RESEARCH METHODS PSYCHOLOGY

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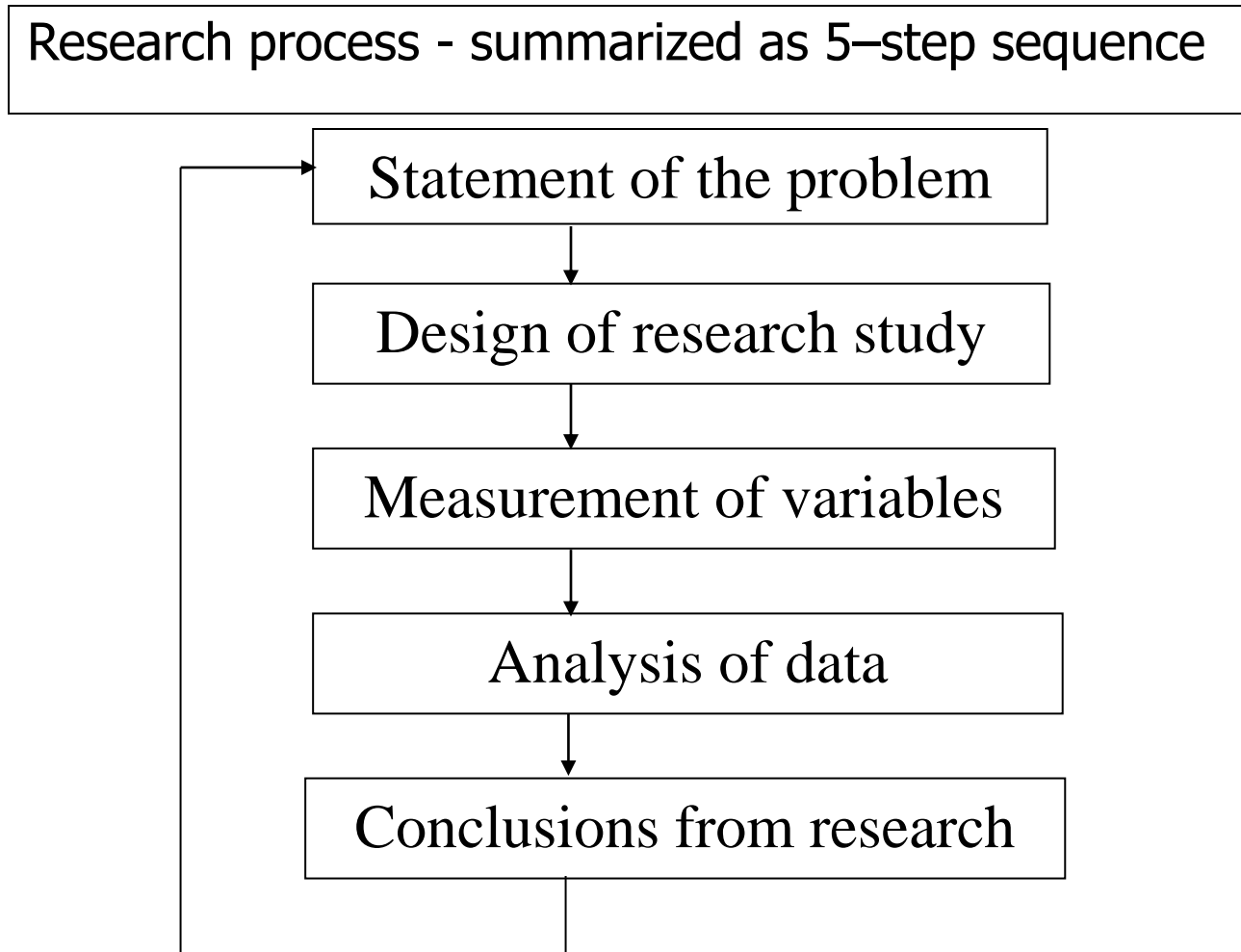
Department of Psychology

University of Sargodha
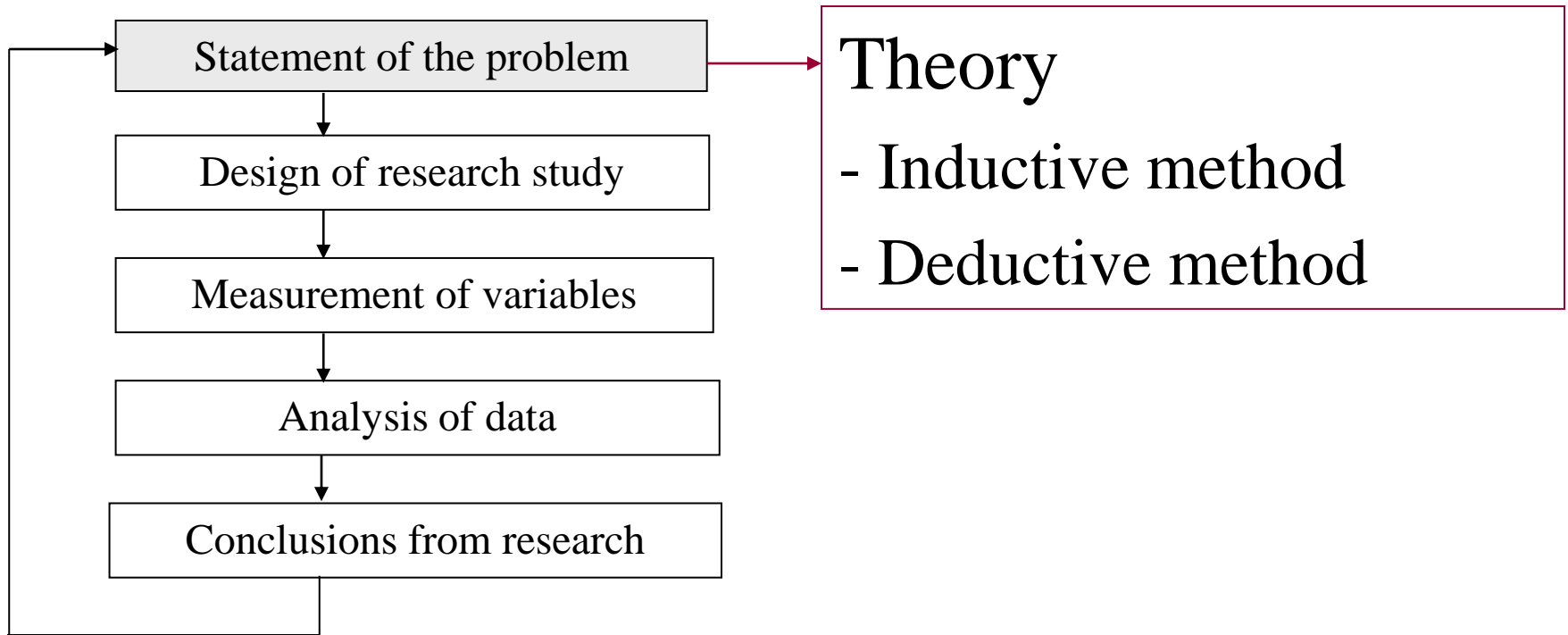
Goals of Science

- Description

- Prediction

- Explanation

The Empirical Research Cycle

Research process - summarized as 5–step sequence

Statement of the problem

↓

Design of research study

↓

Measurement of variables

↓

Analysis of data

↓

Conclusions from research

STATEMENT OF THE PROBLEM

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┌─────────────────────────────┐
│  Statement of the problem   │──────────▶  Theory
└─────────────────────────────┘
            │                              - Inductive method
            ▼
┌─────────────────────────────┐            - Deductive method
│   Design of research study  │
└─────────────────────────────┘
            │
            ▼
┌─────────────────────────────┐
│   Measurement of variables  │
└─────────────────────────────┘
            │
            ▼
┌─────────────────────────────┐
│      Analysis of data       │
└─────────────────────────────┘
            │
            ▼
┌─────────────────────────────┐
│   Conclusions from research │
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STATEMENT OF THE PROBLEM

Statement of the problem	→	Hypothesis

Example:

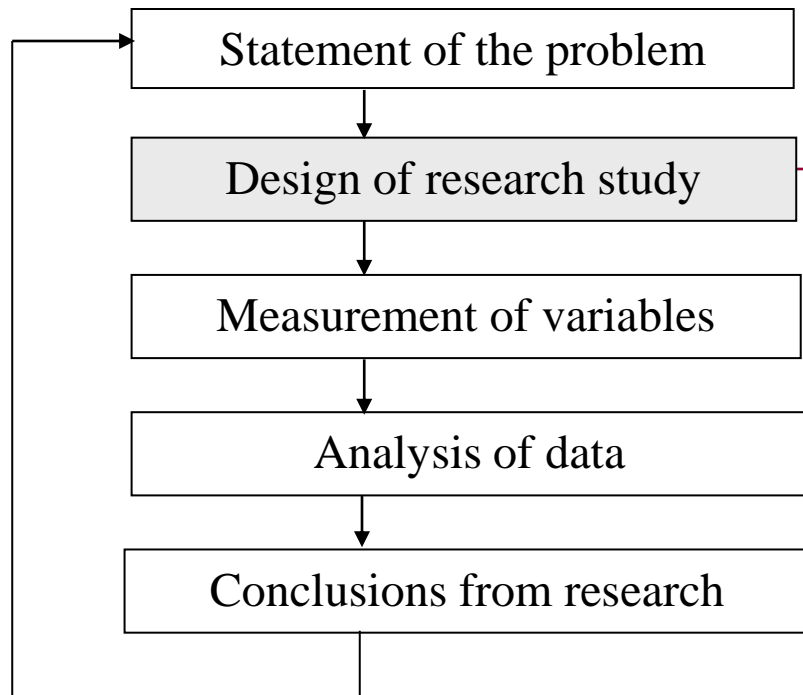**Statement**: It is difficult for individuals in dual-career families to experience WF balance.

Research Question: How can individuals in dual-career families experience WF balance?

Hypothesis: Dual-career individuals who have family and organizational support are more likely to experience WF balance compared to dual-career individuals with no family and organizational support.

RESEARCH DESIGN

Statement of the problem

Design of research study

Measurement of variables

Analysis of data

Conclusions from research

Plan of Study

- Internal & External Validity

- Naturalness of Setting

- Degree of Control

Primary Research Methods

- Laboratory Experiment

- Quasi Experiment

- Questionnaire

- Observation

- Qualitative

Secondary Research

Plan of Study:
Internal Validity

The extent to which we can infer that a relationship between two variables is causal or that absence of a relationship implies absence of cause.

The extent to which observed relationship obtained from research design/study is real or artifactual.

Plan of Study:
External Validity

The extent to which the findings from a research study are relevant to individuals and settings beyond those specifically examined in the study.

The extent to which observed relationship obtained from research design/study are "*generalizable*".

Plan of Study:
Naturalness of Research Setting

Lab   *or*   Field

- "artificiality"
- contrived and artificial
- controlled

-"naturalness"
- typically employs a
  real–life setting

Plan of Study:
Degree of Control

• Confounding and extraneous variables

• Manipulation—this is reflective of a high degree of control

• Research designs that permit manipulation are technically referred to as "experiments"

Primary Research

There are 5 categories of types of Primary Research:

Laboratory (experimental)

Quasi-experimental

Questionnaire

Observation

Qualitative

Primary Research:
Experimental Research

Experiment
- Investigator manipulates a variable under carefully controlled conditions and observes whether changes occur in a second variable
- Used to detect *cause-and-effect* relationships

Conditions that make a <u>true</u> experiment
- Manipulation of independent variables
- Random assignment into experimental conditions (experimental conditions & control)

Primary Research:
Experimental and Control Groups

Experimental group
- •Subjects who receive some special treatment in regard to the independent variable

Control group
- •Subjects who do not receive the special treatment given to the experimental group

LOGIC: If the 2 groups are identical except for the variation created by the manipulation of IV, then any differences between groups must be due to manipulation of the IV

Example of Experimental Design

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              ┌─────────────┐
              │   Sample    │
              └─────────────┘
              ↙             ↘
    ┌──────────────┐   ┌──────────────┐
    │   Control    │   │ Experimental │
    └──────────────┘   └──────────────┘
              ↘             ↙
          ┌──────────────────┐
          │   Measure DV     │
          └──────────────────┘
```

Sample

Control

Experimental

Measure DV
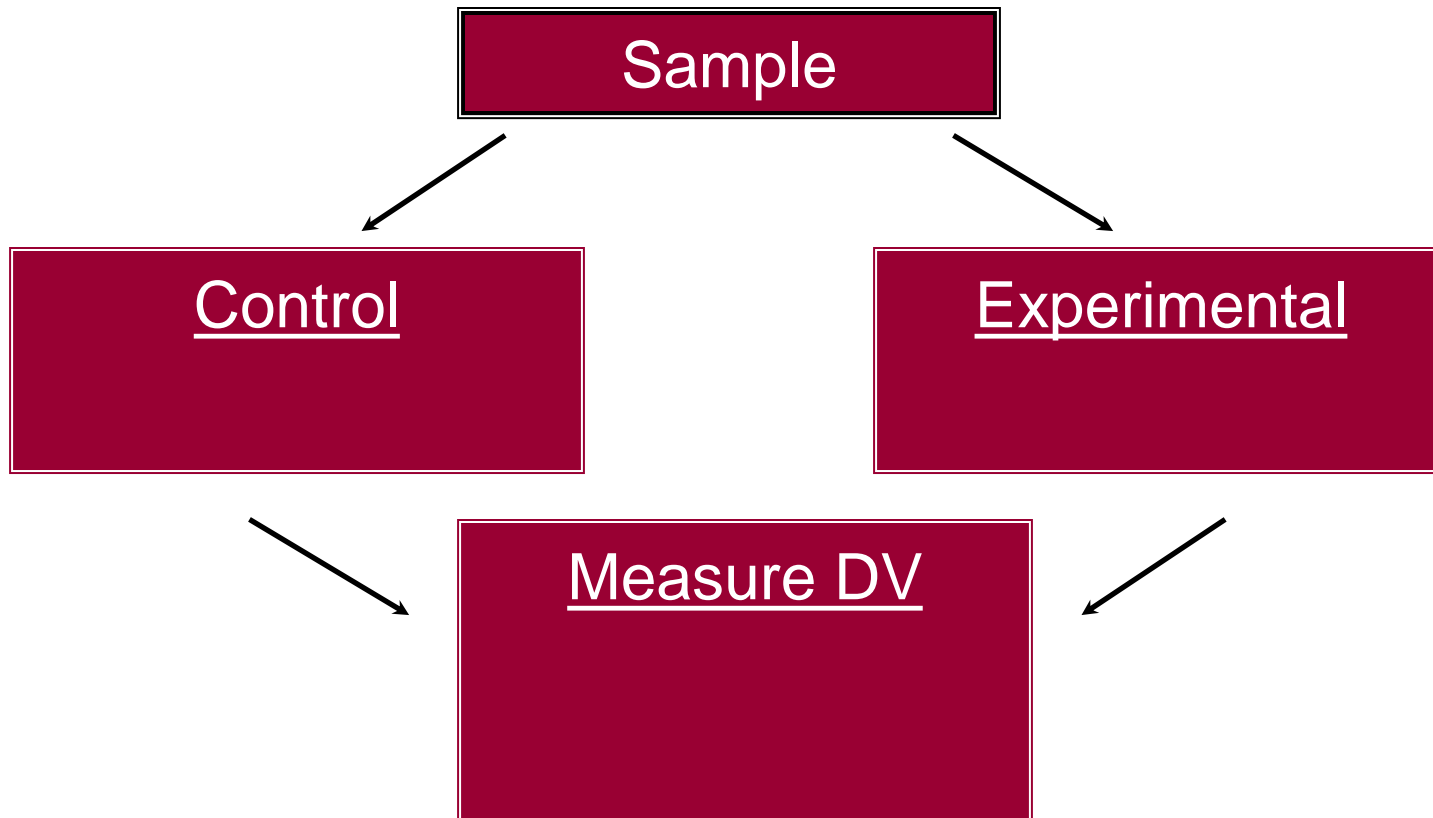
Advantages and Disadvantages of Experimental Research

+   permit cause-and-effect conclusions

-    lab experiments tend to be artificial

-    cannot be used to explore some research questions

Primary Research
Field Experiments: Quasi-Experiments

•Participants must be and are selected for different conditions from pre–existing groups

•Levels of the IV are/may be selected from pre–existing values and not created through manipulation by the researcher

•Unlike <u>true experimental designs</u> where participants are randomly assigned to experimental and control groups, with quasi–experimental designs they are NOT

•<u>Quasi–experiments</u> DO NOT permit the researcher to control the assignment of participants to conditions or groups

Quasi-Experimental Example

Greenberg: Employee Theft and Underpayment Inequity

Greenberg: Employee Theft and Underpayment Inequity

Pay
deduction $\longrightarrow$ Expressed inequity
(Employment theft)

- Theft is a mechanism for redressing states of inequity

- Adequate explanations can lessen feelings of inequity

- This is "dose-responsive": magnitude of the expressed inequity, rate of theft

Greenberg: Employee Theft and Underpayment Inequity

Plant 1	Plant 2	Plant 3

Control

No cut in pay

Condition 1

Inadequate explanation

Condition 2

Adequate explanation

DV
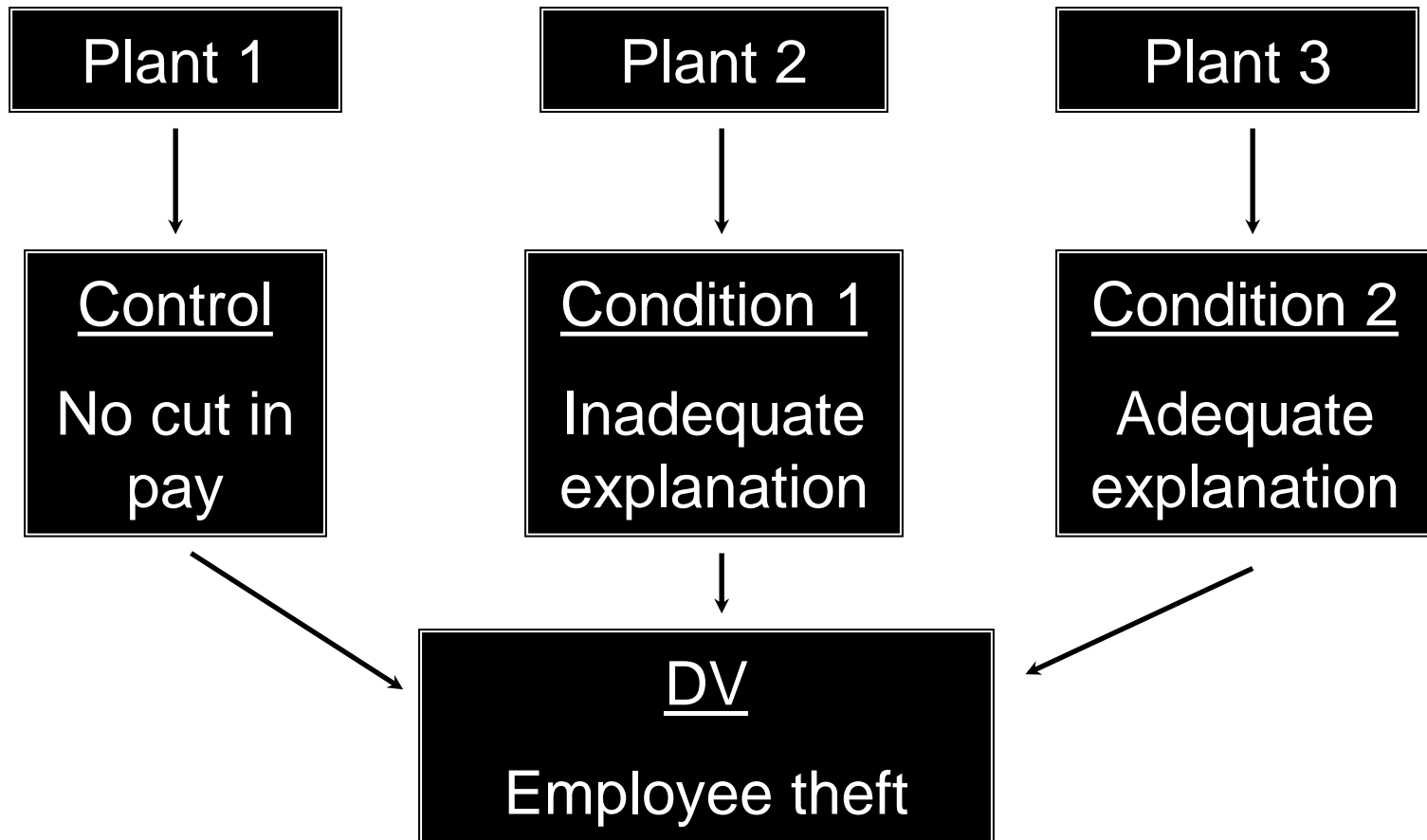
Employee theft

Greenberg: Employee Theft and Underpayment Inequity

	Time 1	End	**Measurement**
Plant A	64	55	1. Actuarial data on employee theft
Plant B	53	30	
Plant C **Control**	66	58	2. Self-reported measures

•Randomly selected treatment for A and B, C as control
•Assumed/proved homogeneity among subjects in different plants
•Same characteristics among those who dropped out.
•Treatment was received the same by all workers in a plant.

Greenberg: Employee Theft and Underpayment Inequity
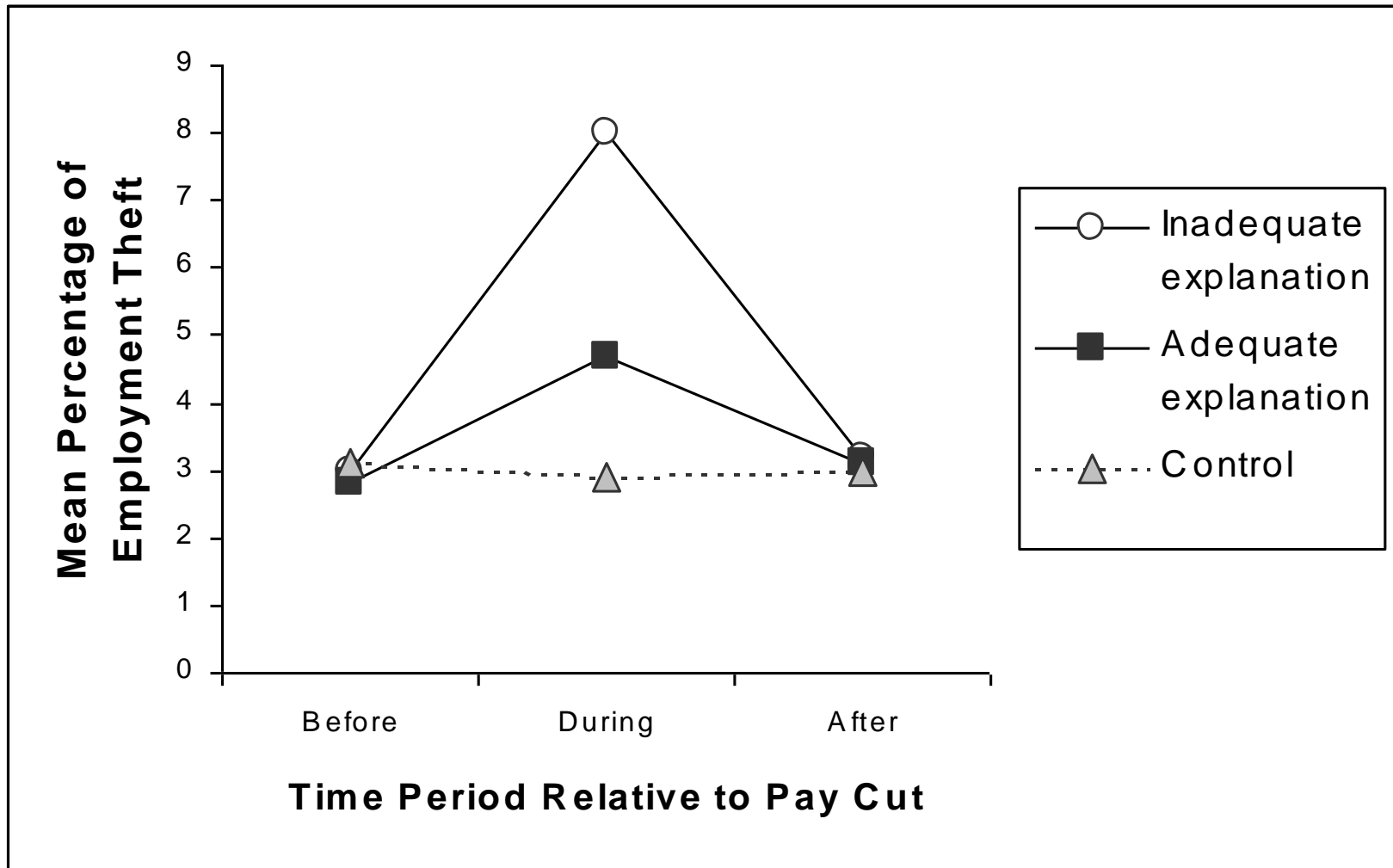
Primary Research:
Naturalistic Observation

Careful, usually prolonged, observation of behavior without intervening directly with the subjects

- No manipulation by researcher

- No random assignment

Often referred to as ex post facto designs

Primary Research:
Survey Research

Measurement and assessment of opinions, attitudes, and other descriptive phenomenon usually by means of questionnaires and sampling methods

- Popular method of research for I/O psychologists

- Limitations include return rate

- Web-based survey

Primary Research:
Qualitative

A class of research methods in which the investigator takes an active role in interacting with the subjects he or she wishes to study

- Interview/focus group
- Ethnography: a research method that utilizes field observation to study a society's culture.
- Emic versus Etic
  - *Emic*: an approach to researching phenomena that emphasizes knowledge derived from the participants' understanding of their own culture.
  - *Etic*: An approach to researching phenomena that emphasizes knowledge derived from the perspective of an objective investigator in understanding a culture.

Primary Research: Summary

Laboratory (experimental)

Quasi-experimental

Questionnaire

Observation

Qualitative

Issues:

Obtaining access to samples

Common method bias

Choosing the correct design to answer the research question.

Secondary Research Methods

A class of research methods that examines existing information from research

Meta-analysis – statistical procedure designed to combine the results of many individual, independently conducted empirical studies into a single result or outcome

Differences in studies could be due to *statistical artifacts*.

Issues:
- File draw effect
- Subjective nature of research

Measurement of Variables

Statement of the problem

Design of research study

Measurement of variables

Analysis of data

Conclusions from research

Types of Measurement

Level of Measurement

Characteristic
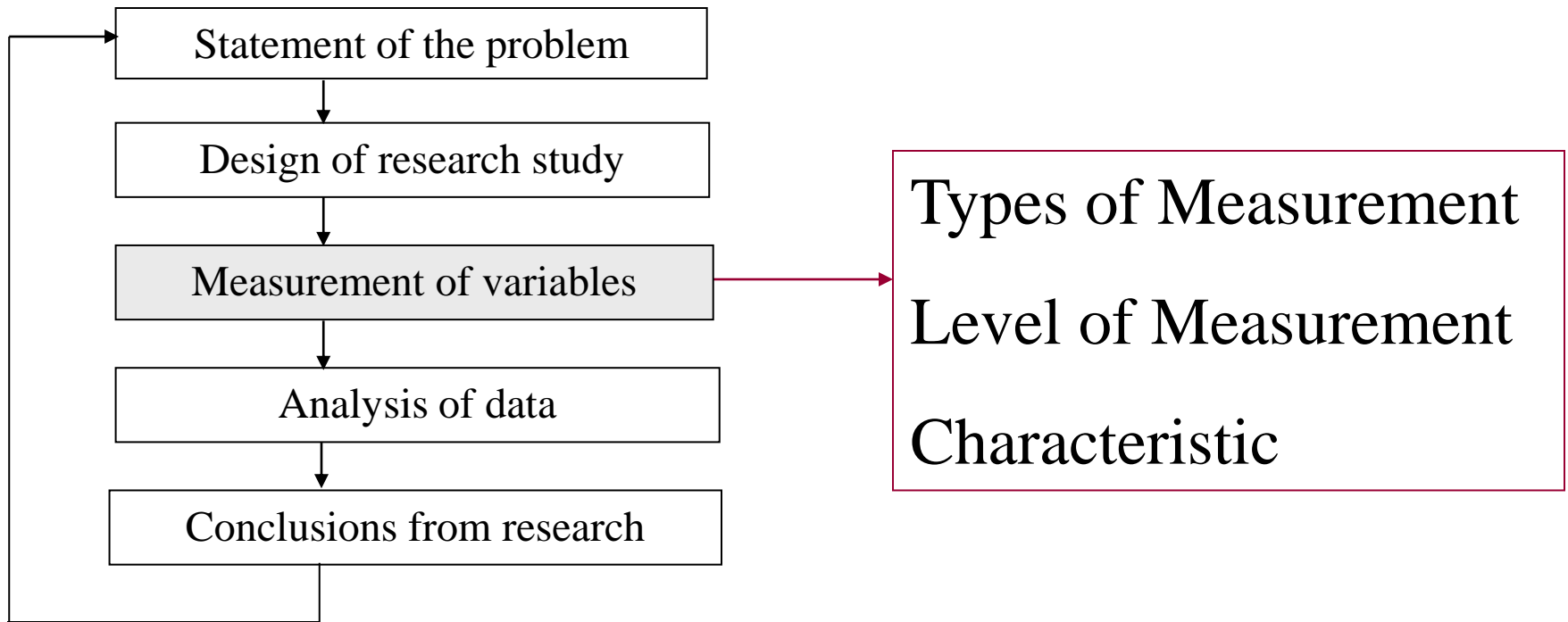
Measurement of Variables:
Types of Variables

Variable: Some property of an object, phenomenon, or event whose measurement can take on two or more values

- Independent/dependent
- Predictor/criterion
- Continuous/discrete
- Qualitative/quantitative

Measurement of Variables:
Types of Variables

What is the DV and what is the IV?

In a study of the effects of different types of legal arguments on jurors' perceptions of the guilt or innocence of a defendant, subjects were randomly assigned to hear an argument which related to their daily experiences or to an argument of a more abstract and idealistic nature. After listening to one of these legal arguments, subjects were asked to rate the guilt or innocence of the defendant on a twelve-point scale.

Measurement of Variables:
Levels of Measurement

A scale is a measuring device used to assess a person's score or status on a variable

The four basic types of scales are:

       Nominal scales

       Ordinal scales

       Interval scales

       Ratio scales

Measurement of Variables:
Levels of Measurement

Nominal Scale: 1=Single 2=Married
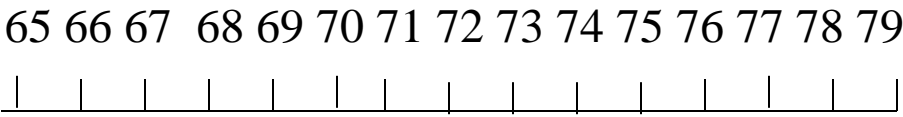
Ordinal Scale

1	2	3
Not Satisfied	Satisfied	Very Satisfied
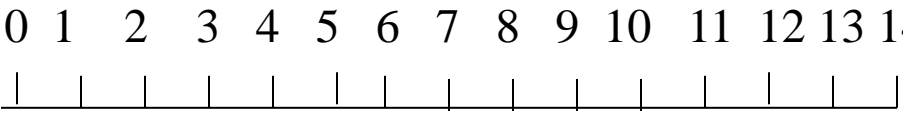
Interval Scale

65 66 67 68 69 70 71 72 73 74 75 76 77 78 79

Degrees Fahrenheit

Ratio Scale

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Weight in pounds

Measurement of Variables:
Characteristics of Good Measurement

Good test or measurement system should be:

- reliable
- valid
- objective
- standardized

STATISTICAL ANALYSES OF DATA

Statement of the problem

Design of research study

Measurement of variables

Analysis of data

Conclusions from research
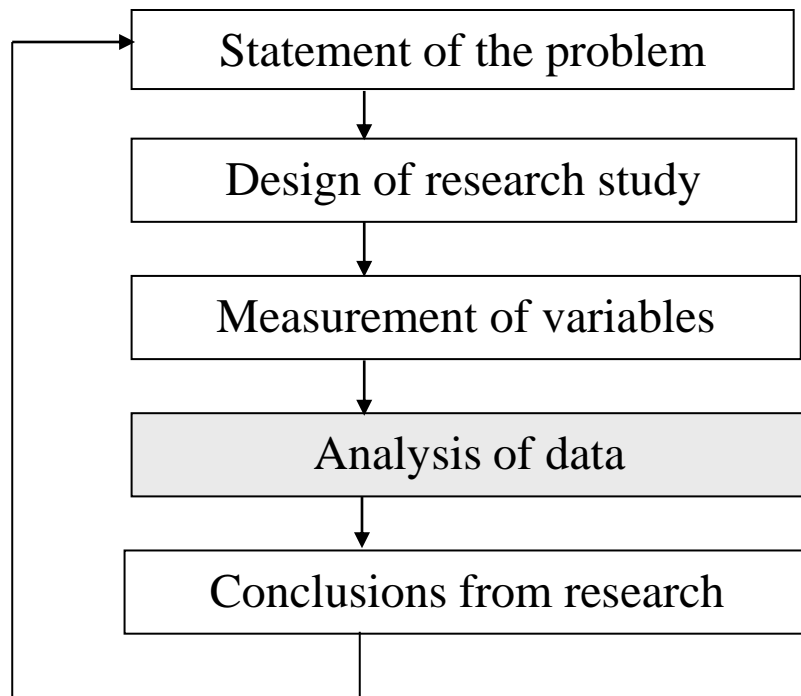
Purpose

Distributions and Their Shape

Measures of Central Tendency
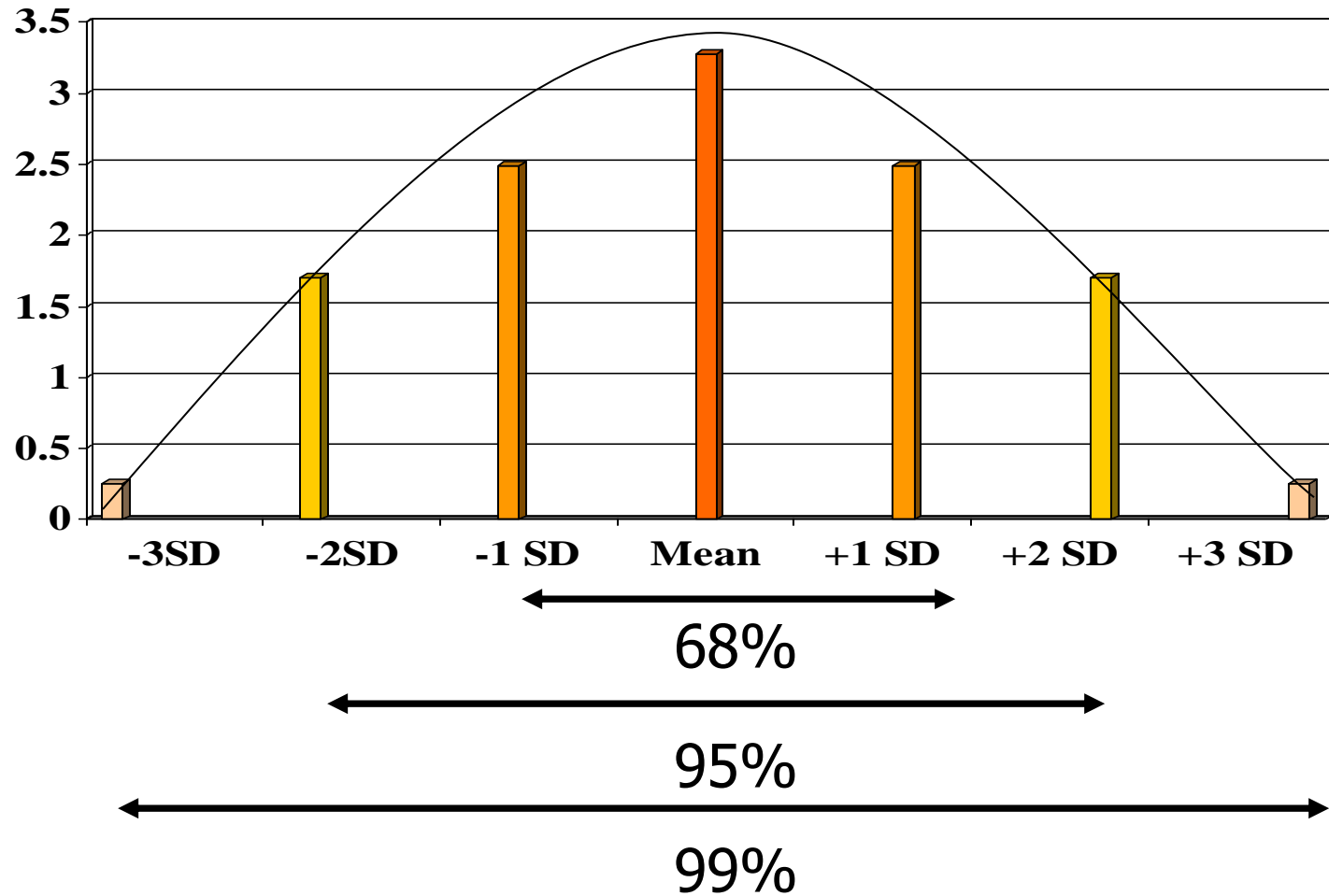
Measures of Variability

Correlation

Statistical Analysis: Purpose

Statistical tests are procedures that are used to:

- describe data
- analyze relationships between variables (i.e., make inferences)

Statistical Analysis: Distributions and Their Shape

Statistical Analysis: Measures of Central Tendency

- Mean

- Median

- Mode

Statistical Analysis: Measures of Central Tendency

12, 15, 10, 10, 9, 5, 10, 8, 12, 6, 7

12, 15, 10, 10, 9, 5, 10, 1, 8, 12, 6, 7

Statistical Analysis: Measures of Variability

- Variability

- Range

- Standard Deviation

Statistical Analysis: The Concept of Correlation

Permit investigators to see whether there is a link or association between the variables of interest.

Does not permit cause-and-effect conclusions.

Statistical Analysis: The Concept of Correlation

A <u>correlation</u> exists when two variables are related to one another.

Two aspects of a correlation coefficient:
      Direction: Positive or negative
      Strength: Range of coefficients is from -1.00 to +1.00

Statistical Analysis:
Positive Correlation

**high school
GPA**

**college
GPA**

Statistical Analysis:
Negative Correlation

age   **hair on head**

Statistical Analysis:
Positive Correlation

Cognitive ability
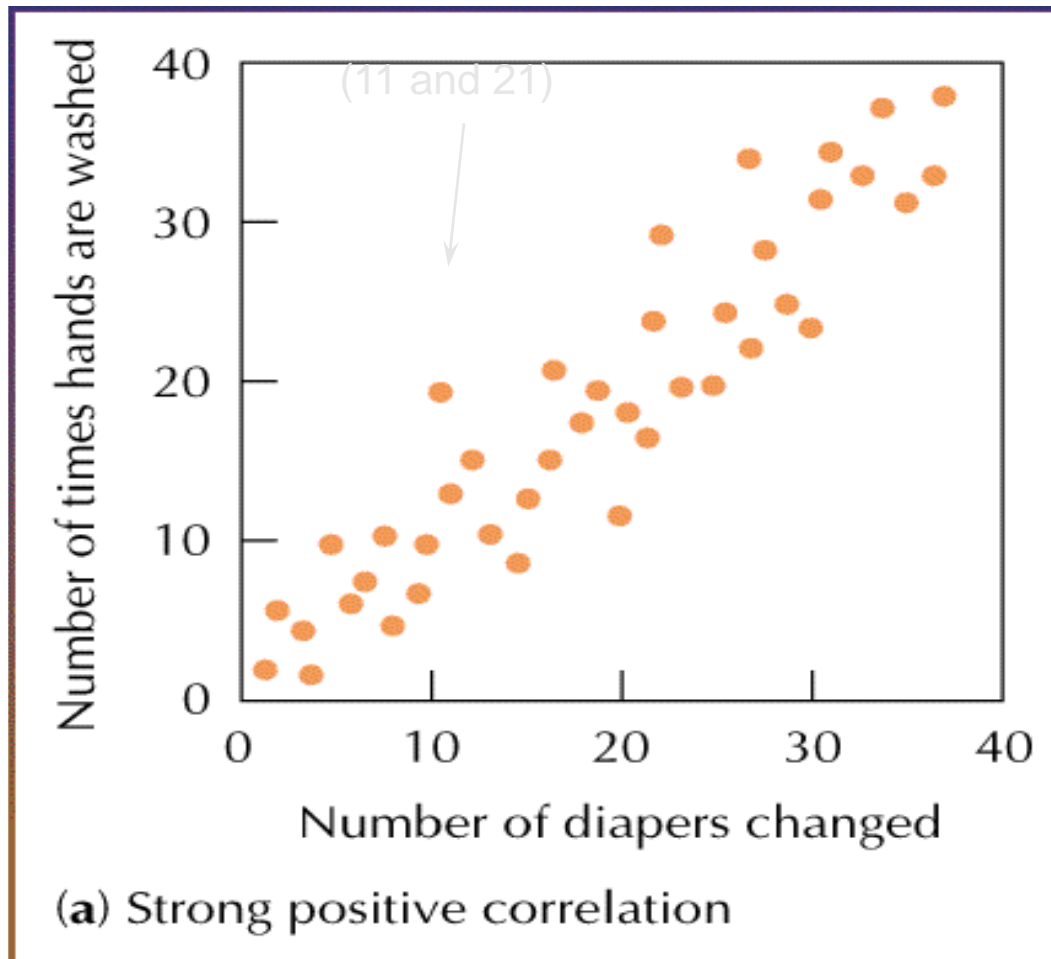
Job performance

Statistical Analysis
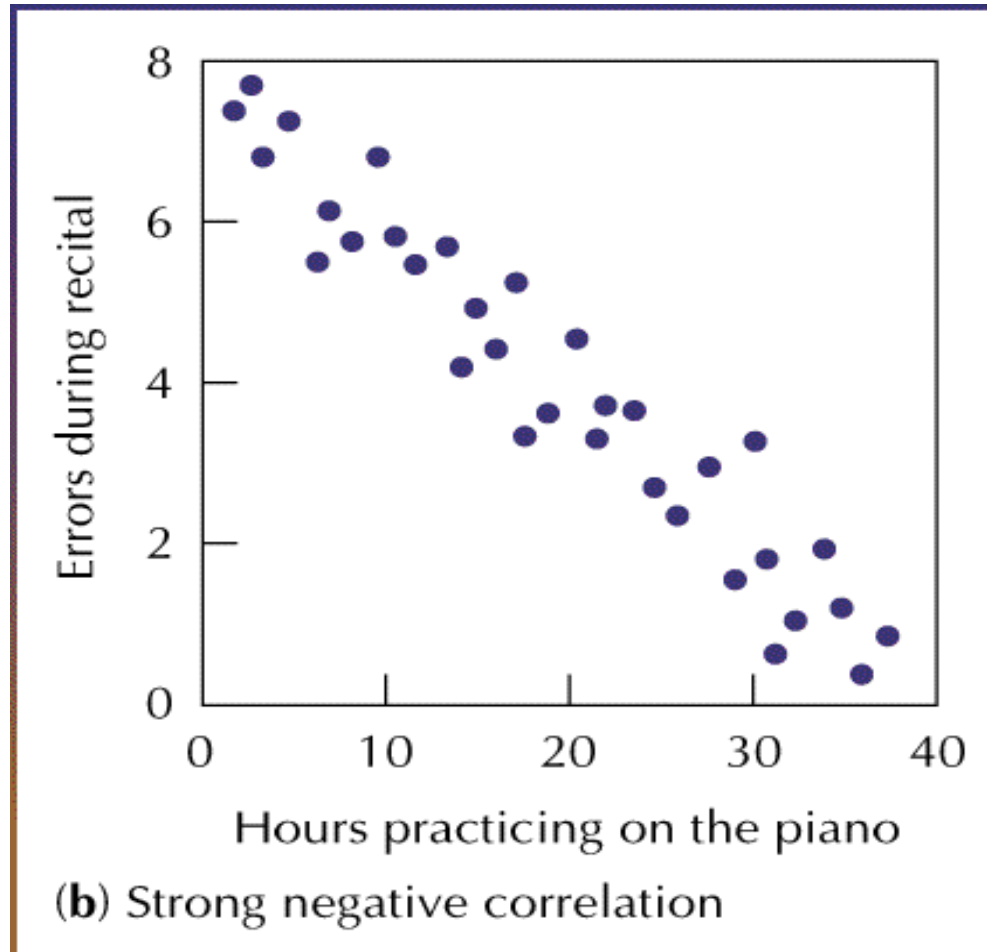

(a) Strong positive correlation

Statistical Analysis

(b) Strong negative correlation
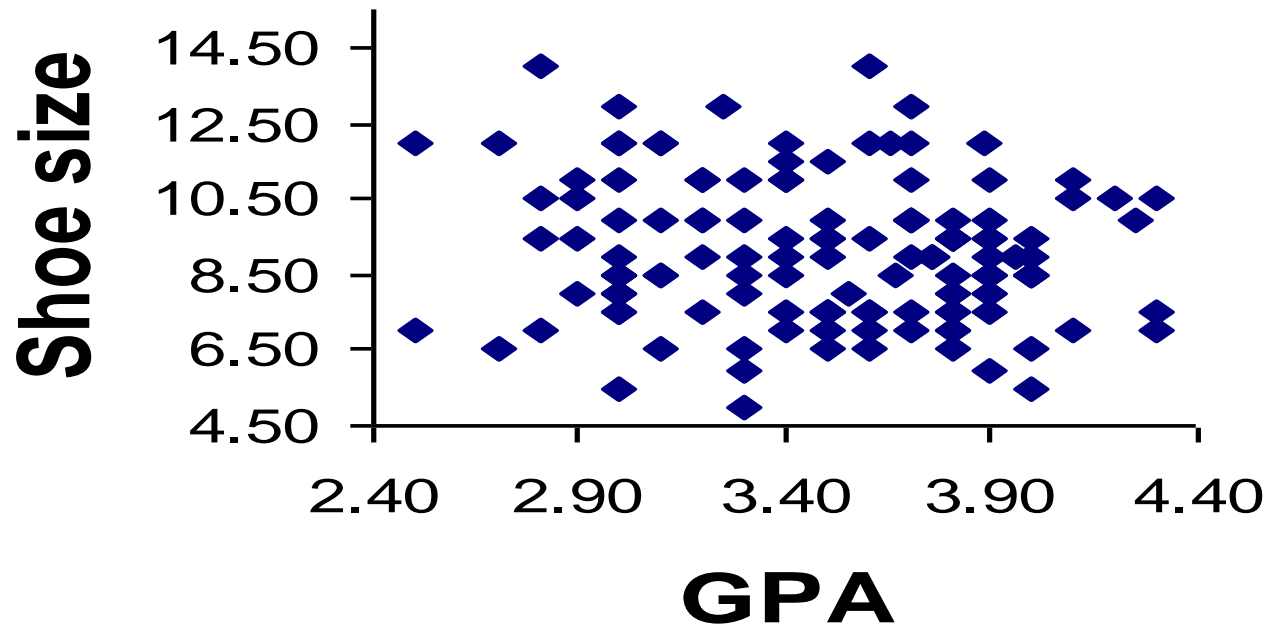
Statistical Analysis
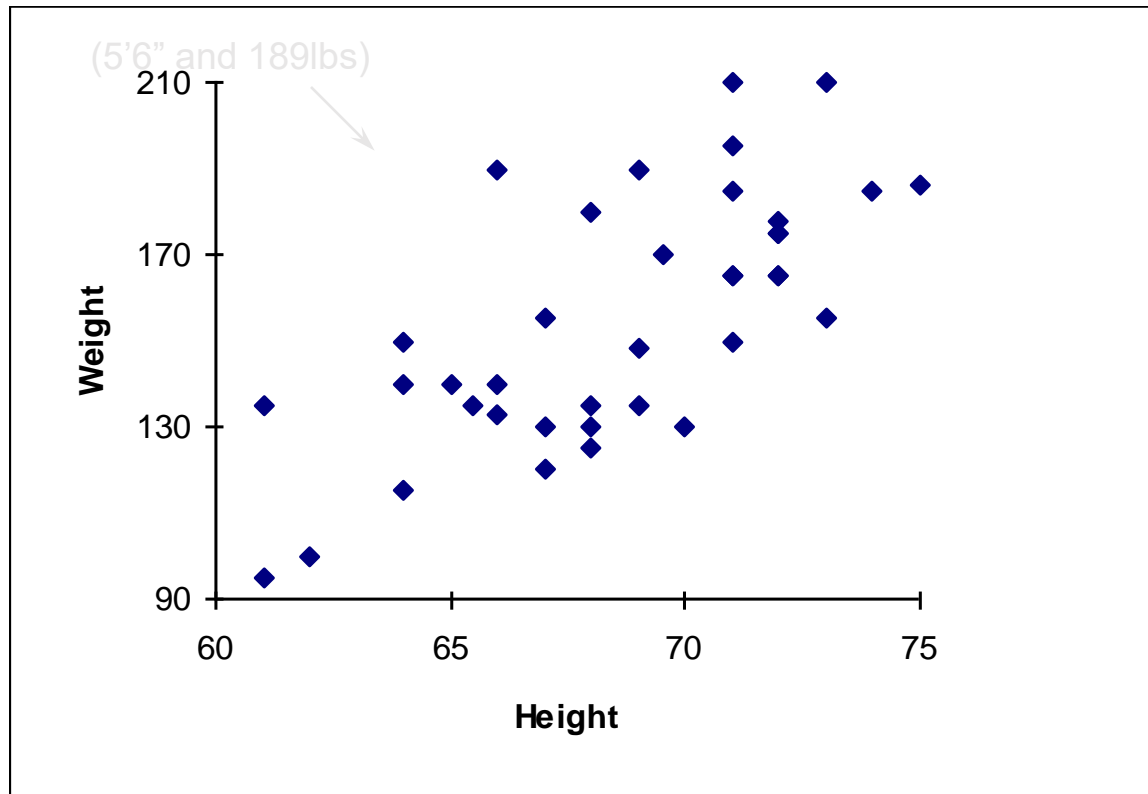
Statistical Analysis

Statistical Analysis:
Interpreting a Correlation

- Correlation and prediction
- Correlation and causation

  - X may cause Y
  - Y may cause X
  - Z causes both X and Y

Statistical Analysis:
Summary of Correlation coefficients

- The degree of linear relationship (association) between 2 variables
- *r*
- -1.0 to +1.0
- Correlation does not mean causality
  - Causality determined through laboratory or statistical control
- Statistical vs. practical significance

Statistical Analysis:
Correlation coefficients examples

Table 1

Descriptive Statistics and Intercorrelations for Study 1 Variables

Variable	M	SD	1	2	3	4	5	6	7	8
1. OJS Satisfaction	63.0	13.5	—							
2. MSQ Satisfaction	75.8	12.1	.63**	—						
3. Combined satisfaction	3.7	0.5	.91**	.89**	—					
4. Affective–cognitive consistency	10.9	9.9	−.04	.04	−.01	—				
5. Performance	5.7	0.9	.33*	.36*	.38**	−.04	—			
6. Age	29.0	7.7	.07	.14	.11	.00	−.11	—		
7. Sex[a]			−.02	−.06	−.04	−.09	.08	.29*	—	
8. Tenure[b]	32.0	26.3	.14	.11	.14	.01	−.05	.69**	.05	—

Note. $N = 65$. OJS = Overall Job Satisfaction Scale; MSQ = Minnesota Satisfaction Questionnaire.
[a] The variable is coded such that 1 = male; 2 = female. [b] Tenure is reported in months.
* $p < .05$. ** $p < .01$.

Bond, F. W., Bunce, D. (2003). The Role of Acceptance and Job Control in Mental Health, Job Satisfaction, and Work Performance. *Journal of Applied Psychology, 88,* 1057-1067.

Statistical Analysis:
Correlation coefficients examples

Table 1

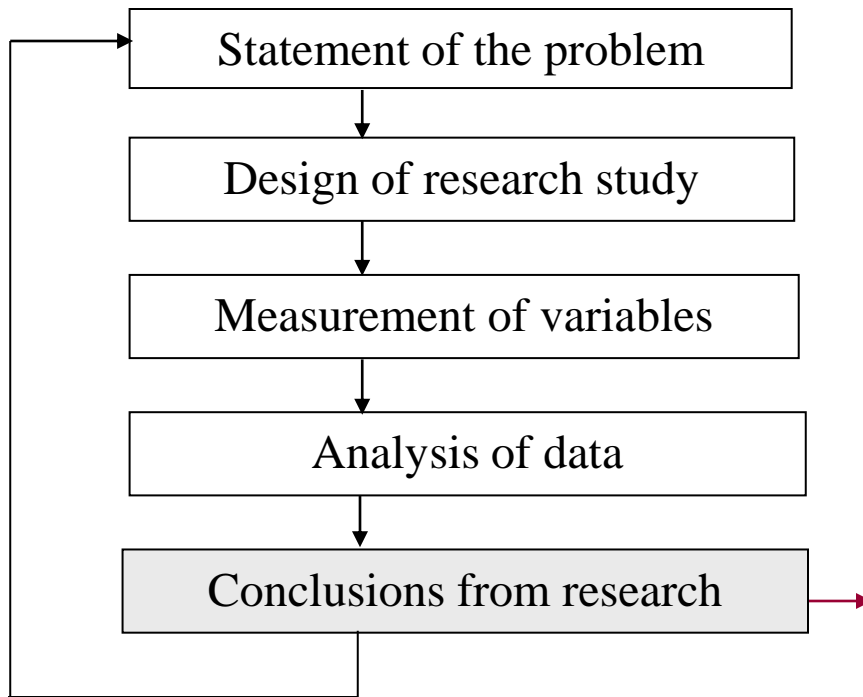*Descriptive Statistics and Intercorrelations for All Variables Included in the Analyses*

| Variable	M	SD	1	2	3	4	5	6
1. Gender	1.44	0.50						
2. Age	4.97	2.21	−.11**					
3. Gross pay	11.70	5.51	−.36**	.27**				
4. Total hours worked	39.99	13.64	−.29**	.10**	.56**			
5. High-quality work	2.72	0.81	−.02**	.05**	.30**	.17**		
6. Job satisfaction	6.56	1.99	.06**	.07**	−.01	−.05**	.26**	
7. Injuries	1.20	0.53	−.06**	−.00	−.06**	.03**	−.12**	−.13**

Note. $N = 16,446$.
$** p < .01$.

Barling, J., Kelloway, K. E., Iverson, R. D. (2003). High-quality work, job satisfaction, and occupational injuries. *Journal of Applied Psychology, 88*, 276-283.

Conclusions

Statement of the problem

Design of research study

Measurement of variables

Analysis of data

Conclusions from research

- Theoretical and applied implications

- Limitations

  - Generalizability

  - Size and representativeness of sample

  - Research method & protocol

- Suggestions for future research

Ethics in Research: What is Ethical Research?
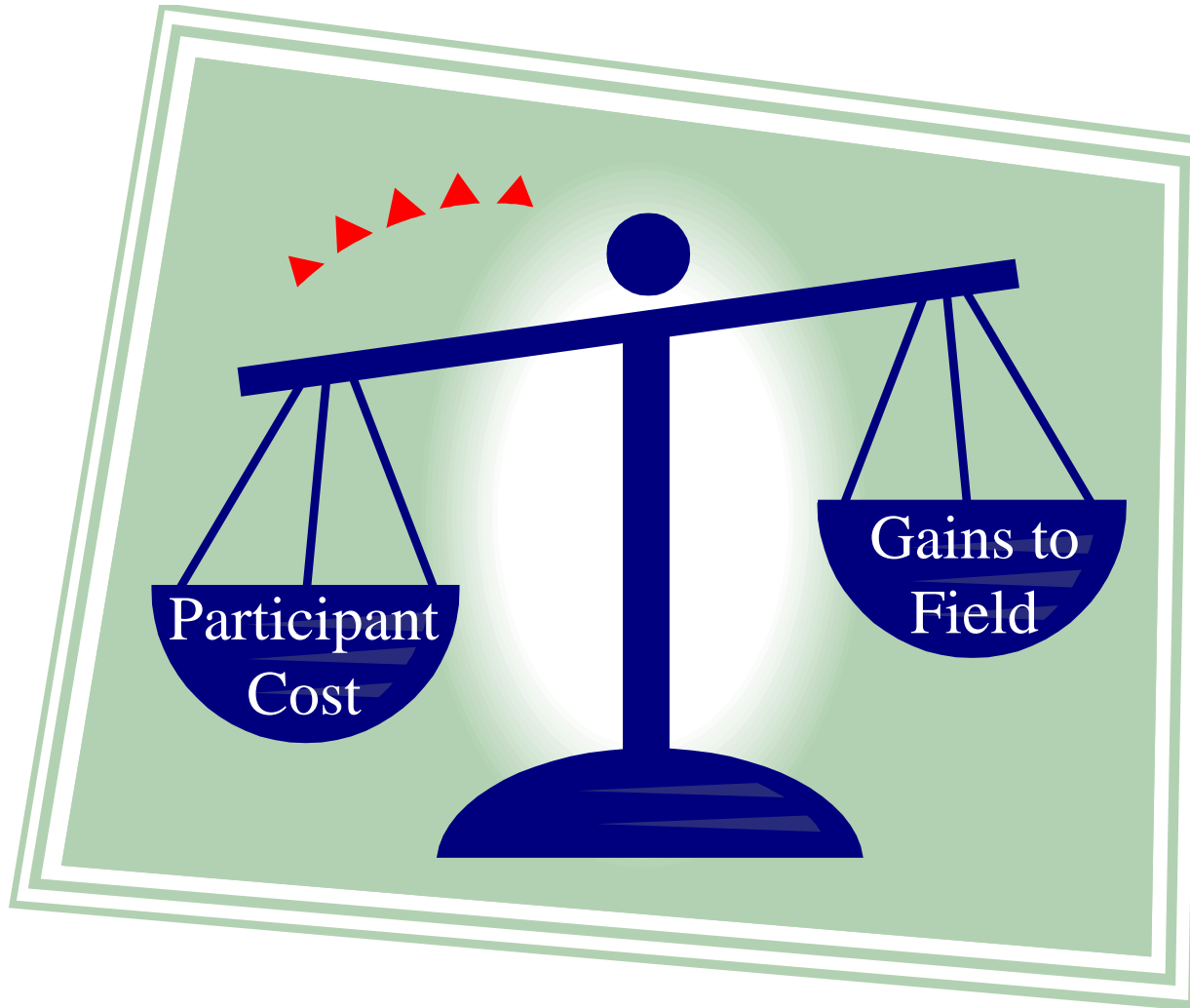
- Do not always know effects ahead of time

- Ethical guidelines change over time

Ethics in Research: What is Ethical Research?

Ethically based research is concerned about the welfare of the research participant, maintaining honesty in conducting and reporting scientific research, giving appropriate credit for ideas and effort and considering how knowledge gained through research should be used.

There are no clear "right" or "wrong' answers.

Treating research participants ethically matters not only for the welfare of the individuals themselves but also for the continued effectiveness of behavioral science as a scientific discipline

Ethics in Research:
Protecting Participants

Type of Threats

 - Past research: e.g., Milgram studies

 - Participants may be told they failed an IQ or social skills test

 - Participant may learn something negative about themselves (tendency to stereotype others or they make unwise decisions)

 - Participants may perform behavior they are later embarrassed about

The Potential for Lasting Impact

Ethics in Research:
Providing Freedom of Choice

Conducting research outside the laboratory

- Participant may not know research is happening

- Institutions

Securing Informed Consent

Weighing informed consent versus the research goals

Ethics in Research: Power Differentials

Avoiding Abuses of Power

Respecting Participants' Privacy

 - anonymous vs. confidential

Ethics in Research:
Describing Research

Deception: occurs whenever research participants are not completely and fully informed about the nature of the research project before participating in it.

  - Active vs. Passive

  - When Deception is necessary
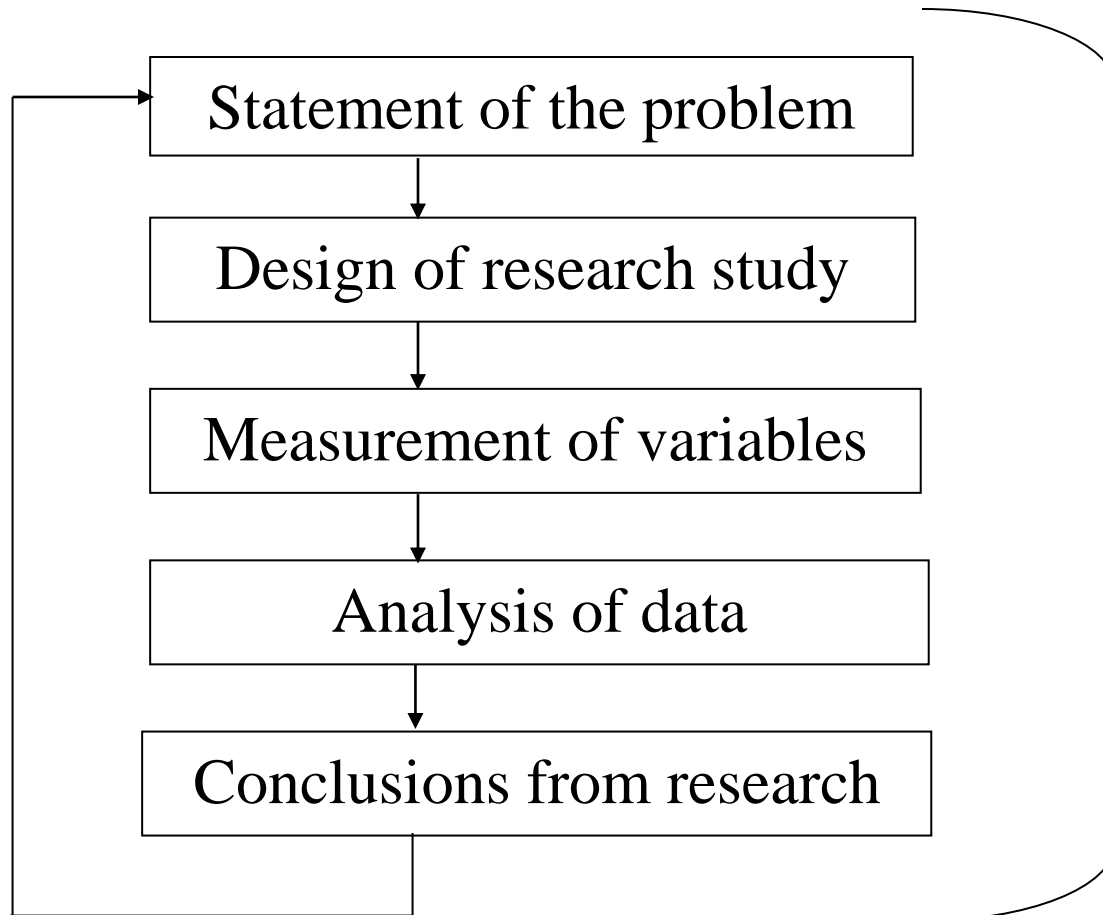
  - Simulation studies

  - Consequences

  - Debriefing

Ethics in Research: Ensuring Research is Ethical

Department of Health and Human services has developed regulations for the protection of both animal and human research participants.

 - require all universities set up institutional review board (IRB) to determine whether proposed research meets regulations

 - researchers submit a written application to IRB requesting permission to conduct research

 - researchers have to describe potential risks and benefits.

Researcher's Own Ethics

Research in Summary

Statement of the problem → Design of research study → Measurement of variables → Analysis of data → Conclusions from research

Each stage should be conducted in an *ethical* and *scientific* manner

Research in Industry

- Distinguishing Features
  - Arise from organizational problems
  - Use of results
  - Motives
  - Science-practice divide