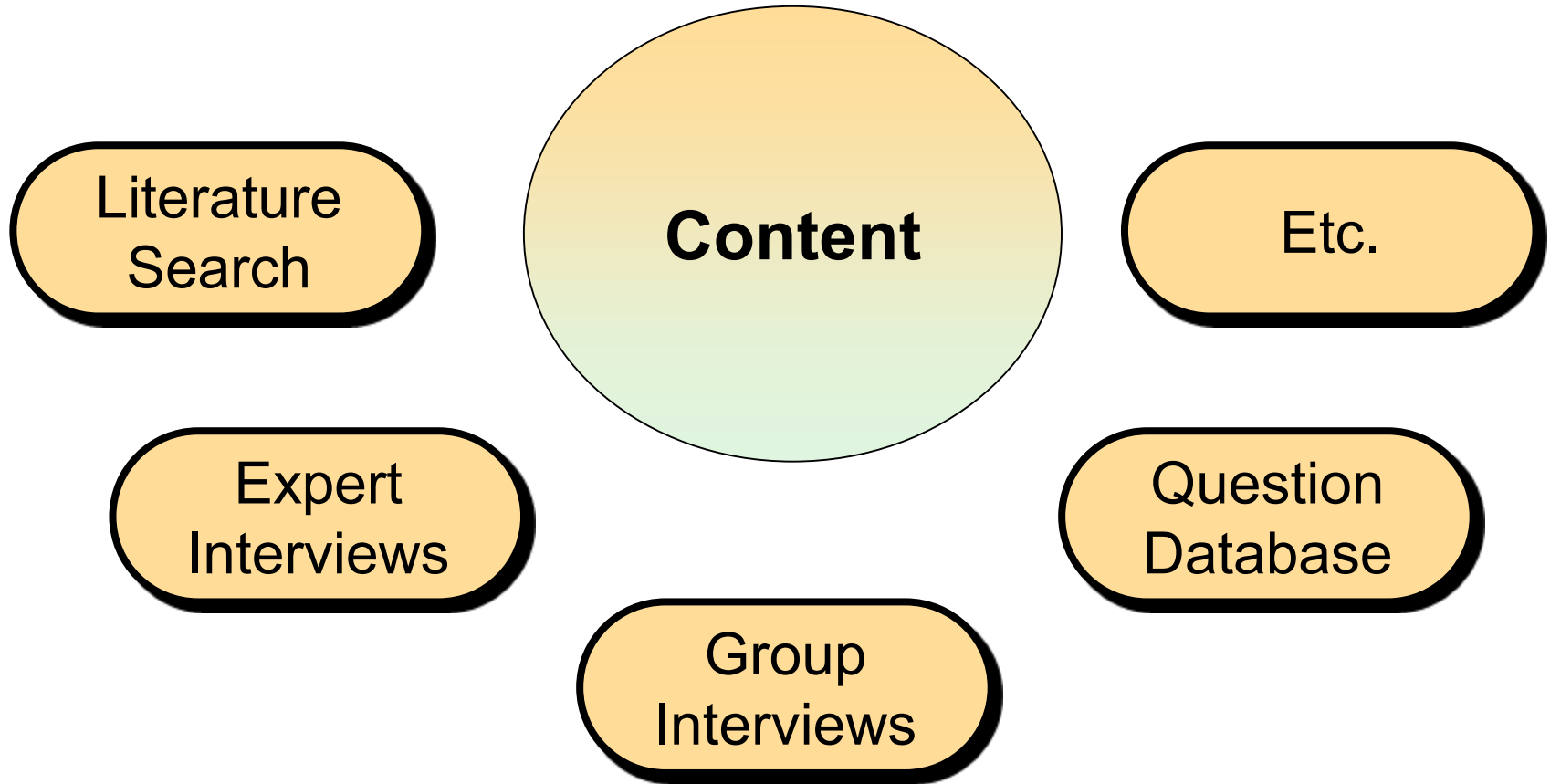
Construct Validity

Type	What is Measured	Method
Construct	Does the instrument tap the concept as theorized?	Factor analysis
Convergent	Do 2 instruments measuring the same concept correlate highly?	Correlation
Discriminant	Does the measure have a low correlation with a variable that is supposed to be unrelated to this variable?	Correlation

Increasing Construct Validity

New measure of **Trust**

Known measure of **Trust**

Empathy

Credibility

Criterion Related Validity

Type	What is Measured	Method
Criterion related	Does the measure differentiate in a manner that helps to predict criterion variable?	Regression
Concurrent	Does the measure differentiate in a manner that helps to predict a criterion variable currently?	Regression
Predictive	Does the measure differentiate individuals in a manner as to help predict a future criterion?	Regression

Criterion

Relevance

Freedom from bias

Reliability

Availability
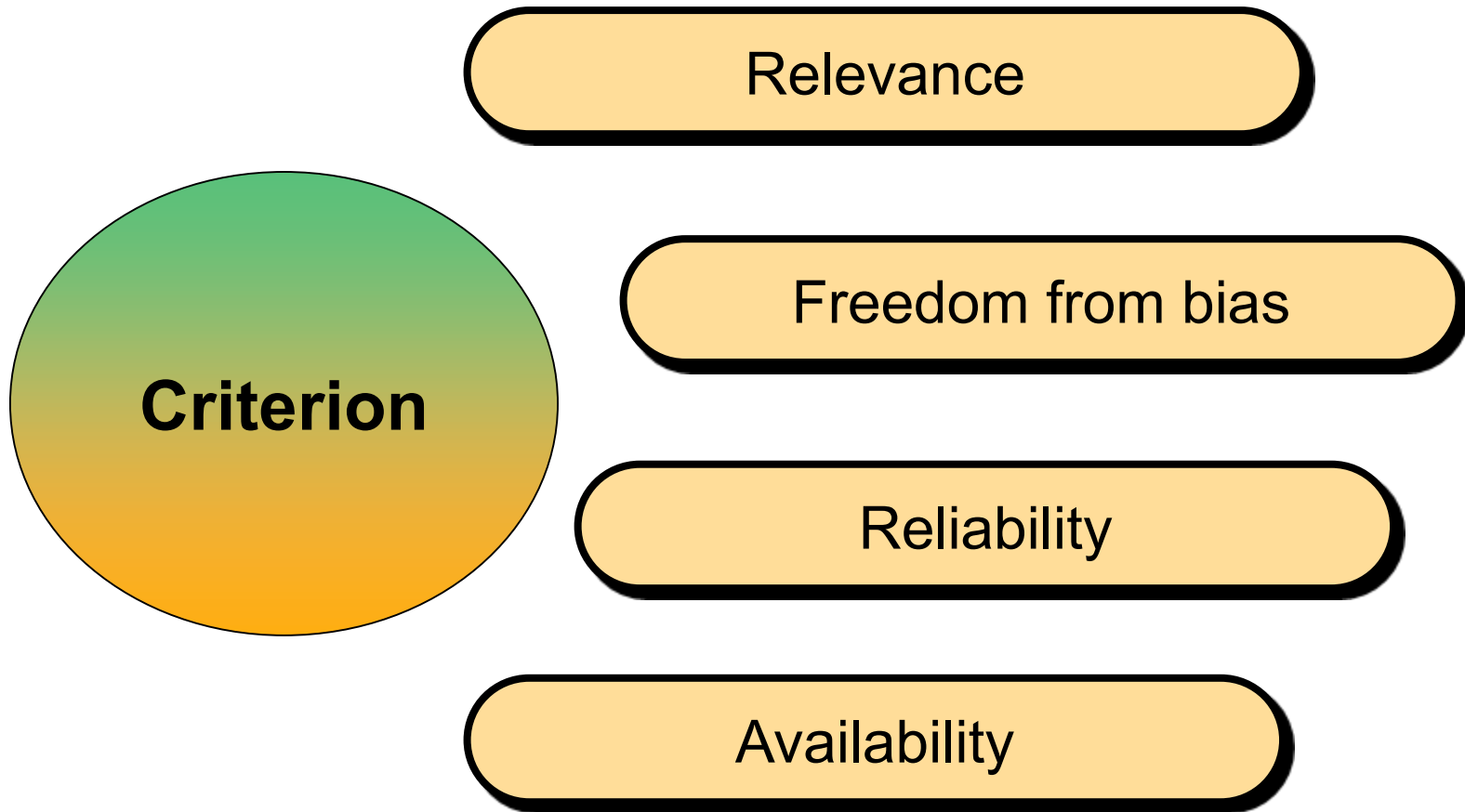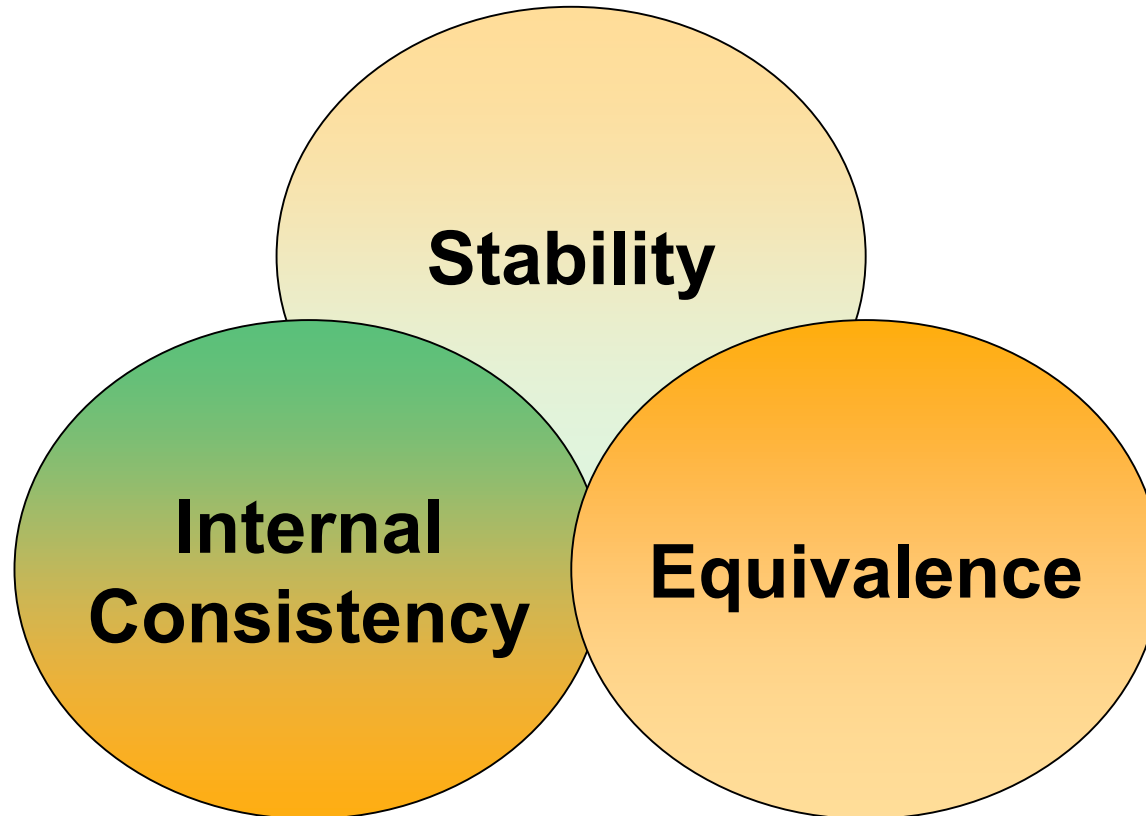
Stability

Type	What is Measured	Method
Stability	The ability to maintain stability over time despite uncontrollable testing conditions and respondents state	Correlation
Test-retest	Repetition of identical measure over 2 point of time	Correlation

Equivalence

Type	What is Measured	Method
Equivalence	The extent to which an alternative form of measurement yields exactly the same or similar results.	Correlation
Parallel-form	Items and scale is the same only change in sequence	
Inter rater	The agreement of 2 or more raters	Concordance test (Value ranges 0 – 1)

Internal Consistency

Type	What is Measured	Method
Internal Consistency	The extent to which the items in the measure tap the same construct - homogeneity	Cronbach alpha
Inter-item consistency	Tests the consistency of the respondents responses of the same concept	Cronbach alpha
Split half	Splits the instrument to 2 halves	Split half Correlation

Practicality

Economy

Convenience

Interpretability

- **Is the survey economical**
  - Cost of producing and administering the survey
  - Time requirement
  - Common sense!

- **Convenience**
  - Adequacy of instructions
  - Easy to administer

- **Can the measurement be interpreted by others**
  - Scoring keys
  - Evidence of validity and reliability
  - Established norms

Sampling

The basic idea of sampling is that **by selecting several elements** from a population, we can make an **inference** about the **entire population**.

Population

Inference?

A sample is selected
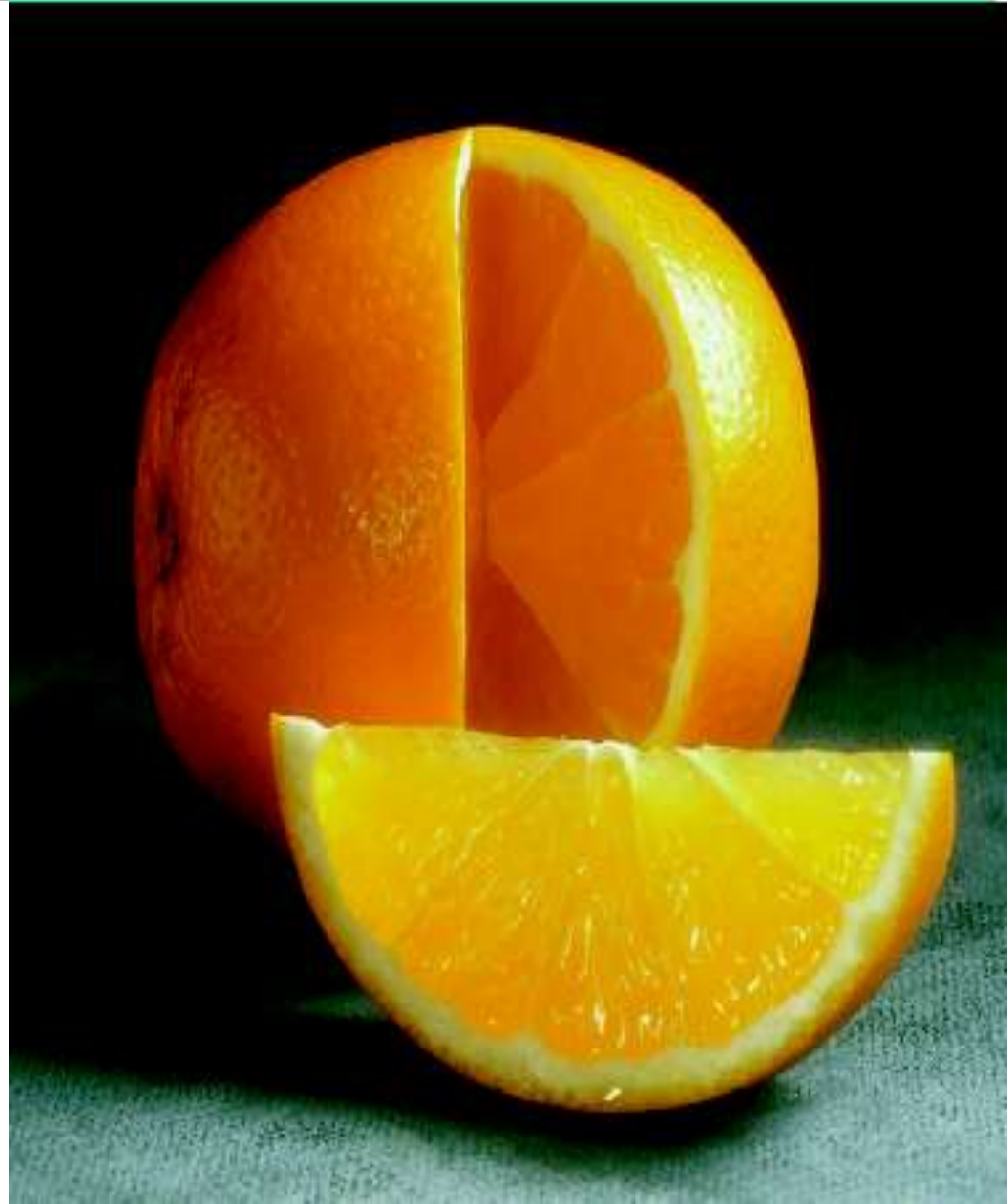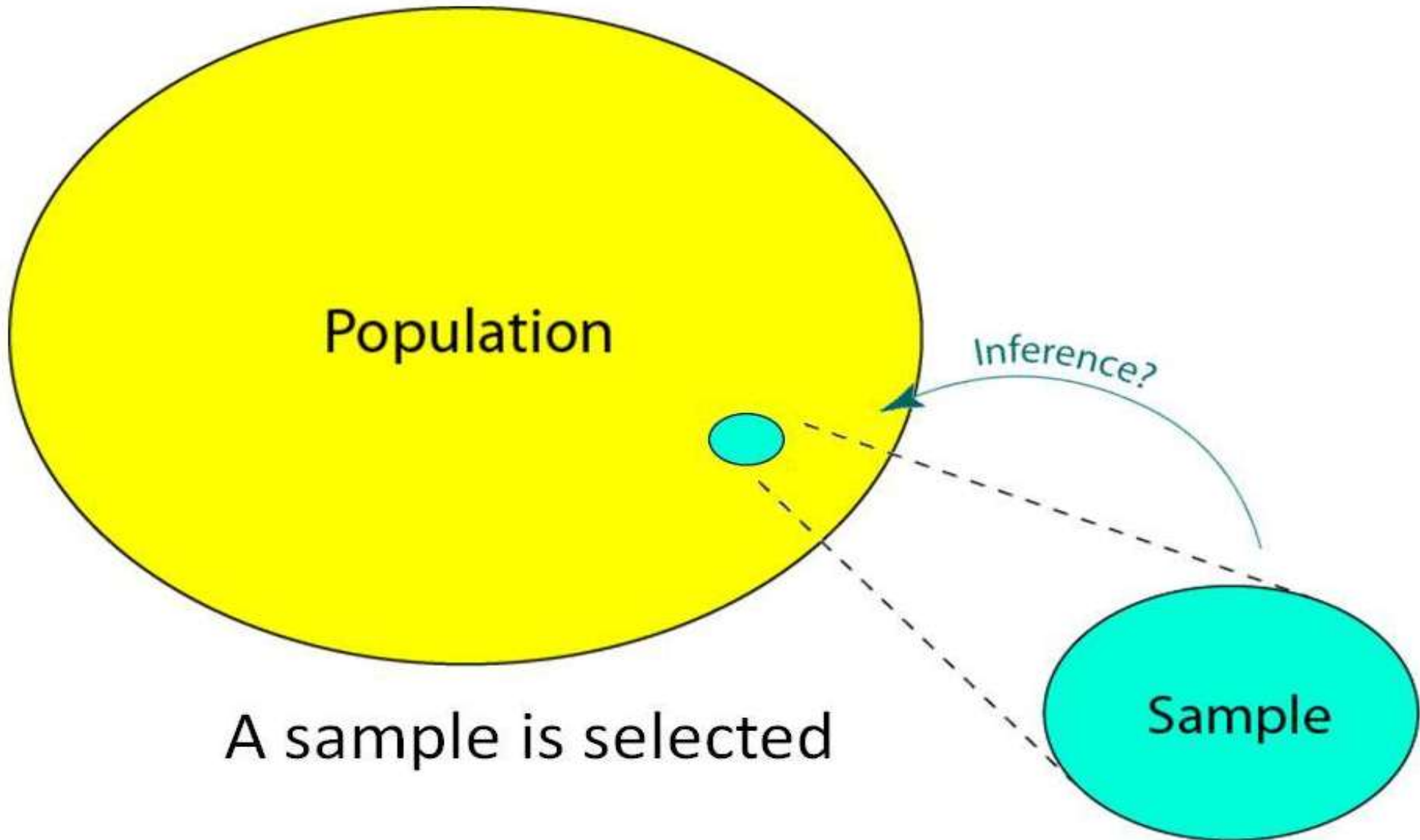
Sample

The Nature of Sampling

- Population
- Population Element
- Sample
- Sample subject
- Sampling frame
- Census
- Parameter
- Statistics

Inference Process
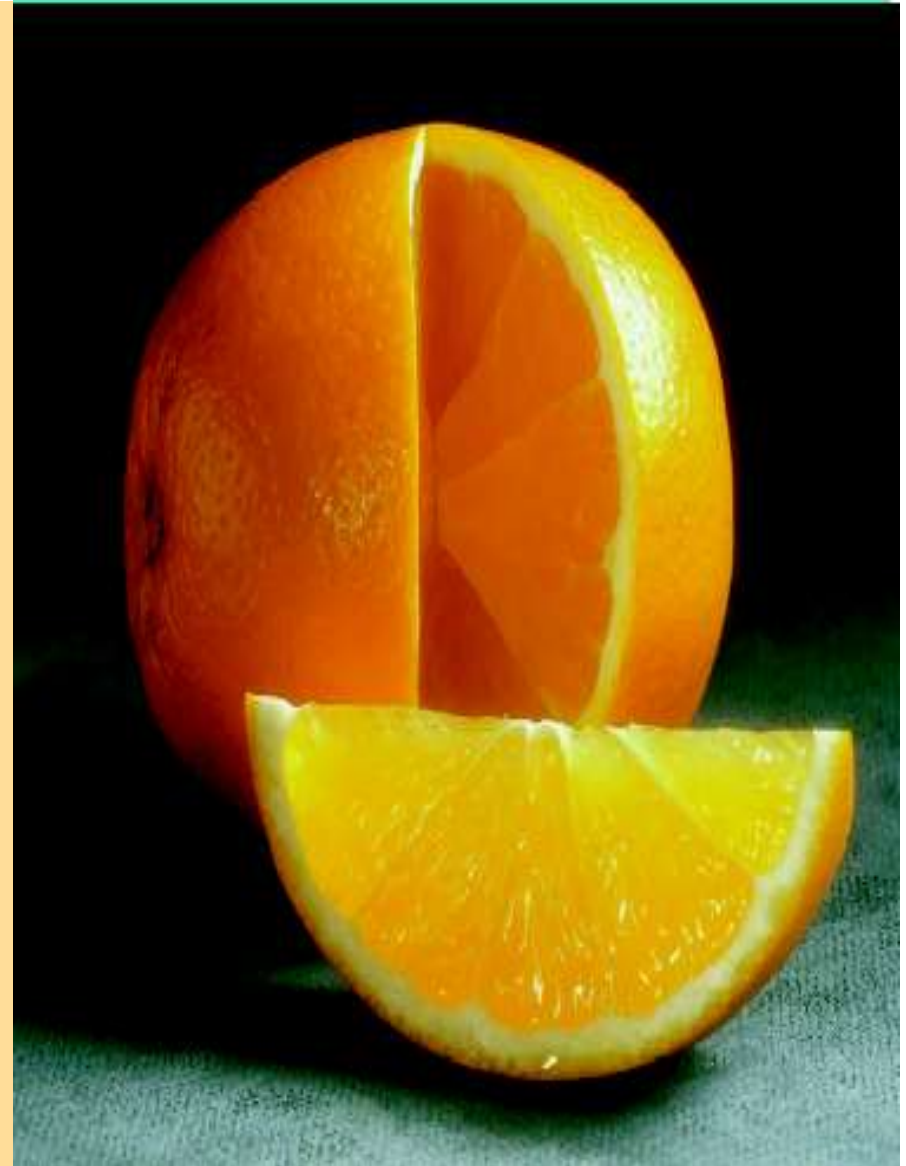
Estimation &
Hypothesis
Testing

Population

Sample
Statistics

$(\overline{X}, p_s)$
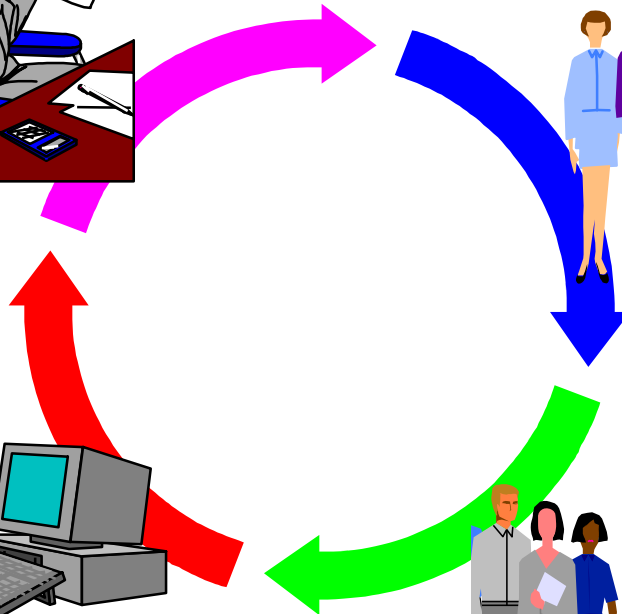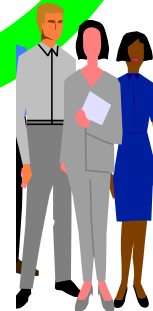
Sample

"Average height of 2nd year students is 150 centimeters"

Parameter

"Average height of 2nd year students in Mr Ali's class is 150 centimeters"

Statistic

Population
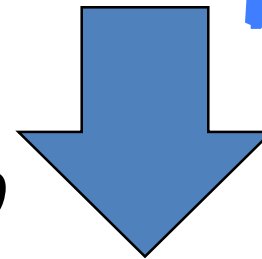
Sample

Why Sampling is Needed?

- Cost
- Time
- Destruction of Test unit
- More accurate
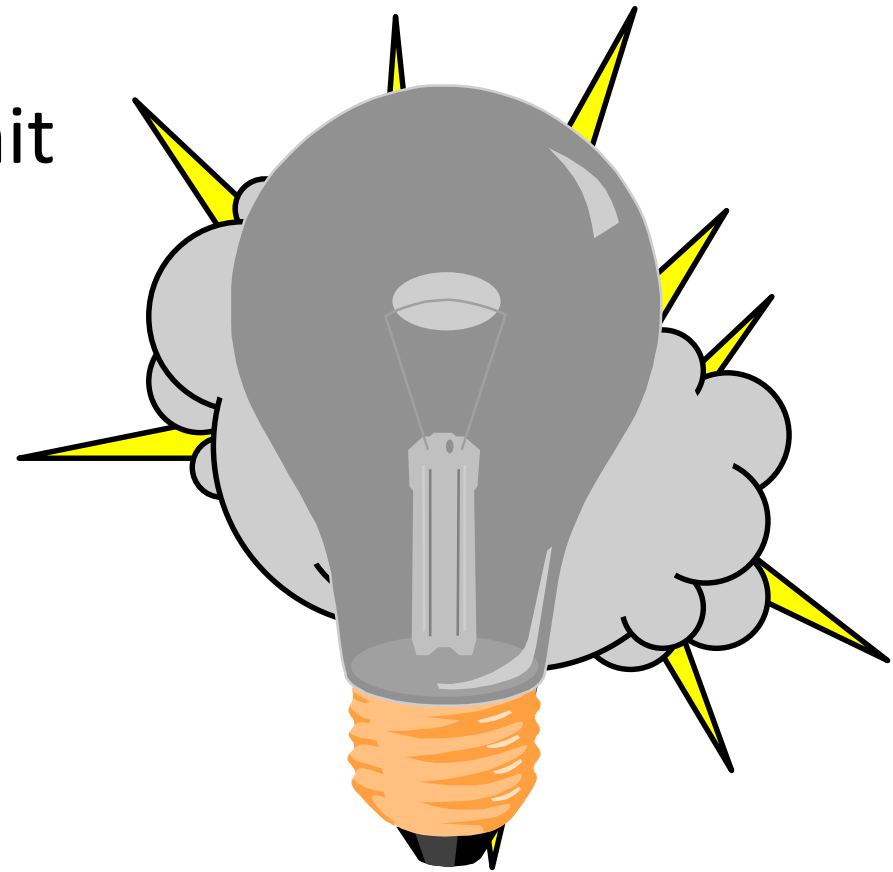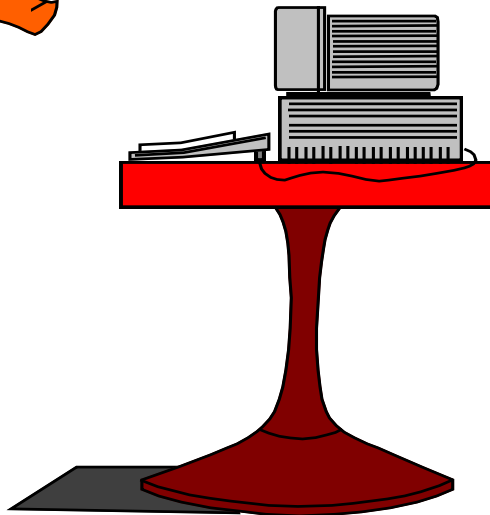
Feasible

Necessary

Accurate

Precise

Sampling Design
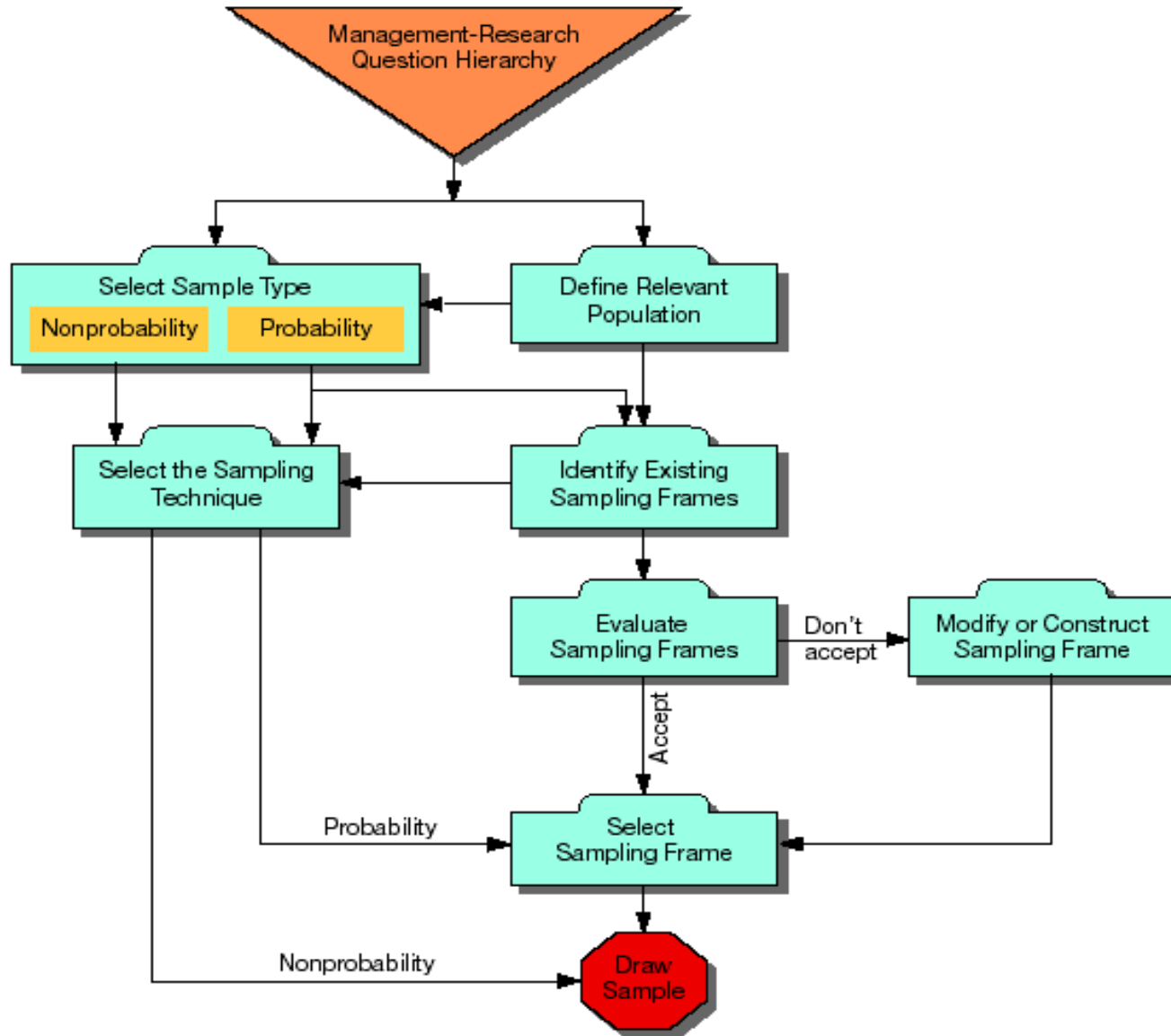
Types of Sampling Designs

Element Selection	Probability	Nonprobability
Unrestricted	Simple random	Convenience
Restricted	Complex random	Purposive
	Systematic	Judgment
	Cluster	Quota
	Stratified	Snowball
	Double	

Some basic terms

- Representativeness

- Probability Sampling
  - **Randomly selected, each element has a known probability of being chosen which is not equal to 0**

- Non Probability Sampling
  - **Non random, unknown probability of being chosen**

Steps in Sampling Design

What is the target population?

What are the parameters of interest?

What is the sampling frame?

What is the appropriate sampling method?

What size sample is needed?

When to Use Larger Sample Sizes?

Population variance

Number of subgroups

Desired precision

Confidence level

Small error range

- Numbered paper/ball

- Random number tables

- Computer generated

TABLE 1   RANDOM DIGITS

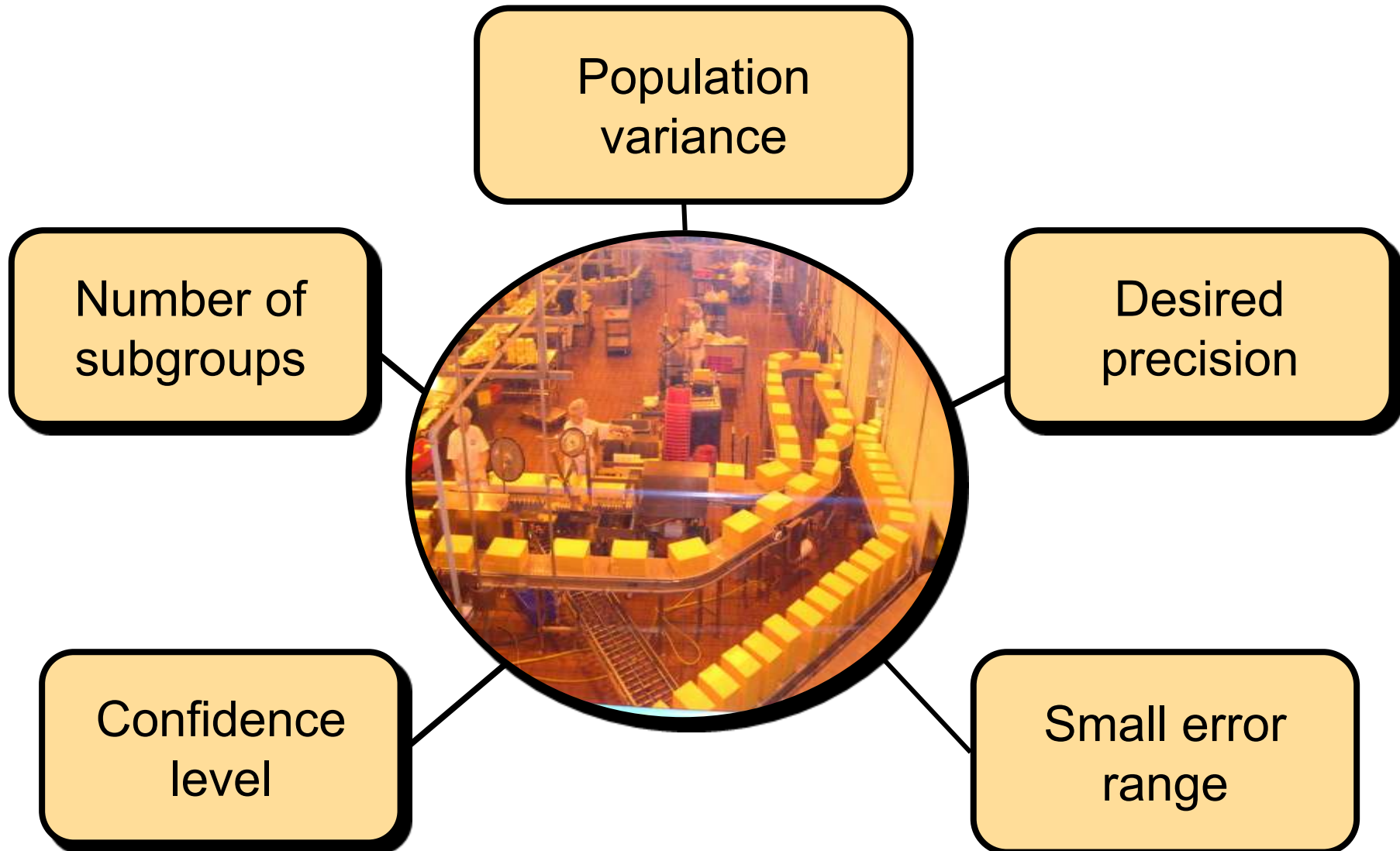|									
37751	04998	66038	63480	98442	22245	83538	62351	74514	90497
50915	64152	82981	15796	27102	71635	34470	13608	26360	76285
99142	35021	01032	57907	80545	54112	15150	36856	03247	40392
70720	10033	25191	62358	03784	74377	88150	25567	87457	49512
18460	64947	32958	08752	96366	89092	23597	74308	00881	88976
65763	41133	60950	35372	06782	81451	78764	52645	19841	50083
83769	52570	60133	25211	87384	90182	84990	26400	39128	97043
58900	78420	98579	33665	10718	39342	46346	14401	13503	46525
54746	71115	78219	64314	11227	41702	54517	87676	14078	45317
56819	27340	07200	52663	57864	85159	15460	97564	29637	27742
34990	62122	38223	28526	37006	22774	46026	15981	87291	56946
02269	22795	87593	81830	95383	67823	20196	54850	46779	64519
43042	53600	45738	00261	31100	67239	02004	70698	53597	62617
92565	12211	06868	87786	59576	61382	33972	13161	47208	96604
67424	32620	60841	86848	85000	04835	48576	33884	10101	84129
04015	77148	09535	10743	97871	55919	45274	38304	93125	91847
85226	19763	46105	25289	26714	73253	85922	21785	42624	92741
03360	07457	75131	41209	50451	23472	07438	08375	29312	62264
72460	99682	27970	25632	34096	17656	12736	27476	21938	67305
66960	55780	71778	52629	51692	71442	36130	70425	39874	62035
14824	95631	00697	65462	24815	13930	02938	54619	28909	53950
34001	05618	41900	23303	19928	60755	61404	56947	91441	19299
77718	83830	29781	72917	10840	74182	08293	62588	99625	22088
60930	05091	35726	07414	49211	69586	20226	08274	28167	65279
94180	62151	08112	26646	07617	42954	22521	09395	43561	45692

Systematic Sampling

Advantages

- Simple to design
- Easier than simple random
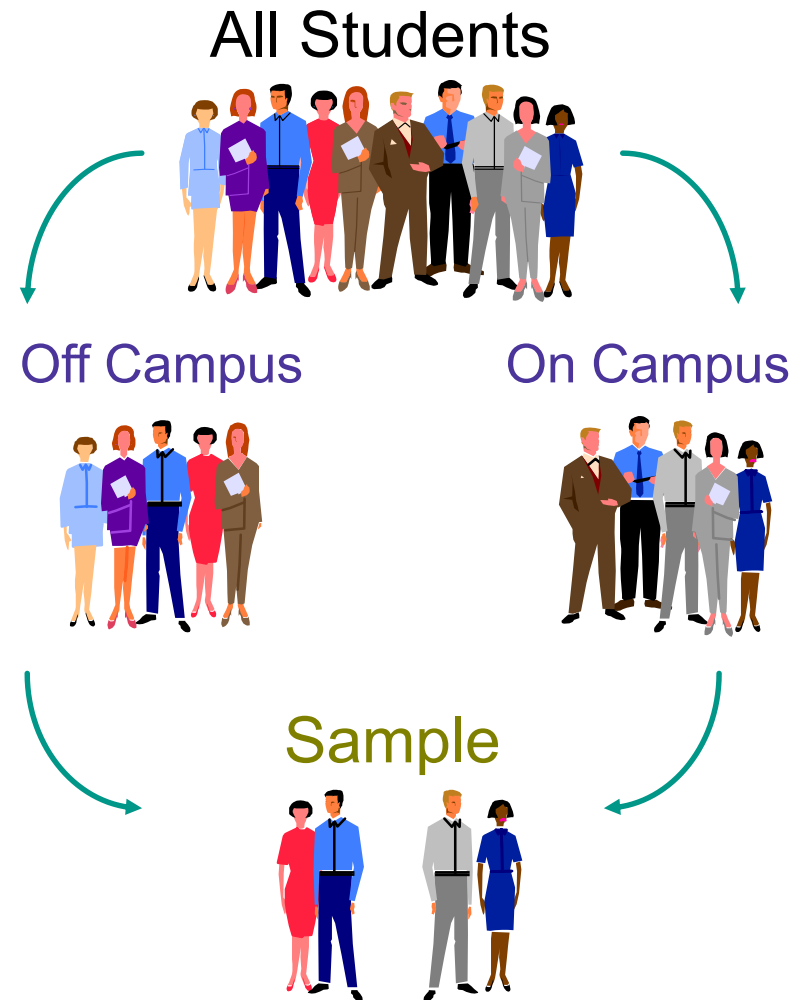- Easy to determine sampling distribution of mean or proportion

Disadvantages

- Periodicity within population may skew sample and results
- Trends in list may bias results
- Moderate cost

Stratified Sampling

- Population is divided into sub-population or stratum and the subjects selected randomly.
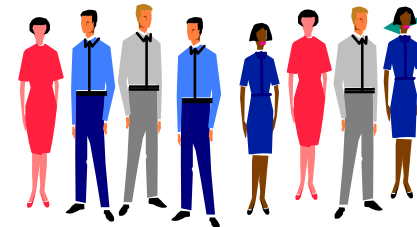 - Proportionate.
  - Disproportionate

All Students

Off Campus   On Campus

Sample

Clustered Sampling

- Population is divided into clusters, the cluster is randomly selected

All Students in Malaysia
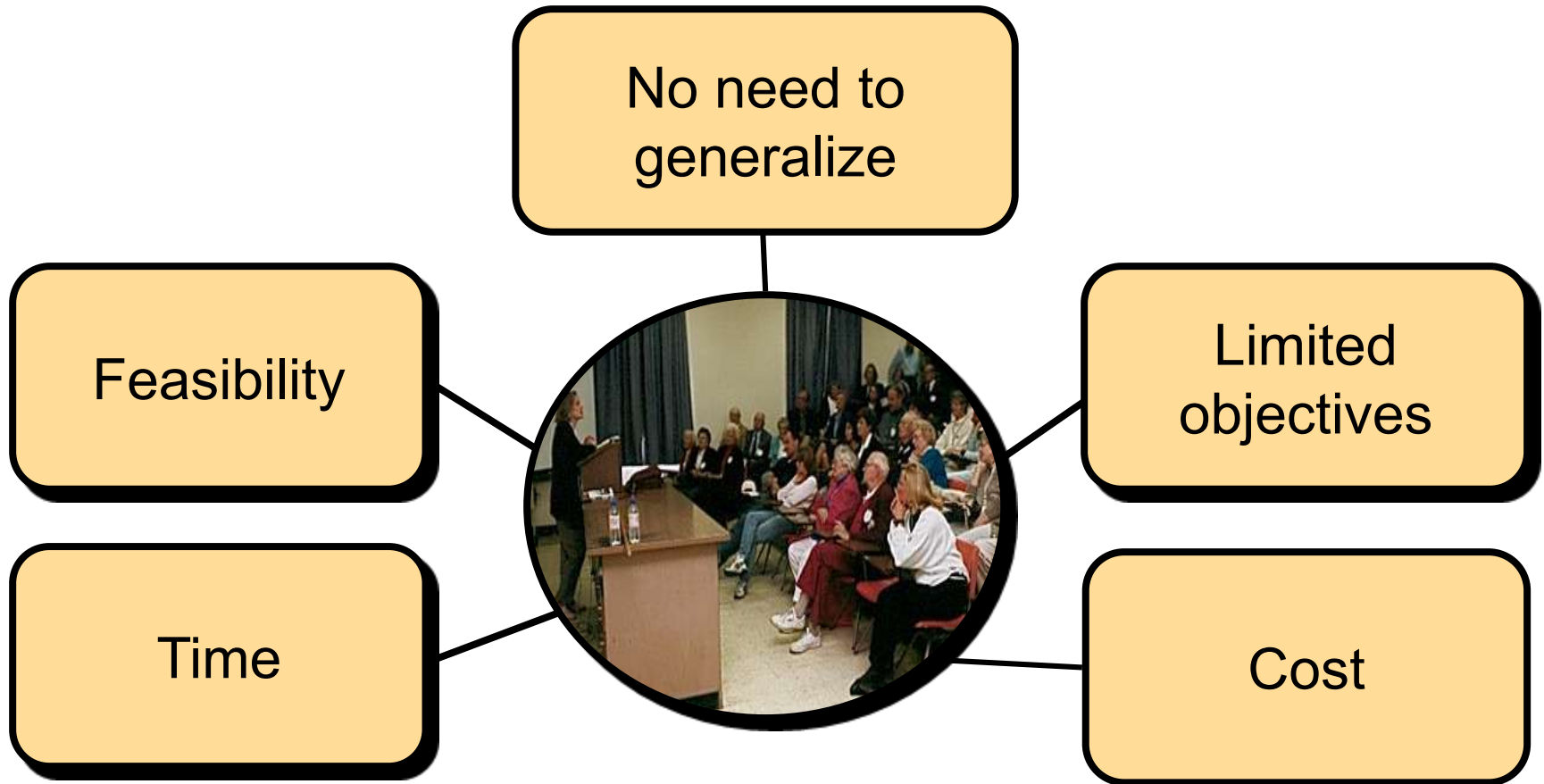
Kuala Lumpur

Malacca

Johor

Sample

Nonprobability Samples

Sample Size

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
         "S" is sample size.

Krejcie, Robert V., Morgan, Daryle W., "Determining Sample Size for Research Activities", Educational and Psychological Measurement, 1970.

Sample Size

Data Collection Methods
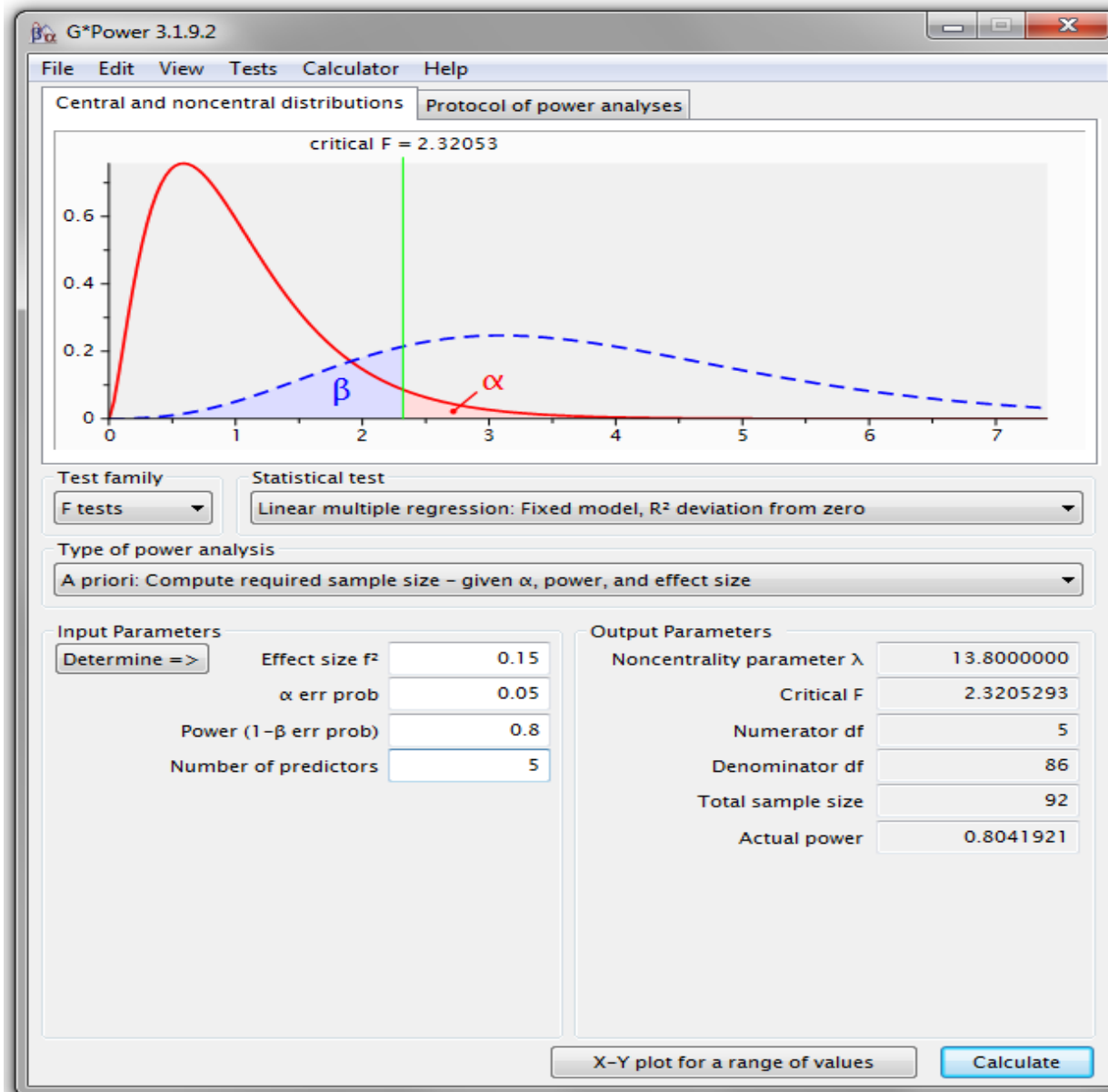
- Observation

- Experiments

- Surveys

Thank you