

# Ch. 13: Clinical & Counseling

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## Ch. 13: Clinical & Counseling

- Settings / Situations
- Test Types
- Test Designs
  - Deductive
    - Logical Content
    - Theoretical
  - Empirical
    - Criterion Group
    - Factor Analysis
- Example tests

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## Clinical and Counseling Settings

- Hospital
  - Inpatient
    - acute
    - long-term
  - Outpatient
- School
  - Counseling (educational)
  - Counseling (psychological)
- Vocational
- Motivational/Performance

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## Types of Tests

- IQ & Achievement
- Personality
  - structured (“objective”)
  - unstructured (“projective”)
- Clinical
  - Diagnostic
    - Depression, Anxiety, etc.
  - Symptom checklists
- Neuropsychological

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## Logical Reasoning

- Deduction
  - premises → conclusion
    - All swans are white
    - Susan is a swan
    - Therefore, Susan is white
- (Empirical) Induction
  - less certain: evidence → probability
  - All of the swans we have seen are white
  - Thus, all swans are probably white

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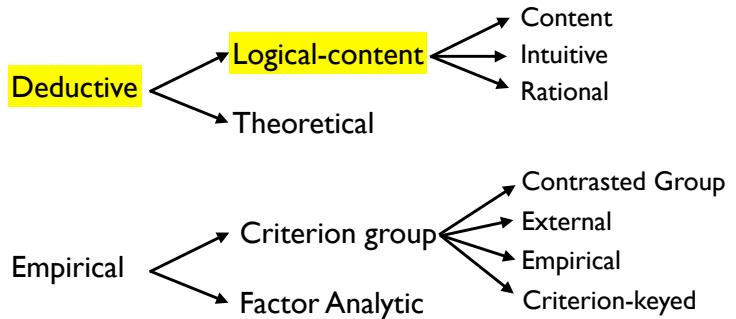
# Design Theories

- Deductive (aka “Top Down” or “Theory-driven”)
  - Use reason, clinical experience and common sense to choose test items that are face-valid.
- Empirical (aka “Bottom-Up” or “Data-driven”)
  - Look for patterns in large groups of data
  - Data tells us what factors exist
  - Don’t assume face validity

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# Design Theories



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## Logical-Content

- Deductive
  - Logical-Content
    - aka “Content approach”, “Intuitive approach”, “Rational approach”
    - straightforward questions
      - e.g. “did you wet the bed last night?”
    - assumes subjects are honest
    - assumes *face validity*
    - Pro: simple
    - Con: simplistic, naive

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## Logical-Content: Woodsworth

- Woodsworth Personal Data Sheet (1920)
  - Developed in WWI to identify soldiers who would fail in combat
  - 116 Yes/No questions
    - “Do you drink a fifth of whiskey a day?”
    - “Do you frequently daydream?”
    - ...
  - All questions are Face valid
    - rarely used today
    - why?

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## Logical-Content: Mooney

- Mooney Problem Checklist (1950)
  - yes/no to many problem items “I’m having trouble with money”
  - All questions face valid
  - Sometimes used today
    - Why?

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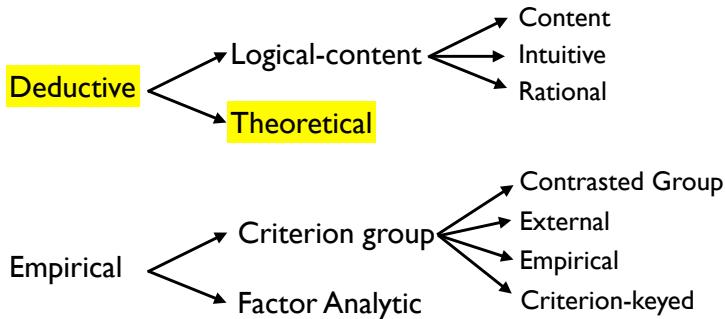
## Criticism : Logical-Content

- Major assumptions:
  - Subjects are being honest
  - Items have one objective interpretation
    - e.g. “I never drink too much alcohol”
  - Assumptions are flawed
  - This design rarely used post 1940

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# Design Theories



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# Theoretical

- Deductive
- Theoretical
  - Theory of constructs (dimensions, factors, facets, etc.) used to create test questions.
- Example (from Freud)
  - Depression =
    - **Anaclitic** (anger at parents)
    - “do you get along with Mom & Dad?”
  - **Introjective** (self loathing)
  - “do you fall short of your goals?”

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# Criticisms of Theoretical Approach

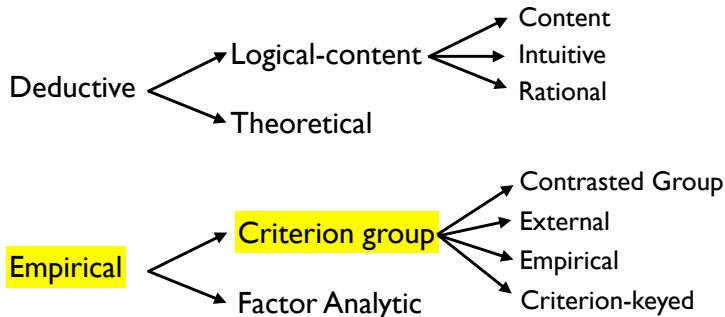
- What evidence that the theory / construct / sub-constructs exist?
- Example:
  - Depression - what theory to use?
  - Psychodynamic?
  - Cognitive?
  - Behavioral?
  - Medical?
  - Social
  - ...

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	Extraversion/ Surgency	Agreeableness	Conscientiousness	Emotional Stability	Intellect/ Openness
<b>Goldberg</b>	Surgency	Agreeableness	Conscientious	Emotional	Intellect
<b>Adler</b>	Superiority		Social Interest		Superiority
<b>Bakan</b>	Agency	Communion			Agency
<b>Bales</b>	Dominant Initiative	Social-Emotional	Task Orientation		
<b>Bartholomew</b>	Model of Other			Model of Self	
<b>Block</b>	Low Ego Control		High Ego	Ego Resiliency	
<b>Buss and</b>	Activity		Impulsivity	Emotionality (r)	
<b>Cattell</b>	Exvia (vs. Invia)	Pathenia (vs. Superego		Adjustment vs.	Independence
<b>Comrey</b>	Extraversion and Femininity		Orderliness	Emotional	Rebelliousness
<b>Costa and</b>	Extraversion	Agreeableness	Conscientious	Neuroticism (r)	Openness
<b>Digman</b>	Beta	Alpha			Beta
<b>Erikson</b>		Basic Trust			
<b>Eysenck</b>	Extraversion		Psychoticism (r)	Neuroticism (r)	
<b>Fiske</b>	Confident Self-	Social	Conformity	Emotional	Inquiring
<b>Freud</b>			Psychosexual Development		
<b>Gough</b>	Extraversion	Consensuality	Control		Flexibility
<b>Guilford</b>	Social Activity	Paranoid	Thinking	Emotional	
<b>Hogan</b>	Ambition and Likeability		Prudence	Adjustment	Intellectance
<b>Horney</b>		Moving Toward			
<b>Jackson</b>	Outgoing, Social	Self-Protective	Work	Dependence (r)	Aesthetic /

# Design Theories



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# Criterion-Group

- Empirical
- Criterion Group
  - aka “Contrasted Group”, “External strategy”...
  - Give test items to a group that has some disease, disorder or diagnosis (e.g. “Schizophrenics”)
  - Compare (contrast) with performance in an “normal” group
  - Items which strongly distinguish the groups are kept.
  - Cross-validate results with other group(s)

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## Criterion-Group Example

Question	Bullies	Non-Bullies
1. It feels good to hurt others	N	N
2. I like watching Boxing	Y	Y
3. I like Hello Kitty	N	Y
4. I am always a good person	Y	Y
5. Other people are weak	Y	N

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## Cross-Validation

- Method of giving a more fair, accurate estimate of reliability by essentially “repeating the study” with new subjects
- Use the prediction equations (formulas) on a “fresh” sample
- Guards against “over fitting” data in the first experiment (e.g. Shrinkage)
- If cross-validation groups differ in demographics, increases generalizability.

## Cross-Validation Example

- Researcher #1 does a study in their hospital showing that Schizophrenic patients say “Yes” to the question “I’m afraid of the color blue” at a much higher rate than control subjects.
- This test item can diagnosis Schizophrenia?
- Researcher #2 attempts to cross-validate this study at a different hospital with a different set of patients and controls, and does not find the same effect.
- Why?

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## Criterion-Group Tests

- Strong Interest Inventory...
- MMPI...
- CPI...

## Strong Interest Inventory

- Select one occupation (“bartender”)
- Two samples
  - Criterion sample: people who are strongly representative (e.g. happy doing normal bartending tasks)
  - General sample: people from other occupations
- Administer test questions to both groups
- Keep only the questions that discriminate
- [Repeat this process for each different occupation...]

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## Criterion-Group Tests

- California Psychological Inventory - 3 (CPI-3)
  - 20 scales
  - focused more on health than illness
  - psychometrics are fair, not great
- Minnesota Multiphasic Personality Inventory
  - Most popular / well researched test
  - Revisions
    - MMPI-2 : 1989; revised norms in 2003; 567 items
    - MMPI-2-RF : 2008 ; shortened to 338 items
  - 10 clinical scales
  - Focused more on psychopathology
  - Good psychometrics

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## MMPI Design

- Goal : detect abnormal psychology
- Subjects: Eight criterion groups (psychiatric inpatients) plus normal\* control group
- Method: Items which contrasted criterion group with normal group, AND which passed cross-validation at  $P < .05$  level were kept.
- Test items were grouped into scales, the scales were named after the criterion group
- Later: additional scales added: Mf and Si

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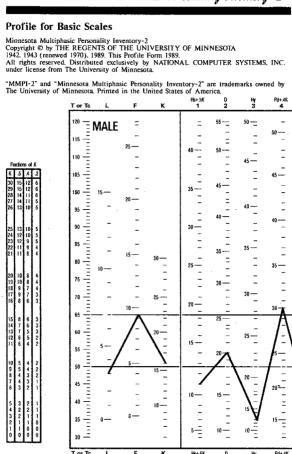
## MMPI-2

- 567 true/false items
- About 2 hours to administer
- Item content appear as face valid statements “I like mechanics magazines”
- Item scoring is not done in face-valid way.
- Each item contributes to one or more Clinical Scales or Content Scales
- Additional Validity Scales attempt to correct for response styles, faking bad or good, etc.
- Scales are normed to T-Scores (mean 50,  $sd = 10$ )

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## MMPI-2



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## MMPI Validity Scales

#	Scale	Name	Interpretation
1	L	Lie scale	naive attempt to fake good
2	F	F scale	“Frequency” scale: attempt to fake bad
3	K	K scale	(sophisticated) defensiveness
4	VRIN	Variable response inconsistency	random responding
5	TRIN	True response inconsistency	“yes” bias

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## MMPI Clinical Scales

#	Scale	Name	Interpretation
1	Hs	Hypochondriasis	physical complaints
2	D	Depression	depression
3	Hy	Hysteria	immaturity
4	Pd	Psychopathic Deviate	authority conflict
5	Mf	Masculinity-Femininity	stereotypic m/f interests
6	Pa	Paranoia	suspicion, hostility
7	Pt	Psychasthenia	anxiety
8	Sc	Schizophrenia	alienation, withdrawal
9	Hy	Hypomania	elevated mood & energy
0	Si	Social Introversion	introversion, shyness

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## MMPI Psychometrics

- Reliability is good but not as high as the best tests (such as IQ tests)
- Test-retest correlations  $r=0.50$  to  $0.90$ , mean  $\sim 0.80$
- Scales poorly designed -- some items on multiple scales  $\rightarrow$  scales are highly intercorrelated
- Questions poorly designed: (all items on the L scale are keyed False)  $\rightarrow$  sensitive to response style
- Scores are correlated to demographics (age, gender, IQ, ethnicity...)

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## MMPI Validity

- Thousands of studies have been done on the MMPI supporting its Construct validity
- Used and researched in a very wide range of subjects, settings, disorders.

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## Criticism : Criterion-Group

- Major assumptions:
  - People/Patients can be grouped, groups show consistent features and are independent
  - Face validity of response is not important, but responses should be consistent
  - Scales can predict membership in criterion group
- Flaws:
  - Criterion group assumes a lot about patterns of behavior. Neglects possible commonalities across groups.
  - Time-consuming and expensive to create tests

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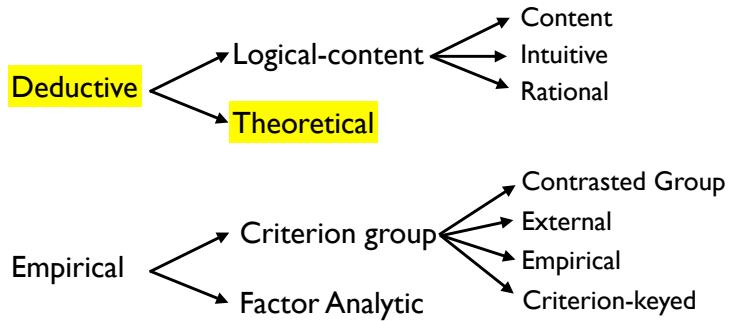
## Project Example: Measuring Depression

- Theory
- Measurement
- Reliability / Validity

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## Design Theories



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## Theory & Construct, Measures

- Theories:
  - Psychodynamic
  - Modern CBT
- Measures
  - BDI-II
  - HAM-D

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## Getting a Review Article

- The Hard Way
  - [library.csusm.edu](http://library.csusm.edu)
  - search PsycINFO for 'depression'
    - about 200,000 hits
  - choose: methodology = literature review
    - about 9000 hits
- Browse through results
- Ouch!

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## Getting a Review Article

- The Easy Way
  - [annualreviews.org](https://annualreviews.org)
  - select Journals / Psychology
  - search for 'Depression / In This Journal'
  - 600 results
  - more relevance

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## Depression : the Construct

- Examples of different theories and ways to define the construct of 'depression'

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## Psychodynamic Theory of Depression

- depression = inverted hostility
- Angry at parents, but parents needed for survival
- "anger turned inward"
- "self hatred"

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## Psychodynamic Theory of Depression

- Subtypes (Factors):
- *Anaclitic depression* : (perceived) loss of relationships one depends on
  - Facets: helpless, fears of abandonment, separation anxiety
- *Introjective depression* : failure to meet own standards (harsh superego)
  - Facets: worthlessness, guilt, feelings of failure

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## Depression-modern theory

- Psychological (Emotional, Cognitive)
- Biological

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## Depression-modern theory

- Psychological
  - depressed mood
  - anhedonia
  - poor concentration
  - ruminations (guilt, worthlessness)
  - suicidal ideation
- Cognitive Triad - negative thoughts:
  - about the world
  - about the future
  - about the self

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## Depression-modern theory

- Biological:
  - weight change: unintentional loss or gain
  - sleep disturbances
  - psychomotor agitation or retardation
  - loss of energy

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## DSM-5 : Major Depressive Episode

- 5 or more for 2 week period, must include (\*)
  - \*Depressed mood most of most days
  - \*Anhedonia
  - Significant weight gain or loss (5%/month)
  - Insomnia/hypersomnia
  - Psychomotor retardation/agitation
  - Fatigue/loss of energy
  - Worthless/guilty feelings
  - Trouble concentrating or indecisiveness
  - Suicidal ideation, plans, attempts

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## Narrow down Topic

- Review Article
  - Field / Subfield
  - Clinical Psychology / Depression
- Refine / choose specific Construct
  - a sub-topic
  - theory
  - method
- Find an Original Research Article

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## Original Research Article

- The hard(er) way:
- PsycINFO
  - search PsycINFO for keywords
  - e.g. “depression” + “stress”
    - 10,000 hits
  - e.g. “depression” + “anaclitic”
    - 150 hits
- *If your construct is narrow, this method may work OK*

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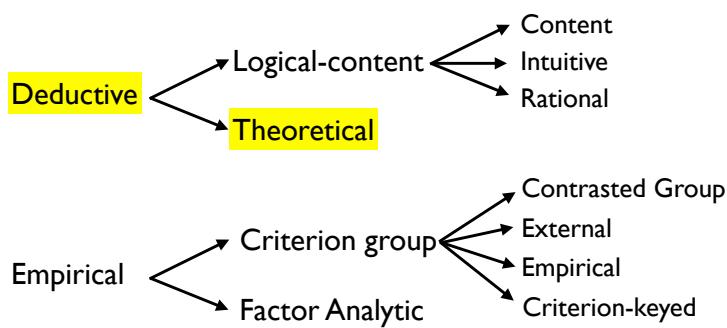
## Original Research Article

- From your Review article, find the discussion of your Sub-Topic / Construct. It will have References
  - many references will be Original Research articles
  - find these articles
- Search for a specific measure of your construct.
- Web search for “self-report measure of \_\_\_\_\_”

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## Design Theories



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# Sample Constructs & Measures

- BDI
- HAM-D (HRSD)

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# Beck Depression Inventory

- Aaron T Beck - Psychiatrist (with cognitive focus)
- BDI (1961), BDI-1A (1976)
- BDI-II (1996) - in response to DSM-IV
- 21 item self report
- 0-3 points per item
- Scoring
  - 0-9 minimal depression
  - 10-18 mild depression
  - 19-29 moderate depression
  - 30-63 severe depression

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## BDI-II

**Roche** | Beck Depression Inventory | CRTN: \_\_\_\_\_ | CRF number: \_\_\_\_\_ | Page 14 | patient initis: \_\_\_\_\_ | Baseline | Date: \_\_\_\_\_

**BDI-II**

Name: \_\_\_\_\_ Marital Status: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: \_\_\_\_\_

Occupation: \_\_\_\_\_ Education: \_\_\_\_\_

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

**1. Sadness**

- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad or unhappy that I can't stand it.

**2. Pessimism**

- 0 I am not discouraged about my future.
- 1 I feel more discouraged about my future than I used to be.
- 2 I do not expect things to work out for me.
- 3 I feel my future is hopeless and will only get worse.

**6. Punishment Feelings**

- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

**7. Self-Dislike**

- 0 I feel the same about myself as ever.
- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

**8. Self-Criticalness**

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## BDI-II Questions

Sadness	Self-Criticalness	Loss of Energy
Pessimism	Suicidal Thoughts	Sleep Changes
Past Failure	Crying	Irritability
Loss of Pleasure	Agitation	Appetite
Guilty Feelings	Loss of Interest	Concentration
Punishment Feelings	Indecisiveness	Fatigue
Self-Dislike	Worthlessness	Interest in Sex

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## BDI-II Psychometrics

- Test-retest:  $r = 0.93$
- Cronbach's Alpha = 0.91
- Correlation with HAM-D :  $r = 0.71$

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## HAM-D aka HRSD

- Hamilton Rating Scale for Depression
- Max Hamilton - Psychiatrist 1912-1988
- 17 item clinician rating
- 0-7 rating for each question
- Scoring:
  - 0-7 : normal
  - 8-13 : Mild
  - 14-18 : Moderate
  - 19-22 : Severe
  - 23+ : Very Severe

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# HAM-D

## Hamilton Depression Rating Scale (HDRS)

PLEASE COMPLETE THE SCALE BASED ON A STRUCTURED INTERVIEW

Instructions: for each item select the one "cue" which best characterizes the patient. Be sure to record the answers in the appropriate spaces (positions 0 through 4).

**1 DEPRESSED MOOD** (sadness, hopeless, helpless, worthless)

- 0  Absent.
- 1  These feeling states indicated only on questioning.
- 2  These feeling states spontaneously reported verbally.
- 3  Communicates feeling states non-verbally, i.e. through facial expression, posture, voice and tendency to weep.
- 4  Patient reports virtually only these feeling states in his/her spontaneous verbal and non-verbal communication.

**2 FEELINGS OF GUILT**

- 0  Absent.
- 1  Self reproach, feels he/she has let people down.
- 2  Ideas of guilt or rumination over past errors or sinful deeds.
- 3  Present illness is a punishment. Delusions of guilt.
- 4  Hears accusatory or denunciatory voices and/or experiences threatening visual hallucinations.

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# HAM-D Questions

Depressed Mood	Retardation	Hypochondriasis
Feelings of Guilt	Agitation	Weight Loss
Suicide	Anxiety: Psychic	Insight
Insomnia: Early	Anxiety: Somatic	
Insomnia: Middle	Appetite	
Insomnia: Late	General Somatic Sx	
Work/Activities	Genital Symptoms	

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# HAM-D Psychometrics

- Often considered the “Gold Standard”
- Criticized for not being “Gold Standard”
- Bagby, Ryder et al (2004)
  - Pros:
    - test-retest:  $r = 0.81$  to  $0.98$
    - Cronbach’s alpha:  $r = 0.48$  to  $0.92$
    - inter-rater:  $r = 0.65$  to  $0.98$

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# HAM-D Psychometrics

- Cons:
  - poor item characteristics
  - “Most of the items still measure multiple constructs, items that have consistently been shown to be ineffective have been retained, and the scoring system still includes differential weighting of items...”

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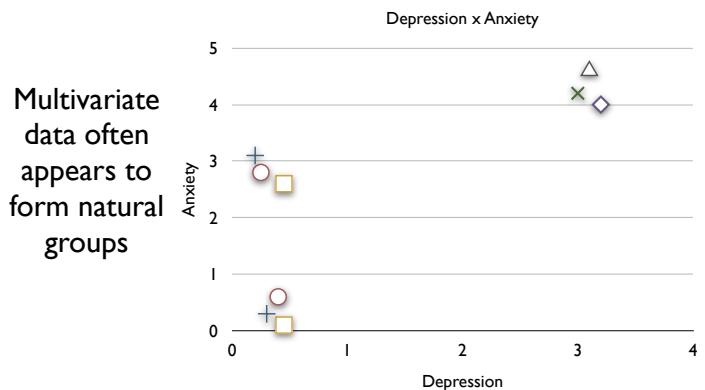
# Factors?

- What if you don’t know what the factors are?

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# Empirical Analysis

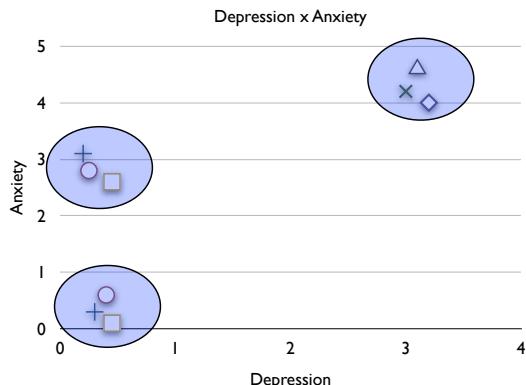


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## Empirical Analysis

“Natural” groupings in data are determined statistically

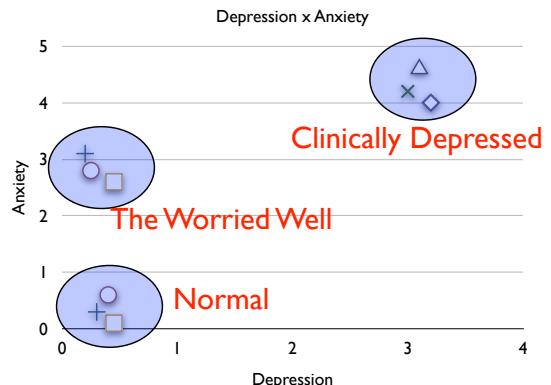


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## Empirical Analysis

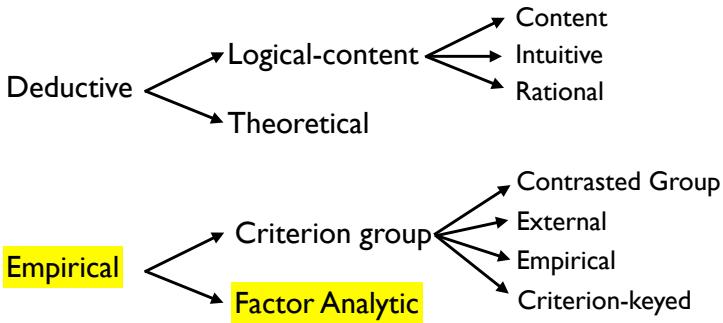
Groups are then named using logical/ content analysis



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## Review : Design Theories



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## Factor-Analytic

- Empirical
- Factor-Analytic
  - Ignore face-validity, content-validity or criterion-group
  - Look for natural patterns in the data
  - Assume patterns are meaningful (not random)
  - Reduce redundant variables
  - Examine the content, name the factors

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## Factor Analysis

- Patterns within correlation matrix
- Compute *Factors* which account for maximum variance
- Factors: How many? Naming them?

Correlation Matrix

Measure	Factor 1	Factor 2
Love	<b>0.75</b>	0.17
Like	<b>0.87</b>	0.05
IQ	-0.02	<b>0.65</b>
GPA	0.10	<b>0.91</b>

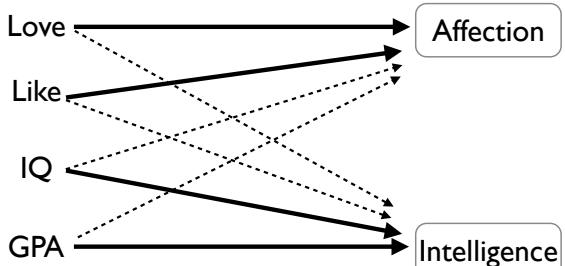
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## Validity & Factor Analysis

- Convergent Validity : strong correlation
- Divergent Validity: weak correlation

### Measurement



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# Factor Analytic Tests

- 16PF...
- Big 5...
- NEO...

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# Factor-Analytic : 16PF

- Cattell's 16 Personality Factor Questionnaire (16PF)
- 4504 traits chosen from dictionary, reduced to 171 traits.
- These 171 items given to college students
- Factor Analysis reduced these to 16 distinct factors (with 4-5 higher factors)
- Extensive norms for age, gender, reading level, etc.
- Similar test available for adolescents and children

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# 16PF Factors

Scale	Name	Low	High
A	Warmth	cool, reserved	warm, outgoing
B	Reasoning	concrete, dull	abstract, bright
C	Emotional Stability	affected by feelings	emotionally stable
E	Dominance	submissive, humble	dominant, assertive
F	Liveliness	sober, restrained	enthusiastic, spontaneous
G	Rule-Consciousness	expedient, indulgent	conscientious, conforming
H	Social Boldness	shy, timid	bold, venturesome
I	Sensitivity	tough-minded	tender-minded, sensitive
L	Vigilance	trusting, easy going	suspicious, skeptical
M	Abstractedness	practical, down to earth	imaginative, absent-minded
N	Privateness	forthright, genuine	shrewd, calculating
O	Apprehension	self-assured, secure	apprehensive, insecure
Q1	Openness to Change	conservative, traditional	experimenting, liberal
Q2	Self-Reliance	group-oriented, joiner	self-sufficient, resourceful
Q3	Perfectionism	undisciplined, lax	controlled, compulsive
Q4	Tension	relaxed, tranquil	tense, frustrated

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# Criticism : Factor-Analytic

- Major assumptions:
  - Data patterns (factors) are stable
  - Factors can be named from question content
- Flaws:
  - Factor analysis allows multiple solutions
  - # of factors is arbitrary (16 or 5 or 4?)
  - Naming factors : face-valid examination of data

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# Factor-Analysis

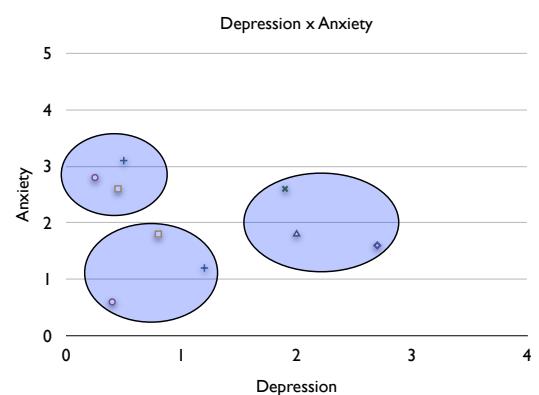
- MMPI-2 has 10 scales
- Factor analysis of MMPI-2 suggests only 2 major factors:
  - “positive affectivity”
  - “negative affectivity”
- How many factors are there really?

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# Factor Analysis

# of groups, and group boundaries can be arbitrary

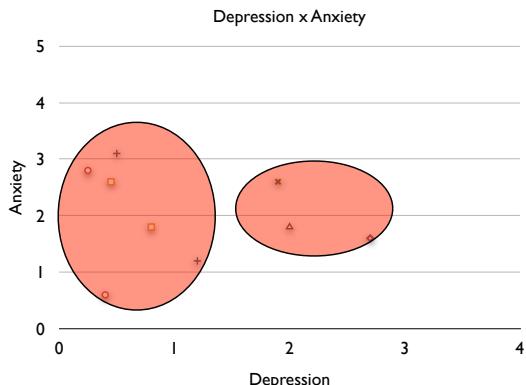


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## Factor Analysis

3 groups?  
Or only two?



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## The “Big 5”

- Many researchers find 3 to 5 personality factors a good balance
- The 16PF factors reduce to 4 (or 5) bigger factors

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## Big 5 Personality Factors

Scale	Description
N	Neuroticism
E	Extraversion
O	Openness to experience
A	Agreeableness
C	Conscientiousness

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## NEO Personality Inventory

- MMPI : psychopathology in abnormal subjects
- NEO: “positive psychology” - health & style in normal subjects
- Versions
  - NEO : 3 factors (N,E,O)
  - NEO-PI: 5 factors (N,E,O, A,C)
  - NEO-PI-R
  - NEO-FFI (60-item version of NEO-PI-R)
  - NEO-PI-3
  - NEO-FFI-3 (*the version you took*)
  - The NEO Five-Factor Inventory-3: Four-Factor Version (NEO-FFI-3:4FV)

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## NEO Facets

Scale	Description	Facets						
		anxiety	hostility	depression	self-consciousness	impulsive-ness	vulnerability to stress	
N	Neuroticism							
E	Extraversion	warmth	gregarious-ness	assertiveness	activity	excitement-seeking	positive emotion	
O	Openness to experience	fantasy	aesthetics	feelings	actions	ideas	values	
A	Agreeableness	trust	straight-forwardness	altruism	compliance	modesty	tender-mindedness	
C	Conscientiousness	compe-tence	order	dutifulness	achieve-ment striving	self-discipline	delibera-tion	

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## NEO Facets - Detail

### Facets of the Big Five

NEO PI-R Facet	IPIP Scale Name	High/low example items fr
<b>Conscientiousness</b>		
Competence	Self-efficacy	complete tasks successfully/r
Order	Orderliness	like order/leave a mess
Dutifulness	Dutifulness	follow the rules/break rules
Achievement-striving	Achievement-striving	work hard/do just enough to
Self-discipline	Self-discipline	get chores done right away/w
Deliberation	Cautiousness	avoid mistakes/rush into things

Neuroticism (Emotional Stability)

## NEO-FFI-3 Scoring

- For each column (N,E,O,A,C), circle the RAW score.
- The T-score is then on the very left

Female					
T	N	E	O	A	C
≥75	≥42	≥45	≥45	48	
74	41	44	44		
73	40	43		47	48
72			43	46	47
71	39	42			
70	38			45	46
69	37	41			45
68		40		44	
67	36		40		44
66	35	39	39	43	43

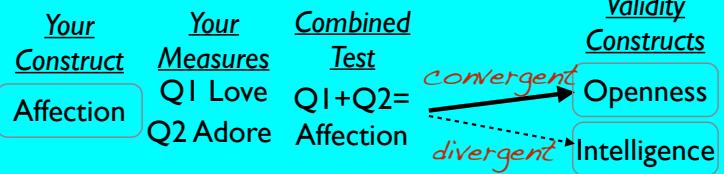
T-score

Raw Score

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## Project Proposal



You create these

These are already on the Survey

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## Project Proposal : FAQ - Part 1

- Articles : 1 Review, 1 Research
  - Review article doesn't have to be [AnnualReviews.org](https://www.annualreviews.org)
- Your construct
  - does not have to have Cog, Emo, Bio dimensions (like my *Anxiety* example)
  - 2 test items (must be same *construct* but should measure two different *factors* of the construct)
- Measuring Reliability
  - which type?

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## Project Proposal : FAQ - Part 2

- Measuring Reliability?
- Anxiety
- Factor 1: *cognitive anxiety*
  - I can't stop obsessing about bad things that might happen in the future. Rating scale: 1 (never) to 10 (always)
- Factor 2: *physical anxiety*
  - When I worry, I feel my heart racing. Likert: SA, A, N, D, SD

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## Reliability: errors & methods

	Description	Name	Statistic
Time Sampling	1 test given two times	test-retest reliability	correlation between scores at two times
Item Sampling	2 different tests given once	Alternate or Parallel forms	correlation between scores on 2 versions
Internal Consistency	One test, multiple items	Split Half or internal reliability	Cronbach's Alpha
Observer Differences	One test w/ 2+ observers	inter-observer reliability	Kappa

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## Project Proposal : FAQ - Part 3

- Increasing Reliability
  - Add scores together to make combined score
  - Reverse coding?

(1) I am not a worrier

(6) At time I have felt bitter and resentful

1	4	3	2	1	0
6	0	1	2	3	4
11	0	1	2	3	4
16	4	3	2	1	0

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## Project Proposal : FAQ - Part 4

- Validity: Convergent & Divergent
  - you pick 2 other constructs
  - already on survey (GPA, NEO-FFI factors)
  - or... work with another student
- Convergent
  - should correlate strongly (+ or -) with your combined measure
- Divergent
  - should not correlate at all (close to zero)