

Measurement

PSYC 203

Outline

- **What is measurement?**
- Levels of measurement
- Why does this matter?
- Assessing measurement quality

What is measurement?

- Key assumptions
 - If a thing exists, it exists in some amount
 - If a thing exists in some amount, it can be measured
- Definition
 - “...the assignment of numerals to objects or events according to rules.”

What is measurement?

- Variables
 - characteristic or condition that changes or has different values for different individuals
- Constructs
 - internal attributes or characteristics that cannot be directly observed but are useful for explaining and describing behavior
- Operational definition
 - describes a set of operations for measuring a construct
 - defines the construct in terms of the resulting measurement

What is measurement?

- Discrete variable
 - Consists of separate, indivisible categories and no values can exist between two neighboring concepts
- Continuous variable
 - Infinite number of possible values that fall between two observed values, divisible into an infinite number of fractional parts

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Scales of measurement: Nominal

- Consists of a set of categories that have different names
- Measurements label and categorize information but do not make any quantitative distinctions between observations

Scales of measurement: Ordinal

- Consists of a set of categories that are organized in an ordered sequence
- Measurements rank observations in terms of size or magnitude
- Can't determine the size of the difference between individuals

Scales of measurement: Interval & Ratio

- Consists of a series of ordered categories that are all intervals of exactly same size
- Equal differences between numbers on scale reflect equal differences in magnitude
- Difference
 - Interval — arbitrary zero point
 - Ratio — anchored by a zero point

Review

	Indicates Difference	Indicates Direction of Difference	Indicates Amount of Difference	Absolute Zero
Nominal	x			
Ordinal	x	x		
Interval	x	x	x	
Ratio	x	x	x	x

Example 1

- What type of measurement is a Likert scale?
 - *On a scale of 1 to 10 with one being no pain and ten being high pain, how much pain are you in today?*

Example 2

- What type of measurement is an IQ score?

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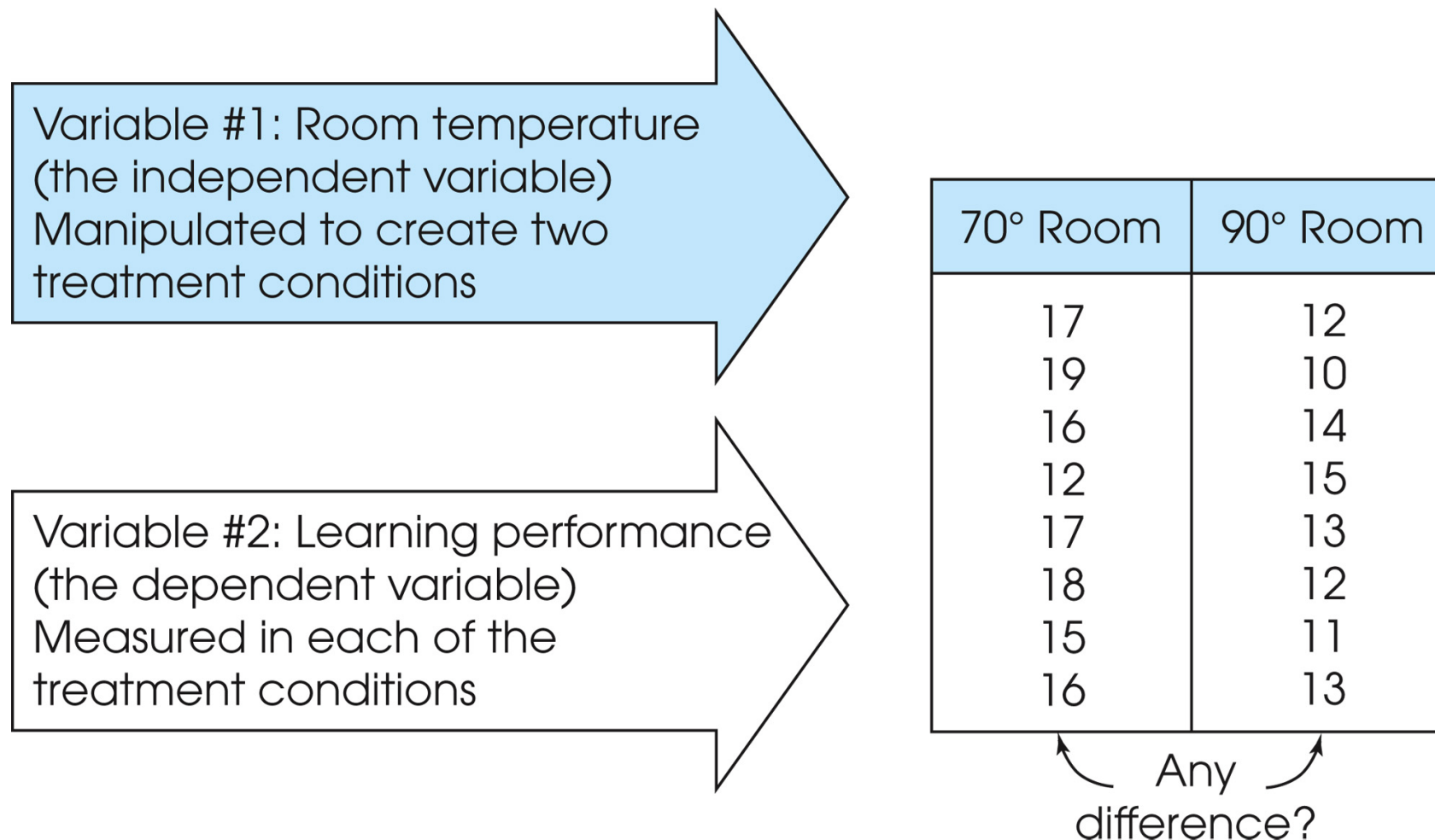
Why does this matter?

- Know your data

Case	Sex	Birth Order	Midterm	Height	Attitude
1	1	3	95	62	4
2	2	1	70	72	3
3	2	1	85	70	5
4	1	1	90	60	3
5	1	2	60	65	3
6	1	4	80	61	2
7	2	3	80	74	1
8	2	2	95	72	5
9	2	2	75	68	5
10	1	1	80	66	3

Types of Variables

- Independent variable — manipulated by the researcher
- Dependent variable — outcome variable that is caused by changes in independent variable



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Reliability

- *Can an instrument be interpreted consistently across different situations?*
- Consistency of scores
 - Across time
 - Across forms/items
 - Across raters

Validity

- *Does an instrument measure what it sets out to measure?*
- Accuracy of scores
 - Content
 - Criterion-related
 - Construct