

PSYCHOLOGICAL MEASUREMENT

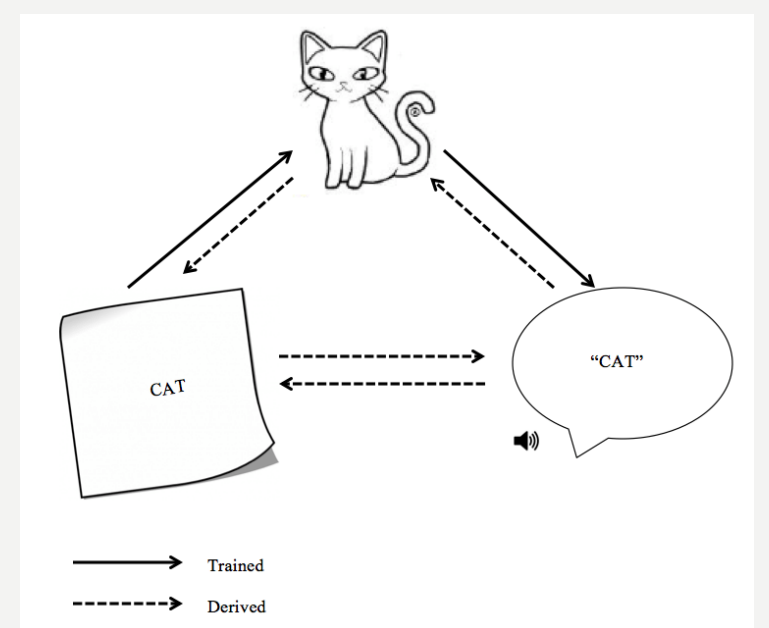
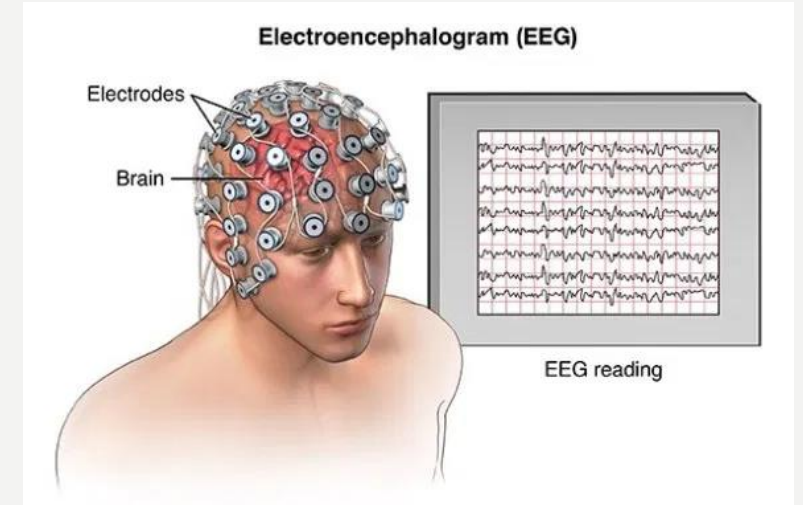
WEEK 4

READING: PP. 85-108 (23 PAGES)

HOW DO WE MEASURE PSYCHOLOGICAL VARIABLES?

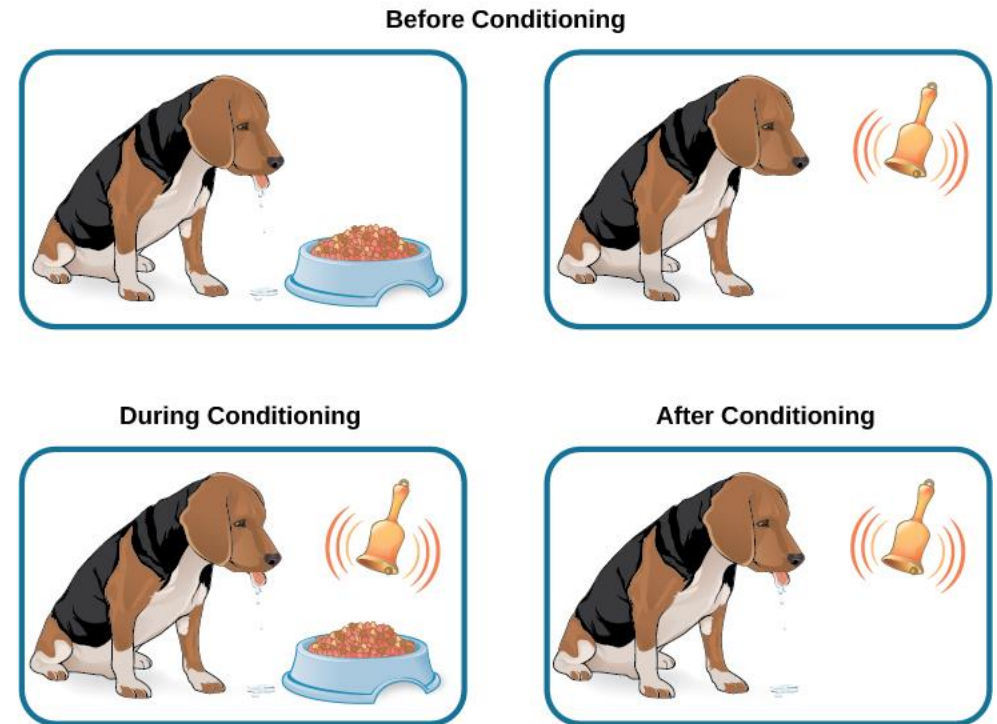
Is it really possible to measure things as intangible as self-esteem, mood, or an intention to do something? (p.85)

Yes! You have to **operationalize** your measure (e.g., the firing pattern of individual neurons, the formation of novel concepts...)



DEFINING PSYCHOLOGICAL MEASUREMENT

- Assigning scores to individual performances (e.g., survey responses, saliva produced, electrical brain activations) to represent some characteristic of which said scores are a metric (e.g., saliva ~ grams).
- Specific procedures (e.g., EEG, surveys) are less important than the *systematicity* of their application (i.e., is the measure consistently and correctly applied?)



PSYCHOLOGICAL CONSTRUCTS

- Some variables can be publicly observed (height, weight, gender).
- Variables that are *private* to the individual in question (personality traits, attitudes, emotional states) and cannot be observed directly must be inferred from observable performances. Private/inferred variables are called **constructs**.

Big Five Dimension	Facets					
Openness to Experience	Fantasy	Aesthetics	Feelings	Actions	Ideas	Values
Conscientiousness	Competence	Order	Dutifulness	Achievement Striving	Self-Discipline	Deliberation
Extraversion	Warmth	Gregariousness	Assertiveness	Activity	Excitement Seeking	Positive Emotions
Agreeableness	Trust	Straight-forwardness	Altruism	Compliance	Modesty	Tender-Mindedness
Neuroticism	Worry	Anger	Discouragement	Self-Consciousness	Impulsivity	Vulnerability

MEASURING CONSTRUCTS

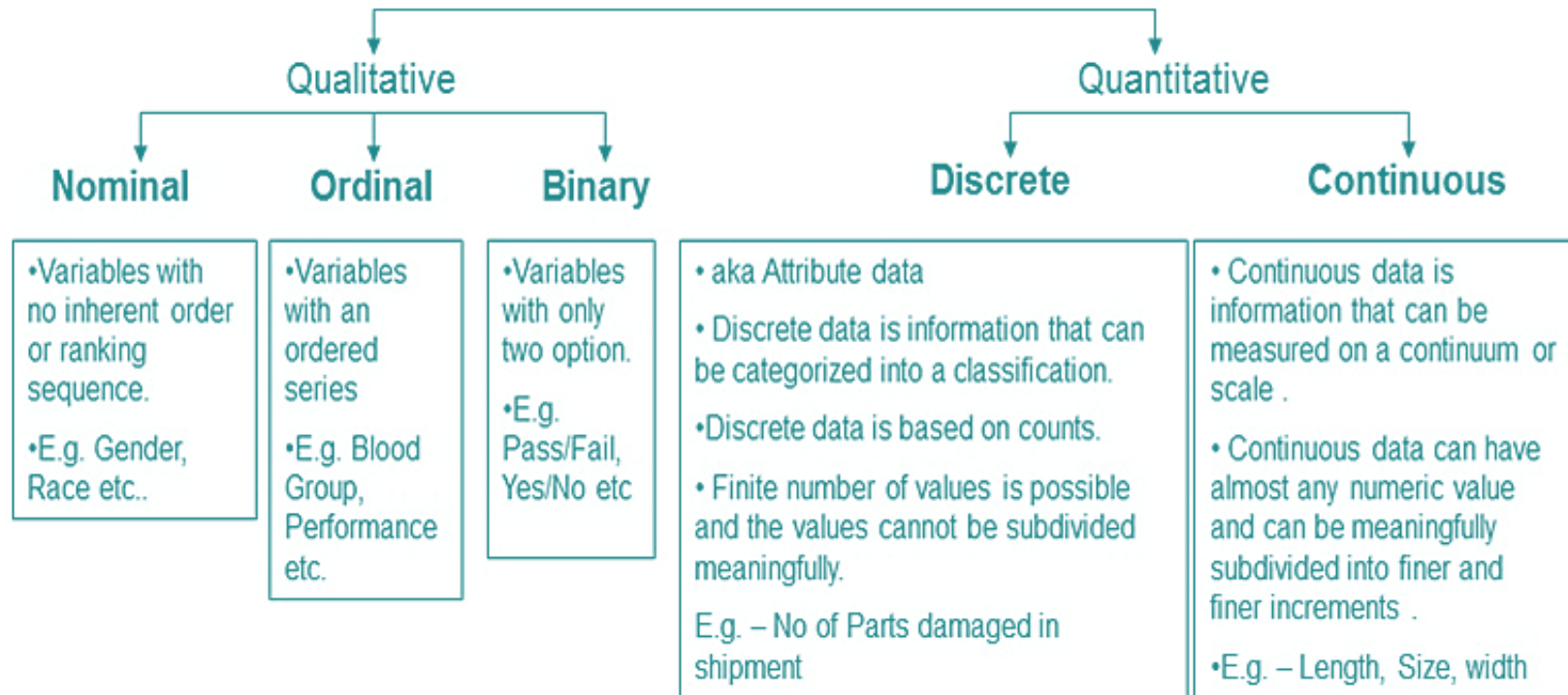
- **Operational definition**
 - **How will you measure your variables of interest?**
 - Multiple operating definitions may refer collectively to a single construct (e.g., appetite, attention)
 - **Converging operations**
- Behavioral
 - Response accuracy, reaction speed, response rate
- Physiological
 - Heart rate variability, brain activity
- Self-report
 - Survey response, visual-analog and Likert scales, evaluations

FOUR LEVELS OF MEASUREMENT

- Nominal
 - Categorical (gender, levels of education, marital status)
- Ordinal
 - Ranking (Likert scales)
 - Insufficient information between ranks (1st vs 2nd is not the same as 2nd vs 3rd)
- Interval
 - Physically meaningful quantities
 - no 'zero' point (all 0's are relative – e.g., 0 Fahrenheit is not 0 Celsius)
- Ratio
 - Meaningful quantities with true 'zero' points (age, height, speed)

Table 4.1 Summary of Levels of Measurements

Level of Measurement	Category labels	Rank order	Equal intervals	True zero
NOMINAL	X			
ORDINAL	X	X		
INTERVAL	X	X	X	
RATIO	X	X	X	X



RELIABILITY AND VALIDITY

- Reliability
 - How *consistent* is the measurement
 - over time? (test-retest reliability) – e.g., *intelligence, personality*
 - across items? (internal consistency) – e.g., *personality tests*
 - across different researchers (inter-rater reliability) – e.g., *different labs*
- Validity
 - Are scores *representative* of the variable measured?
 - Face validity ('head circumference' unlikely to inform about eating habits)
 - Content validity (are all aspects of the target behavior being covered?)
 - Discriminant validity (*not* correlated with conceptually distinct variables)
 - Criterion validity (correlation with other criteria/variables as expected?)
 - Concurrent, Predictive, Convergent

FOUR STEPS TO MEASUREMENT

1. Conceptually defining the construct(s) of interest
 - What is the general category of your interest? (e.g., Memory, Perception, Learning, Emotion, etc)
 - What does the construct *mean* across the relevant research literature?
 - Refine the construct into increasingly specific categories [e.g., Semantic memory, Auditory perception, Symbolic learning, etc]
2. Operationally define the construct(s)
 - How will you measure the construct?
 - Existing measures permit greater reliability and validity than novel measures

FOUR STEPS TO MEASUREMENT

3. Implementing your measure

- Use a quiet, temperature-controlled room with minimal distractions
- Be wary of socially sensitive test items and other **demand characteristics**
- Ensure your collection strategy is replicable and (eventually) standardized

4. Evaluating your measure

- Describe your data (central tendency, dispersion, correlations)
- Analyze the reliability and validity of your measure as required