Psychology 371: Personality Research

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Northwestern University
Spring, 2014

personality-project.org/revelle/syllabi/371.syllabus.html
Personality Research

• “All people are the same, some people are the same, no person is the same”. (Kluckhohn and Murray, 1948)
  • How and why people differ.
  • Descriptive and causal taxonomies
• “Whatever exists at all exists in some amount. To know it thoroughly involves knowing its quantity as well as its quality” (E.L. Thorndike, 1918)
  • How does personality measurement work?
  • Applications of personality measurement.
Personality Research: Goals

• To acquire an appreciation of current research in personality including taxonomic, biological, and cognitive approaches.
• To acquire an understanding of the ways in which personality may be measured using current psychometric techniques.
• To conduct original research in personality.
Personality Research: Requirements

1. Research proposal reviewing relevant prior research and proposing to answer a theoretical question. (May 21st)

2. A mid term exam covering the theories of personality and methods of research discussed in class and in readings. (April 30)

3. A final research project reviewing the relevant literature, experimentally testing a hypothesis, and discussing the implications of the results. Done as a small group project. Individually graded. (June 11)

4. A final exam (optional-- June 1).
Personality Research: Readings

• Readings will be assigned from relevant journals and texts. Most of these will be web accessible.

• Check the syllabus and the associated outline on the web for handouts, course notes, and additional readings. These will be updated at least once a week. The final version of class handouts will become available late in the evening before class.
Personality Research: Syllabus

I. Introduction to personality research
   A. Place of personality in psychology
   B. 5 Basic Questions

II. Descriptive taxonomies

III. Causal models of personality

IV. Psychometric theory

V. Other current research techniques
## Two Disciplines of Psychological Research

(Cronbach, 1957, 1975; Eysenck, 1966, 1997; Revelle and Oehlberg, 2008)

<table>
<thead>
<tr>
<th>B=f(Personality)</th>
<th>B=f(P*E)</th>
<th>B=f(Environment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galton</td>
<td>Fechner, Weber, Wundt</td>
<td></td>
</tr>
<tr>
<td>Binet, Terman</td>
<td>Watson, Thorndike</td>
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<tr>
<td>Allport, Burt</td>
<td>Lewin</td>
<td>Hull, Tolman</td>
</tr>
<tr>
<td>Cattell</td>
<td>Atkinson, Eysenck</td>
<td>Spence, Skinner</td>
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<tr>
<td>Norman, Epstein, Goldberg, Costa &amp; McCrae</td>
<td>Mischel Cervone</td>
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### Two Disciplines of Psychological Research

<table>
<thead>
<tr>
<th>Method/Model</th>
<th>B=f(Person)</th>
<th>B=f(Environment)</th>
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<tbody>
<tr>
<td>Correlational</td>
<td>Correlational</td>
<td>Experimental</td>
</tr>
<tr>
<td>Observational</td>
<td>Observational</td>
<td>Causal</td>
</tr>
<tr>
<td>Biological/field</td>
<td>Biological/field</td>
<td>Physical/lab</td>
</tr>
<tr>
<td>Statistics</td>
<td>Mean</td>
<td>Central Tendency</td>
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<tr>
<td>Variance</td>
<td>Variance</td>
<td>t-test, F test</td>
</tr>
<tr>
<td>Dispersion</td>
<td>Dispersion</td>
<td></td>
</tr>
<tr>
<td>Correlation/ Covariance</td>
<td>Correlation/ Covariance</td>
<td></td>
</tr>
<tr>
<td>Effects</td>
<td>Individuals</td>
<td>Situations</td>
</tr>
<tr>
<td>Individuals</td>
<td>Individuals</td>
<td>General Laws</td>
</tr>
<tr>
<td>Individual Differences</td>
<td>Individual Differences</td>
<td></td>
</tr>
<tr>
<td>B=f(P,E)</td>
<td>Effect of individual in an environment</td>
<td></td>
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<tr>
<td>Multivariate Experimental Psychology</td>
<td>Multivariate Experimental Psychology</td>
<td></td>
</tr>
</tbody>
</table>
Experimental Personality Research involves theory, measurement and experimental technique.
Experimental Personality Research involves theory, measurement and experimental technique.
Experimental Personality Research involves theory, measurement and experimental technique.
Theory and Theory Testing I: Theory

Construct 1 → Construct 2
Theory and Theory Testing II: Experimental manipulation
Theory and Theory Testing III: Correlational inference

Construct 1 <- ? <- ? <- Construct 2

Observation 1 <- ? <- ? <- Observation 2

$r_{oo}$
Theory and Theory Testing IV: Correlational inference

Construct X

Construct 1

Construct 2

Observation 1

Observation 2

\( r_{oo} \)
Theory and Theory Testing V: Alternative Explanations

Construct 1 <-> Construct 2

 Observation 1 <-> Observation 2

?
Individual differences and general laws

- Impulsivity
- Arousal
- Attention
- Working Memory
- Reaction Time
- GREs
- Memory Span
- Caffeine
Theory and Theory Testing VI: Eliminate Alternative Explanations

Construct 1

Construct 2

Observation 1

Observation 2
Types of Relationships

(Vale and Vale, 1969)

- Behavior = f(Situation)
- Behavior = f₁(Situation) + f₂(Personality)
- Behavior = f₁(Situation) + f₂(Personality) + f₃(Situation*Personality)
- Behavior = f₁(Situation * Personality)
- Behavior = idiosyncratic
Types of Relationships: \( \text{Behavior} = f(\text{Situation}) \)

- Environmental Input
- Behavioral Output

Neuronal excitation = \( f(\text{light intensity}) \)
Types of Relationships: 
Behavior = f₁(Situation) + f₂(Person)

Environmental Input (income) 
Probability of college = f₁(income) + f₂(ability)
Types of Relationships:
Behavior = f1(Situation) + f2(Personality) + f3(Situation*Personality)

Avoidance = f1(shock intensity) + f2(anxiety) + f3(shock*anxiety)

Reading = f1(sesame street) = f2(ability) + f3(ss * ability)
Types of Relationships:
Behavior = f(Situation*Person)

- Eating = f(preload * restraint)
- GRE = f(caffeine * impulsivity)

Diagram shows the relationship between environmental input and behavioral output, with 'Low' and 'High' labels.
Types of Relationships:
Behavior = f(Situation*Person)

Environmental Input

Behavioral Output

Low

High

GRE = f(caffeine * impulsivity)
Persons, Situations, and Theory

External stimulation -> Arousal -> Performance

Individual Difference

Arousal

External stimulation ->

Observed relationship

General Law

Performance

Arousal -> 25
Place of personality in psychology

- The study of personality is the core discipline of psychology
- Personality is the coherent patterning of affect, behavior, cognition and desire (ABCD)
- Five meta questions asked by personality research
- Two approaches to the field (descriptive vs. causal)
- Personality is the integration of multiple (brain) systems
Personality is the core discipline of psychology
Personality is the coherent patterning of affect, behavior, cognition and desire

- Personality: Stability and Change
  - How do we recognize an old friend?
  - Are we the same person we were 10 years ago?
  - Are we the same person we will be in 10 years?
Personality: the temporal coherence of affect, behavior, cognition and desire

- Personality as music: Recognizing a person is like recognizing a tune

- Recognition of an old tune
  - Notes may be different but if the pattern of notes is the same, it is the same tune
    - Melody
    - Rhythm
    - Lyrics

- Familiarity of an old friend
  - A person’s recognizable signature is the pattern of
    - Affect
    - Behavior
    - Cognition
    - Desire

- Emotion is to Personality as weather is to climate
  - Emotion is what you see, personality is what you expect
Personality: the temporal coherence of affect, behavior, cognition and desire

Five questions about personality

1. Generality across situations
2. Stability across time
3. Functioning (adaptive vs. maladaptive)
4. Causality (biological/nature + environmental/nature)
5. Application (does it make any difference)
## Dimensions of Explanation and Analysis

<table>
<thead>
<tr>
<th>Generality</th>
<th>Species Typical</th>
<th>Individual Differences</th>
<th>Uniqueness</th>
</tr>
</thead>
<tbody>
<tr>
<td>All people are the same</td>
<td>Some People are the same</td>
<td>No person is the same</td>
<td></td>
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</table>

### Stability

<table>
<thead>
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<th>Species Typical</th>
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<td></td>
</tr>
</tbody>
</table>

### Causality

- Genetic predispositions
- Evolutionary selection
- Biological substrates and constraints
- Development: Learning and Experience
- Cognitive Affective Structures
- Life Meaning/Identity

### Functioning

- Adaptive
- Maladaptive

### Application

- Formal Models
- Direct Application

### Formal Models

- Stability: $10^{-3}$, $10^{-2}$, $10^{-1}$, $10^0$, $10^1$, $10^2$, $10^3$, $10^4$, $10^5$, $10^6$, $10^7$, $10^8$, $10^9$ (sec)
Personality: the temporal dimension

Stability across $10^x$ sec

<table>
<thead>
<tr>
<th>$10^{-3}$</th>
<th>$10^{-2}$</th>
<th>$10^{-1}$</th>
<th>$10^0$</th>
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<th>$10^2$</th>
<th>$10^3$</th>
<th>$10^4$</th>
<th>$10^5$</th>
<th>$10^6$</th>
<th>$10^7$</th>
<th>$10^8$</th>
<th>$10^9$</th>
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<td>0.001</td>
<td>0.01</td>
<td>0.1</td>
<td>1</td>
<td>10</td>
<td>100</td>
<td>1000</td>
<td>10000</td>
<td>100000</td>
<td>1000000</td>
<td>1000000</td>
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</tbody>
</table>

Conventional units

| 1 | 10 | 100 | 1 | 10 | ≈2 | 20 | ≈3 | ≈1 | 11 | 4 | 3 | 32 |
| ms | sec | min | hour | days | months | years |

Phenomena

- Cognitive/Linguistic processing
- Emotional reactions
- Mood states
- Diurnal rhythms
- Monthly Seasonal rhythms
- Life Story
Personality Research: Generality x Levels of Analysis

• Generality
  – All people are the same -- species typical
  – Some people are the same -- individual differences
  – No person is the same-- individual uniqueness

• Levels of analysis
  – Genetic substrate
  – Physiological systems
  – Learning and Experience
  – Cognitive-Emotional structures
  – Life meaning and identity
A conceptual organization of personality theory and research

<table>
<thead>
<tr>
<th>Levels of analysis</th>
<th>Life meaning/identity</th>
<th>Cognitive-affective structures</th>
<th>Learning and experience</th>
<th>Biological substrates and constraints</th>
<th>Genetic predisposition/evolutionary selection</th>
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<td></td>
<td>identity</td>
<td>ego ideal</td>
<td>adjustment - well being</td>
<td>proprium self concept possible selves</td>
<td>narrative structure</td>
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<tr>
<td></td>
<td>ego/superego</td>
<td>secondary process</td>
<td>life satisfaction</td>
<td>self schemas personal constructs</td>
<td>narrative content</td>
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<td></td>
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<td>primary process</td>
<td>intelligence</td>
<td>conscious awareness</td>
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<td></td>
<td></td>
<td></td>
<td>interpersonal skills</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>motivational direction</td>
<td></td>
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<td></td>
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<td></td>
<td>dimensions of affect</td>
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<td></td>
<td></td>
<td></td>
<td>motivational intensity</td>
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<td></td>
<td>gratification</td>
<td>fixation</td>
<td>schedules of reinforcement</td>
<td></td>
<td>childhood experiences</td>
</tr>
<tr>
<td></td>
<td>reproductive</td>
<td>fitness and sexual drive</td>
<td>differential sensitivities</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>temperament</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>evolution of species typical behaviors</td>
<td>c.n.s. and CNS</td>
<td>b.i.s./b.a.s./f.f.s</td>
<td>5-h/t/da/gaba</td>
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Levels of generality: from the species to the individual
Multiple approaches to personality

1. Psychology of the individual
   1. Consistency and change in the life of a person
   2. Coherence over situations and time

2. Individual differences
   1. How many dimensions are needed?
   2. What are they?

3. Stability of individual differences over time
   Does knowing about individuals in one situation predict anything about other situations?
Multiple approaches to personality

1. Psychology of the individual
   1. Consistency and change in the life of a person
   2. Coherence over situations and time

2. Individual differences
   1. How many dimensions are needed?
   2. What are they?

3. Stability of individual differences over time
   • Does knowing about individuals in one situation predict anything about other situations?
Personality Consistency: the power of the situation

Evocative situations reduce Individual Differences
Inhibitory situations reduce Individual Differences
Moderate situations enhance Individual Differences
Coherency of individual differences: the example of time of day and positive affect

Low impulsive, “larks”  High impulsive, “owls”
Conley’s meta analysis of personality stability

Year to year correlations (correcting for initial reliability) = .98

<table>
<thead>
<tr>
<th>Years</th>
<th>Consistency</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>.98</td>
</tr>
<tr>
<td>5</td>
<td>.90</td>
</tr>
<tr>
<td>10</td>
<td>.82</td>
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<td>20</td>
<td>.67</td>
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<tr>
<td>30</td>
<td>.55</td>
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<tr>
<td>40</td>
<td>.45</td>
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</table>
Early Personality Research

I. Gideon
II. Plato
III. Theophrastus
IV. Hippocrates/Galen
V. Galton/Wundt/Heymans
Gideon, master methodologist

I. introduced the within subjects design

II. recognized the power of cross over interactions

III. was not afraid of asking hard questions
Gideon's tests for God are an early example of a double dissociation and probably the first published example of a cross over interaction. On the first night, the wool was wet but the floor was dry. On the second night, the floor was wet but the wool was dry (Judges 6:36-40)
Gideon and assessment

I. The problem: 32,000 volunteers were too many for purpose

II. Solution: Sequential Affective and Cognitive Assessment

A) 10,000 passed the affective test (step back if you are afraid)

B) 300 passed the cognitive assessment (lapping water like a dog showing battlefield skill)
Gideon’s assessment technique
Plato’s contribution to psychometrics and personality assessment
Plato’s contribution to psychometrics and assessment

I. True Score theory

II. The Allegory of the Cave and latent variable analysis

III. The Republic: leadership effectiveness and the Giant 3: the role of intelligence, anxiety and impulsivity
Plato and latent variables: The allegory of the cave

Suppose that there is a group of human beings who have lived their entire lives trapped in a subterranean chamber lit by a large fire behind them. Chained in place, these cave-dwellers can see nothing but shadows (of their own bodies and of other things) projected on a flat wall in front of them. Some of these people will be content to do no more than notice the play of light and shadow, while the more clever among them will become highly skilled observers of the patterns that most regularly occur. In both cases, however, they cannot truly comprehend what they see, since they are prevented from grasping its true source and nature. (Republic 514a)
Plato and leadership

“... quick intelligence, memory, sagacity, cleverness, and similar qualities, do not often grow together, and that persons who possess them and are at the same time high-spirited and magnanimous are not so constituted by nature as to live orderly and in a peaceful and settled manner; they are driven any way by their impulses, and all solid principle goes out of them.

On the other hand, those steadfast natures which can better be depended upon, which in a battle are impregnable to fear and immovable, are equally immovable when there is anything to be learned; they are always in a torpid state, and are apt to yawn and go to sleep over any intellectual toil.

And yet we were saying that both qualities were necessary in those to whom the higher education is to be imparted, and who are to share in any office or command.

And will they be a class which is rarely found?

Then the aspirant must not only be tested in those labours and dangers and pleasures which we mentioned before, but there is another kind of probation which we did not mention--he must be exercised also in many kinds of knowledge, to see whether the soul will be able to endure the highest of all, or will faint under them, as in any other studies and exercises.”
Tyrtamus of Lesbos (Theophrastus) biological taxonomist and taxonomist of character
Theophrastus: behavior genetics and taxonomic theory

“Often before now have I applied my thoughts to the puzzling question -- one, probably, which will puzzle me for ever -- why it is that, while all Greece lies under the same sky and all the Greeks are educated alike, it has befallen us to have characters so variously constituted.”
Theophrastus, Chaucer and personality taxonomy

I. Theophrastus and the characters
II. Chaucer and the Canterbury Tales
# Theophrastus meets Goldberg

<table>
<thead>
<tr>
<th>Extraversion</th>
<th>Agreeableness</th>
<th>Conscientious</th>
<th>Neuroticism</th>
<th>Openness</th>
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</thead>
<tbody>
<tr>
<td>Talkative</td>
<td>Sympathetic</td>
<td>Organized</td>
<td>Tense</td>
<td>Wide Interests</td>
</tr>
<tr>
<td>Assertive</td>
<td>Kind</td>
<td>Thorough</td>
<td>Anxious</td>
<td>Imaginative</td>
</tr>
<tr>
<td>Active</td>
<td>Appreciative</td>
<td>Planful</td>
<td>Nervous</td>
<td>Intelligent</td>
</tr>
<tr>
<td>Energetic</td>
<td>Affectionate</td>
<td>Efficient</td>
<td>Moody</td>
<td>Original</td>
</tr>
<tr>
<td>-Quiet</td>
<td>-Cold</td>
<td>-Careless</td>
<td>-Stable</td>
<td>-Commonplace</td>
</tr>
<tr>
<td>-Reserved</td>
<td>-Unfriendly</td>
<td>-Disorderly</td>
<td>-Calm</td>
<td>-Simple</td>
</tr>
<tr>
<td>Talker</td>
<td>Anxious to please</td>
<td>-Hostile</td>
<td>Coward</td>
<td>-Stupid</td>
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<tr>
<td>Chatty</td>
<td>Flatterer</td>
<td>-Shameless</td>
<td>Grumbler</td>
<td>-Superstitious</td>
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<tr>
<td>Boastful</td>
<td>-Unpleasant</td>
<td>-Distrustful</td>
<td>Mean</td>
<td>-Boor</td>
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<td>Arrogant</td>
<td>-Outcast</td>
<td>-Avaricious</td>
<td>Unseasonable</td>
<td>-Gross</td>
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</tbody>
</table>

Goldberg, L. (1990); John, O. (1990); Theophrastus (372-287 BCE)
The biological basis of individual differences

I. Plato and the 3 domains of psychological research
   A) Reason and the brain
   B) Emotion and the heart
   C) Desire and the liver

II. Hippocrates/Galen and theories of temperament
Galen of Pergamum
4 temperaments of Galen/Kant

a recurring taxonomy

<table>
<thead>
<tr>
<th>“element”</th>
<th>Physiological basis</th>
<th>Temperament</th>
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<tbody>
<tr>
<td>Fire</td>
<td>Yellow Bile</td>
<td>Choleric</td>
</tr>
<tr>
<td>Water</td>
<td>Phlegm</td>
<td>Phlegmatic</td>
</tr>
<tr>
<td>Air</td>
<td>Blood</td>
<td>Sanguine</td>
</tr>
<tr>
<td>Earth</td>
<td>Black Bile</td>
<td>Melancholic</td>
</tr>
</tbody>
</table>
Multiple representations of the 4 temperaments
Astrology and the four temperaments

Season

Winter

Spring

Temperament

Phlegmatic

Sanguine

Melancholic

Choleric

Humour

Blood

Phlegm

Yellow Bile

Black Bile

Element

Earth

Fire

Water

Air

Dry

Cold

Wet

Hot

Astrology and the four temperaments

Summer

Autumn
Interest in the 4 temperaments continues today (c.f. wiki)
Wundt’s dimensional analysis

<table>
<thead>
<tr>
<th>Exciteability</th>
<th>Changeability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melancholic</td>
<td>Choleric</td>
</tr>
<tr>
<td>Phlegmatic</td>
<td>Sanguine</td>
</tr>
</tbody>
</table>
Eysenck’s dimensional organization

Melancholic  Choleric

Phlegmatic  Sanguine
Individual differences come of age:
Measurement and experiments

I. Francis Galton and regression
II. Wilhelm Wundt and experimental methods
Francis Galton
1822-1911

- Study of Hereditary Genius
- Regression
- Individual Differences
Galton and Regression

Plate IX.

RATE OF REGRESSION IN HEREDITARY STATURE.

Fig. (a)

The Deviates of the Children are to those of their Mid-Parents as 2 to 3.

When Mid-Parents are taller than mediocrity, their Children tend to be shorter than they.

When Mid-Parents are shorter than mediocrity, their Children tend to be taller than they.

DEViate in inches

+4

+3

+2

+1

0

-1

-2

-3

-4

FORECASTER OF STATURE

Fig. (b)

Height in inches

MALE.

FEMALE.

MOTHER

FATHER

M

F

D

A

B

C

Plate IX. Enabue, 3rd
Galton and Regression
Wilhelm Wundt
1832-1920

• Basic Experimental Paradigm
• 3 factor theory of emotion
• Hedonic theory
Gerard Heymans (1857-1930)

- Empirically based research
- 3 dimensions of personality
Gerard Heymans (1857-1930)

- Empirically based research
  - 3000 (Dutch) doctors were asked to rate all members of a family on a large number of traits
  - ≈ 400 responded with ratings on 2,523 subjects
- Three dimensions
  - Emotionality or Emotional Instability
  - Activity or general drive
  - Dominance of primary or secondary functioning
## Heymams taxonomy

(from Eysenck, 1992)

<table>
<thead>
<tr>
<th></th>
<th>Emotionality</th>
<th>Activity</th>
<th>P/S</th>
<th>Jung</th>
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<td>Apathetic</td>
<td>-</td>
<td>-</td>
<td>S</td>
<td>Sensitive I</td>
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<td>Amorphous</td>
<td>-</td>
<td>-</td>
<td>P</td>
<td>Intuitive I</td>
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<td>Phlegmatic</td>
<td>-</td>
<td>+</td>
<td>S</td>
<td>Intuitive E</td>
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<tr>
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<td>+</td>
<td>P</td>
<td>Sensitive E</td>
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<td>Passionate</td>
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<td>Thinking E</td>
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<tr>
<td>Choleric</td>
<td>+</td>
<td>+</td>
<td>P</td>
<td>Feeling E</td>
</tr>
<tr>
<td>Sentimental</td>
<td>+</td>
<td>-</td>
<td>S</td>
<td>Feeling I</td>
</tr>
<tr>
<td>Nervous</td>
<td>+</td>
<td>-</td>
<td>P</td>
<td>Thinking I</td>
</tr>
</tbody>
</table>
Mid - late 20th Century
Measurement and theory testing

I. John Atkinson
II. Donald Broadbent
III. Raymond Cattell
IV. Hans Eysenck
V. Jeffrey Gray
I. Theory of Achievement Motivation
   A) Individual differences and general laws
   B) Theory testing through experimentation

II. Theory of the Dynamics of Action
   A) Inertial properties of motivations and desires
   B) Introduced the concept of personality traits as rates of change in psychological states
Donald E. Broadbent  
1926-1993

I. Cognitive experiments showed individual differences interacting with situational determinants of attention and performance

II. Experimental work on arousal theory inspired work by Eysenck and others
Raymond Cattell
1905-1998

Founding President:
Society for Multivariate Experimental Psychology

- Primarily multivariate, little “experimental”
Hans J. Eysenck
1916-1997
Founding President: International Society for the Study of Individual Differences
Cronbach, Eysenck and the two disciplines of scientific psychology

I. Cronbach (1957, 1975) and Eysenck (1966, 1983, 1997) argued for the unification of the two disciplines of experimental and correlational approaches

II. Is it possible?

III. Are we doing it?
Is it possible to do Experimental Personality?

I. Individuals can not be assigned to personality conditions

II. Experimental designs test person x condition interactions

III. Can combine general laws with theories of individual differences
Few studies with experimental techniques or that study IQ are reported in our journals

<table>
<thead>
<tr>
<th>Journal</th>
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<th>Exper.</th>
<th>IQ</th>
<th>Exp%</th>
<th>IQ%</th>
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<td>92</td>
<td>26</td>
<td>3</td>
<td>28</td>
<td>3</td>
</tr>
</tbody>
</table>

The basic logic of a personality experiment

Observed paths (A-H) are estimates of latent paths (a-h) and are affected by reliability (r, s, t)
Testing Personality Theory with experimental methods

I. Eysenck’s theory of extraversion and arousal
   A) Preferences
   B) Performance

II. Gray’s theory of sensitivity to reward and punishment cues
Eysenck and Wundt curve
Eysenck (1967) + Hebb (1954) + Yerkes/Dodson (1908)

Level of Arousal function (non specific cortical bombardment)
Experiments test limits of generality

I. If a personality dimension interacts with a manipulation, then we are able to define the limits of the individual difference

II. Interactions allow us to exclude alternative hypotheses
Introversion and cognitive performance

I. Introverts do better on exams in relaxed conditions than extraverts.

II. Is this because they are smarter?

III. No, because experimentally we can show this effect reverses under time stress and caffeine
Introversion, time pressure, and caffeine: effect on verbal performance

Verbal GRE Performance  Standardized for NU

Revelle, Amaral, & Turriff, 1976 Science
Does this support Eysenck’s hypothesis?

I. Yes, but further studies limit this effect and show an interaction with time of day

II. This interaction tests and finds the limit of the overall trait effect
Impulsivity, Caffeine, and Time of Day: the effect on complex cognitive performance

Revelle, Humphreys, Simon and Gilliland, JEP:G, 1980
Impulsivity, Caffeine, and Time of Day: the effect on complex cognitive performance

Cognitive Performance (median standard scores)

AM Performance

PM Performance

Placebo Caffeine Placebo Caffeine

High Impulsives

Low Impulsives

Revelle, Humphreys, Simon and Gilliland, JEP-G, 1980
Extraversion vs. Impulsivity

- Caffeine effects are systematic, but not for extraversion, but rather for impulsivity
- Systematic interaction with time of day
- Implications
  - Performance does vary as function of personality and arousal, but depends upon time of day
  - Personality dimension of relevance was impulsivity
- Experimental studies allowed us to limit the generalization of the personality trait
Multiple approaches to personality

1. Psychology of the individual
   1. Consistency and change in the life of a person
   2. Coherence over situations and time

2. Individual differences
   1. How many dimensions are needed?
   2. What are they?

3. Stability of individual differences over time
   • Does knowing about individuals in one situation predict anything about other situations
Identifying personality structure

Is it possible to reduce the broad range of individual variation in personality to a limited number of personality traits?

Trait: A particular feature of mind or character; a distinguishing quality; a characteristic; spec. of a culture or social group (OED)

The pronunciation tr ei, after mod. French, in the 19th c. considered in England the correct one, is becoming less general; in U.S. tr eit is the established one (OED)
Definition of the relevant domain

• Individual differences in personality
  – Personality traits vs. abilities?
  – Traditional personality traits are central tendencies and preferences rather than limits
  – What do you do vs. what can you do

• What do we want to know about ourselves or others?
  – what we do
  – what we can do
Descriptive Approaches to Personality

• Derived from three approaches to taxonomy construction
  
  – **Folk Theories**: How ordinary people think about personality – constrained to types and typologies; categorical, not dimensional
  
  – **Constructive** approach: How verbal *descriptions* of feelings and actions covary; leading to trait dimensions – constrained by interests and ingenuity of investigators
  
  – **Analytic** approaches: How endorsements of *words* covary, leading to trait dimensions – constrained by the language

• All seek to provide a characterization of kinds of people (a flatterer, extravert, etc.); all are only a first approximation for what a person will do (next)
### Theophrastus’ Folk Theory

<table>
<thead>
<tr>
<th>The talker</th>
<th>The anxious to please</th>
<th>The hostile man</th>
</tr>
</thead>
<tbody>
<tr>
<td>The chatterer</td>
<td>The toady or the flatterer</td>
<td>The shameless man</td>
</tr>
<tr>
<td>The boaster</td>
<td>The coward</td>
<td>The distrustful man</td>
</tr>
<tr>
<td>The inventor of news</td>
<td>The superstitious man</td>
<td>The slanderer</td>
</tr>
<tr>
<td>The ironical man</td>
<td>The feckless</td>
<td>The skinflint or stingy man</td>
</tr>
<tr>
<td>The boor</td>
<td>The tiresome man</td>
<td>The mean man</td>
</tr>
<tr>
<td>The arrogant man</td>
<td>The outcast</td>
<td>The avaricious man</td>
</tr>
</tbody>
</table>
Early theoretical taxonomies

• Plato and the requirement for leadership

"... quick intelligence, memory, sagacity, cleverness, and similar qualities, do not often grow together, and ... persons who possess them and are at the same time high-spirited and magnanimous are not so constituted by nature as to live in an orderly and peaceful and settled manner; they are driven any way by their impulses, and all solid principle goes out of them. ... On the other hand, those stable and steadfast and, it seems, more trustworthy natures, which in a battle are impregnable to fear and immovable, are equally immovable when there is anything to be learned; they are always in a torpid state, and are apt to yawn and go to sleep over any intellectual toil."
Early taxonomies

• Hippocrates (publicized by Galen): “Blood, phlegm, yellow bile and black bile are the particular elements of the nature of man”.
• the sanguine, bouyant type; the phlegmatic, sluggish type; the choleric, quick-tempered type; and the melancholic, dejected type
• The 4 temperaments were later discussed by Kant (1798)
19th Century Taxonomy: Wundt’s dimensional structure of the 4 temperaments

<table>
<thead>
<tr>
<th>Excitable</th>
<th></th>
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<tbody>
<tr>
<td>Melancholic</td>
<td>Choleric</td>
</tr>
<tr>
<td>Phlegmatic</td>
<td>Sanguine</td>
</tr>
<tr>
<td></td>
<td>Changeable</td>
</tr>
</tbody>
</table>
Early 20th century taxonomies

- Heymans - 3 dimensional model
  - data driven!
- Freud:
  - Interaction of character and childrearing
- Jung:
  - Orientations and functioning
- McDougall domains of personality
Heymans

• Empirically based research
  – 3000 (Dutch) doctors were asked to rate all members of a family on a large number of traits
  – ≈ 400 responded with ratings on 2,523 subjects

• Three dimensions
  – Emotionality or Emotional Instability
  – Activity or general drive
  – Dominance of primary or secondary functioning
### Heymans taxonomy
(from Eysenck, 1992)

<table>
<thead>
<tr>
<th></th>
<th>Emotionality</th>
<th>Activity</th>
<th>P/S</th>
<th>Jung</th>
</tr>
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<tr>
<td>Apathetic</td>
<td>-</td>
<td>-</td>
<td>S</td>
<td>Sensitive</td>
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<tr>
<td>Amorphous</td>
<td>-</td>
<td>-</td>
<td>P</td>
<td>Intuitive</td>
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<td>Phlegmatic</td>
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<td>+</td>
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<td>Sanguine</td>
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<td>Sensitive</td>
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<td>Passionate</td>
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<td>+</td>
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<td>Thinking</td>
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<td>Sentimental</td>
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<tr>
<td>Nervous</td>
<td>+</td>
<td>-</td>
<td>P</td>
<td>Thinking</td>
</tr>
</tbody>
</table>
Freud’s taxonomy

• Oral
  – Indulgent: oral erotic -- oral passive optimistic, gullible, dependent, manipulative
  – Restrictive: oral sadistic, oral aggressive pessimistic, suspicious, quarrelsome

• Anal
  – Indulgent: anal retentive, anal compulsive stingy, stubborn, punctual, precise, orderly
  – Restrictive: anal aggressive, anal expulsive cruel, destructive, hostile, disorderly

• Phallic
  – Indulgent: phallic-dominant vain, proud, domineering, ambitious, virile
  – Restrictive: phallic-submissive meek, submissive, modest, timid, feminine
Jung

• Orientations:
  – Introverted Extraverted

• Psychological Functioning
  – Thinking/Feeling
  – Judging/Perceiving
  – Sensing/Intuiting

• (current application, loosely based upon Jung’s typology is the MBTI)
McDougall

- Intellect
- Character
- Temperament
- Disposition
- Temper
Popular culture extensions

• Many simple taxonomies loosely based upon Jung/Galen to describe individual differences

• Popular among group facilitators to show that people differ, with an emphasis that everyone has unique talents

• Practically cult like following of MBTI with people referring to themselves in terms of 4 term abbreviations
Taxonomic problems

• Except for Heymans, based more upon clinical judgment and description rather than systematic analysis of variation.

• It is easy to create 2 x 2 x 2 descriptions of others.
  – (Traits my friends and I have vs those of people I don’t like X traits I have versus my friend X traits of some friends versus other friends)
Constructive Approach
(Rational scale construction)

• Propensities to particular behaviors are captured by verbal descriptions

• Researchers construct items with a view to capturing/predicting phenomena of interest

• Empirical application of item responses to solve specific prediction problems
Representative Items
(constructive approach)

Do you like to go to lively parties?

Do you do and say things without stopping to think?

Would you call yourself a nervous person?

Do you like to go to the opera?
Analytic Approach  
(1950 – 1960s)

• Based on factor analysis of endorsement patterns of words (e.g., Galton, Allport, Cattell, Norman, Goldberg)

• Earliest analysis was the lexical hypothesis of Galton (1884)

• An early systematic analyses was Cattell’s
  – 18,000 English words intuitively grouped into $\approx 45$ pairs of categories or “trait complexes” eventually reduced to 12-14 primary dimensions

• Most ambitious attempt: Warren Norman (1967)
  – selected a subset of about 2,800 from 40,000 English words representing variations between persons or within individuals over time and varying situations . . . encoded in the language
The lexical hypothesis

• based on the following rationale: Because they are so socially meaningful, personality attributes tend to acquire lexical representation, and degree of lexical representation is one guide to the importance of a personality dimension. Presumably, those dimensions that are most fundamental will be ubiquitous, and therefore can be derived independently from studies of any language. (Saucier)
Lexical Hypothesis: Allport

- trait terms selected from unabridged dictionary
- 18,000 Allport-Odberth word lists
  - stable traits
  - fluctuating states
Lexical Hypothesis: Cattell

selected words from Allport 4,504
grouped by semantic meaning 171
formed intuitive clusters 36-46
factored rating scales 12-14

Subjects: Univ. Illinois fraternity members
early use of factor analysis formed personality instruments 14-16 self report scales
# Representative Trait Complexes
(from Cattell, 1957)

<table>
<thead>
<tr>
<th>1. <strong>Adaptable</strong>: flexible; accepts changes of plan easily; satisfied with compromises; is not upset, surprised, baffled, or irritated if things are different from what he expected</th>
<th><strong>V</strong></th>
<th><strong>Rigid</strong>: insists that things be done the way he has always done them; does not adapt his habits and ways of thinking to those of the group; nonplussed if his routine is upset</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. <strong>Emotional</strong>: excitable; cries a lot (children), laughs a lot, shows affection, anger, all emotions, to excess</td>
<td><strong>V</strong></td>
<td><strong>Calm</strong>: stable; shows few signs of emotional excitement of any kind; remains calm, even underreacts, in dispute, danger, social hilarity</td>
</tr>
<tr>
<td>3. <strong>Conscientious</strong>: honest; knows what is right and generally does not tell lies or attempt to deceive others; respects others' property</td>
<td><strong>V</strong></td>
<td><strong>Unconscientious</strong>: somewhat unscrupulous; not too careful about standards of right and wrong where personal desires are concerned; tells lies and is given to little deceits; does not respect others' property</td>
</tr>
<tr>
<td>4. <strong>Conventional</strong>: conforms to accepted standards, ways of acting, thinking, dressing, etc.; does the &quot;proper&quot; thing; seems distressed if he finds he is being different</td>
<td><strong>V</strong></td>
<td><strong>Unconventional, Eccentric</strong>: acts differently from others; not concerned about wearing the same clothes as others; has somewhat eccentric interests, attitudes, and ways of behaving; goes his own rather peculiar way</td>
</tr>
</tbody>
</table>
Reanalyses and extensions of Cattell

- Fiske, 1949 - 5 factors of peer, self report and expert judges
- Tupes and Christal (1958) 5 factors of peer ratings
- Norman (1963) 5 Factors of peer ratings: The "Big 5"
  - 1. Surgency/Extraversion
  - 2. Agreeableness
  - 3. Conscientiousness
  - 4. Emotional Stability versus Emotionality
  - 5. Culture/Openness
- Digman (1985) 5 factors of ratings (teachers + peers)
- But all used roughly the same set of rating scales derived from Cattell
Digman’s Six Data Sets

Oahu 1st & 2nd grades (N = 885): 49 traits
Oahu 5th & 6th grades (N = 834): 49 traits
Kauai 6th grades (N = 502): 43 traits
39 common traits (N = 2,221)

University of Hawaii Laboratory School:
1959 1st & 2nd grades (N = 102): 36 traits
1960 1st, 2nd, & 3rd (N = 149): 50 traits
1963 5th & 6th grades (N = 100): 63 traits

(from Goldberg, 2004)
The Digman-Hawaii Teacher Assessments

The child personality traits were selected to be a comprehensive set, covering at least 10 broad factors.

Each personality trait was specified by classroom behaviors formulated with the help of focus groups of elementary-school teachers.

(from Goldberg, 2004)
Examples of Two Personality Trait Descriptions

**Gregarious**: Likes to be with others and seeks their company; spends as much time with others as possible; dislikes being alone.

**Persevering**: Keeps at his/her work until it is completed; sees a job through despite difficulties; painstaking and thorough.

(from Goldberg, 2004)
Digman’s Preliminary Analyses of Some of These Data

Published in Digman & Takemoto-Chock (1981); Digman & Inouye (1986); and Digman (1989):

10 to 12 factors were hypothesized.
But only 5 factors replicated across samples.

These early findings were influential in popularizing the “Big-Five” factor structure.

(from Goldberg, 2004)
Reanalyses of Digman’s Child Data Sets (Goldberg, 2001)

Data from the 6 separate samples of elementary school children were analyzed independently. Across the 6 samples, the factors were compared at each hierarchical level, from one-factor to 10-factors. In each of the 6 samples, the classic “Big-Five” factor structure was found.

(from Goldberg, 2004)
A Middle-Childhood “Big-Five”

I. Extraversion:
   Gregarious, Energetic vs. Seclusive, Lethargic

II. Agreeableness:
   Humble vs. Rude, Self-centered

III. Conscientiousness:
   Persevering, Planful, Careful vs. Irresponsible

IV. Emotional Stability (vs. Neuroticism):
   Fearful, Tense, Concerned about acceptance

V. Intellect:
   Original, Imaginative, Curious, Aesthetic

(from Goldberg, 2004)
The Hierarchical Structure of Childhood Personality Traits

(from Goldberg, 2004)
## Five Domains of Personality (1980s-1990s)

Analyses and meta-analyses of constructive and analytic approaches converged on five domains (Costa & McCrae, 1989; Goldberg, 1981; John, 1990)

<table>
<thead>
<tr>
<th>technical domain name</th>
<th>colloquial domain name</th>
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</thead>
<tbody>
<tr>
<td>Extraversion (surgency)</td>
<td>Power</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>Affection</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>Work</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>Emotionality</td>
</tr>
<tr>
<td>Openness</td>
<td>Intellect</td>
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</table>

124
## Representative Trait Words by Domain

<table>
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<tr>
<th>extraversion</th>
<th>agreeableness</th>
<th>conscientious</th>
<th>neuroticism</th>
<th>openness</th>
</tr>
</thead>
<tbody>
<tr>
<td>talkative</td>
<td>sympathetic</td>
<td>organized</td>
<td>tense</td>
<td>wide interests</td>
</tr>
<tr>
<td>assertive</td>
<td>kind</td>
<td>thorough</td>
<td>anxious</td>
<td>imaginative</td>
</tr>
<tr>
<td>active</td>
<td>appreciative</td>
<td>planful</td>
<td>nervous</td>
<td>intelligent</td>
</tr>
<tr>
<td>energetic</td>
<td>affectionate</td>
<td>efficient</td>
<td>moody</td>
<td>original</td>
</tr>
<tr>
<td>-quiet</td>
<td>-cold</td>
<td>-careless</td>
<td>-stable</td>
<td>-commonplace</td>
</tr>
<tr>
<td>-reserved</td>
<td>-unfriendly</td>
<td>-disorderly</td>
<td>-calm</td>
<td>-simple</td>
</tr>
<tr>
<td>-shy</td>
<td>-quarrelsome</td>
<td>-frivolous</td>
<td>-contented</td>
<td>-shallow</td>
</tr>
<tr>
<td>-silent</td>
<td>-hard-headed</td>
<td>-irresponsible</td>
<td>-unemotional</td>
<td>- unintelligent</td>
</tr>
</tbody>
</table>
The Giant 3, Big 5, Small 11

(adapted from Ackerman and Heggestad, 1997)
Circumplex of Big 5 dimensions (Abridged Big 5 Circumplex)

• Pair wise ordering of dimensions
  – Agreeableness x Extraversion (interpersonal circumplex of Wiggins)
  – Neuroticism x Extraversion (affective circumplex)
  – Neuroticism x Conscientiousness (the personality disorders?)
  – Agreeableness x Conscientiousness (psychoticism?)

• Comparisons of Self/Other and Positive/Negative Affect
  • a speculative organization

• An alternative would be to organize in terms of Affect, Behavior, Cognition, and Desires
Neuroticism x Extraversion
Affective Circumplex ($S^+/S^-$)
Agreeableness x Extraversion

Interpersonal Circumplex ($S^+/O^+$)
Neuroticism x Conscientiousness

(S⁻/O⁻) : The personality Disorders?

- Anxious
- Fearful
- Inconsistent
- Impractical
- Sloppy
- Informal

- Particular
- Organized
- Efficient
- Thorough
- Relaxed
- Calm
Agreeableness x Conscientiousness

\[(O^+/O^-): \text{Eysenck's P scale } = O^+ \text{ vs. } O^-\]?
Conscientiousness x Extraversion

Circumplex ($S^+/O^-$)

- Impractical
- Sloppy
- Unruly
- Proud
- Active
- Vigorous
- Ambitious
- Efficient
- Organized
- Cautious
- Passive
- Introverted
- Vague
- Lazy
But is Big 5 structure of what people say, not what people do

• Is this the psychology of the stranger?
• Is it merely dimensions of semantic lexicon
• Are personality traits mere delusions?
• (The need for validity studies)
Personality traits as a delusion

- Hartshorn and May (1930)
  - Studies in character -- low correlations across situations for honesty
- Newcomb (1931)
  - Low correlations between real time ratings of behaviors
- Passini and Norman (1966) structure of strangers
- Mischel (1968) critique
- Shweder and D’Andrade (1980) personality as shared delusions
- (This thread continues until today in many classes in social psychology)
Newcomb’s behavioral study
rated by camp counselors during the day and at end of day

1. Tells of his own past of the exploits he has accomplished
2. Gives loud and spontaneous expressions of delight or disapproval
3. Goes beyond only asking and answering necessary questions in conversations with counselors.
4. How is the quiet time spent?
5. Spends a lot of time talking at the table.
Newcomb’s summer camp 1931

- Systematic encoding by camp counselors of immediate behaviors and subsequent ratings

<table>
<thead>
<tr>
<th>Behavior</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>-0.14</td>
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<td>3</td>
<td>0.61</td>
<td>0.68</td>
<td>-</td>
<td>-0.11</td>
<td>0.48</td>
</tr>
<tr>
<td>4</td>
<td>0.97</td>
<td>0.88</td>
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<td>-</td>
<td>0.16</td>
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<tr>
<td>5</td>
<td>0.66</td>
<td>0.92</td>
<td>0.77</td>
<td>0.75</td>
<td>-</td>
</tr>
</tbody>
</table>
Passini and Norman

• Structure of strangers
  – Undergraduates rating other (unknown) undergraduates on 20 paragraph descriptors
  – Big 5 structure emerges
  – Is the structure of personality traits merely the structure of the lexicon, not of people?

• See also Mulaik structure of ratings of adjectives
Shweder and D’Andrande (1980)

• Method:
  – ratings taken of behavior at time it occurs ("on line")
  – ratings done from memory semantic
  – judgments of similarity of trait words

• Analysis
  – Compare(correlate) the correlation matrices from the three procedures
Comparisons of Correlational Structures

On line ratings

Memory based ratings

Semantic similarity ratings
Shweder and D’Andrande

• Results
  – structure of "on line measures" not the same as memory based
  – structure of memory based equivalent to semantic structure
• Implication: structure of personality ratings is in mind of beholder, not in the behavior of target
• But: “on line” measures were forced choice!
Romer and Revelle (1984)

- Conceptual replication of Shweder's "on line ratings"
- Varied "on line ratings"
  - Presented “behavior” e.g. “Rick was self confident at the meeting”
    - forced choice (ala Shweder)
      - which trait does this behavior represent (dominant, arrogant, cold, introverted, submissive, unassuming, warm, extraverted)
    complete rating of all traits (same traits as before)
  Semantic structure ratings: how X is this behavior Y?

structure of "on line ratings" depends upon method
forced choice categories do not correlate
on line ratings of traits match memory based
See also Borkenau et al.
Comparisons of Correlational Structures

Forced choice On line ratings

Complete On line ratings

Memory based ratings

Semantic similarity ratings
Table 5
Intercorrelations Between Behavior Categories for Two Observers

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Observer A (Identification)</th>
<th>Observer E (Scaling)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Immediate codings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Dominant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Arrogant</td>
<td>-.18</td>
<td></td>
</tr>
<tr>
<td>3. Cold</td>
<td>.10</td>
<td>-.15</td>
</tr>
<tr>
<td>4. Introverted</td>
<td>-.18</td>
<td>-.15</td>
</tr>
<tr>
<td>5. Submissive</td>
<td>-.18</td>
<td>-.15</td>
</tr>
<tr>
<td>6. Unassuming</td>
<td>-.18</td>
<td>-.15</td>
</tr>
<tr>
<td>7. Warm</td>
<td>-.23</td>
<td>-.18</td>
</tr>
<tr>
<td>8. Extraverted</td>
<td>-.24</td>
<td>.18</td>
</tr>
<tr>
<td>Memory Ratings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Dominant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Arrogant</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>3. Cold</td>
<td>.63</td>
<td>.66</td>
</tr>
<tr>
<td>4. Introverted</td>
<td>-.89</td>
<td>-.70</td>
</tr>
<tr>
<td>5. Submissive</td>
<td>-.91</td>
<td>-.79</td>
</tr>
<tr>
<td>6. Unassuming</td>
<td>-.91</td>
<td>-.91</td>
</tr>
<tr>
<td>7. Warm</td>
<td>-.54</td>
<td>-.71</td>
</tr>
<tr>
<td>8. Extraverted</td>
<td>.65</td>
<td>.54</td>
</tr>
<tr>
<td>Observer</td>
<td>$\tilde{\alpha}$</td>
<td>Immediate coding and memory rating&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$r$</td>
</tr>
<tr>
<td>Identification condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>.93</td>
<td>.66</td>
</tr>
<tr>
<td>B</td>
<td>.84</td>
<td>.30</td>
</tr>
<tr>
<td>C</td>
<td>.82</td>
<td>.65</td>
</tr>
<tr>
<td>D</td>
<td>.79</td>
<td>.40</td>
</tr>
<tr>
<td>$M$</td>
<td>.85</td>
<td>.50</td>
</tr>
<tr>
<td>Scaling condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>.95</td>
<td>.82</td>
</tr>
<tr>
<td>F</td>
<td>.95</td>
<td>.95</td>
</tr>
<tr>
<td>G</td>
<td>.91</td>
<td>.11</td>
</tr>
<tr>
<td>H</td>
<td>.81</td>
<td>.36</td>
</tr>
<tr>
<td>$M$</td>
<td>.91</td>
<td>.56</td>
</tr>
</tbody>
</table>
Norman and Goldberg (1966)
Construct validity of structure

• Comparison of interrater agreement as rater-ratee interaction increases

• Levels of interaction
  – Unknown (empty chair- Monte Carlo simulation)
  – Minimal acquaintance (Passini and Norman)
  – ROTC members
  – Fraternity juniors and Seniors
  – Peace Corp Trainees

• Structures remain the same across groups, but interrater agreement increases
Norman and Goldberg, 1966

Trait reliabilities increase with interaction

Extraversion
Agreeableness
Dependability
Emotional Stability
Culture
Norman and Goldberg 1966
Interrater agreement increases with contact
Self and Peer ratings

- Observability of traits
  - Some traits more open to others
    - Extraversion
    - Agreeableness
    - Openness
  - Some less open
    - Emotional stability
    - Conscientiousness
Additional construct validity studies

- If traits have basis in behavior of targets, not in the eye of the beholder, then they should show trans-situational consistency
- Consistency over long period of time
- Consistency across situations
- Consistency across degree of genetic relationship
Personality constancy, consistency and coherence

• We do not expect behavior to be constant across situations
• We do expect some consistency
• More complicated is the issue of coherency
Personality Stability, Consistency, and Coherency
Personality Stability, Consistency, and Coherency
Personality Stability, Consistency, and Coherency
Coherency of individual differences: the example of time of day and positive affect

![Graph showing positive affect over time of day, with two curves labeled for low impulsive, “larks” and high impulsive, “owls”]
Estimating the genetics of personality

- Structural equation modeling applied to phenotypic correlations with known genetic pathways.
- Estimate both measurement model as well as strength of pathways
Estimating the Genetics of Personality

A = additive genetic variance
C = Common family environment
E = Unique environment

$r_g = 1,.5, 0$
$r_c = 1, 0$

$r_{s1,s2}$

$r_g = 1$ for MZ, .5 for DZ, sibs
$r_c = 1$ for together, 0 apart
## Personality and Genetics

<table>
<thead>
<tr>
<th>Trait</th>
<th>Narrow heritability</th>
<th>Broad heritability</th>
<th>Shared Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraversion</td>
<td>0.36</td>
<td>0.49</td>
<td>0.00</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>0.28</td>
<td>0.39</td>
<td>0.09</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>0.28</td>
<td>0.38</td>
<td>0.04</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.31</td>
<td>0.41</td>
<td>0.05</td>
</tr>
<tr>
<td>Openness</td>
<td>0.46</td>
<td>0.45</td>
<td>0.05</td>
</tr>
<tr>
<td>IQ</td>
<td>0.50</td>
<td>0.75</td>
<td>0.04</td>
</tr>
</tbody>
</table>

McGue and Bouchard, ARN, 1998
## Personality and Genetics

<table>
<thead>
<tr>
<th>Occupational interest</th>
<th>Narrow heritability</th>
<th>Broad heritability&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Shared Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>0.36</td>
<td>0.41</td>
<td>0.12</td>
</tr>
<tr>
<td>Investigative</td>
<td>0.36</td>
<td>0.66</td>
<td>0.10</td>
</tr>
<tr>
<td>Artistic</td>
<td>0.39</td>
<td>0.50</td>
<td>0.12</td>
</tr>
<tr>
<td>Social</td>
<td>0.38</td>
<td>0.52</td>
<td>0.08</td>
</tr>
<tr>
<td>Enterprising</td>
<td>0.31</td>
<td>0.50</td>
<td>0.11</td>
</tr>
<tr>
<td>Conventional</td>
<td>0.38</td>
<td>0.38</td>
<td>0.11</td>
</tr>
</tbody>
</table>

<sup>a</sup> estimated from MZ apart correlation

McGue and Bouchard, ARN, 1998
## Personality and Genetics

<table>
<thead>
<tr>
<th>Psychiatric illness</th>
<th>Broad heritability</th>
<th>Shared Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizophrenia</td>
<td>0.80</td>
<td>No</td>
</tr>
<tr>
<td>Major Depression</td>
<td>0.37</td>
<td>No</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.30-.40</td>
<td>No</td>
</tr>
<tr>
<td>Generalized Anx</td>
<td>0.30</td>
<td>Small, females</td>
</tr>
<tr>
<td>Phobias</td>
<td>.2-.4</td>
<td>No</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>.50-.60</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Bouchard, CDPS, 2004
## Personality and Genetics

<table>
<thead>
<tr>
<th>Social Attitudes</th>
<th>Broad heritability</th>
<th>Shared Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservatism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under age 20</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>Over age 20</td>
<td>.45-.65</td>
<td>Yes, females</td>
</tr>
<tr>
<td>Right Wing Auth</td>
<td>.50-.64</td>
<td>.0-.16</td>
</tr>
<tr>
<td>Religiousness (adult)</td>
<td>.30-.45</td>
<td>.2-.4</td>
</tr>
<tr>
<td>Specific religion</td>
<td>0</td>
<td>NA</td>
</tr>
</tbody>
</table>

Bouchard, CDPS, 2004
Heritability: misconceptions

• High heritability => Constancy: but
  – Heritability changes by changing the environment
  – Reducing environmental variation increases the heritability
    • Herrnstein’s paradox: higher heritabilities imply more equal environments
    • Low heritability => high environmental inequality
  – Even highly heritable traits can show major environmental variation (consider height with $h^2 = .9$ but variation > 6 inches between N and S Korea)
Descriptive personality and outcomes -- does personality matter?

• Terman (1920 …) - Friedman (1993) studies
  – Childhood Conscientiousness and longer life span
  – Childhood “Happiness” related to shorter life span

• Ongoing Goldberg analysis of lifespan health consequences of mid childhood personality traits (the Digman school children study 40 years later)

• Deary analysis of childhood intelligence and life span among Scottish school children (1933 …)
Life-Span, Health-Behavior Model

External Influences (e.g., socioeconomic status, life/work stress)

Childhood Personality → Health Behaviors over the Life-Span → Morbidity → Mortality

Internal Influences (e.g., genetics)

(from Goldberg, 2004)
Childhood Trait Predictors of Adult Health-Damaging Behaviors

(from Goldberg, 2004)
Childhood Trait Predictors of Adult Health-Protective Behaviors

(from Goldberg, 2004)
Childhood Trait Predictors of Adult Health Outcomes

(from Goldberg, 2004)
Life as an intelligence test

- Conventional tests are short (30 minutes to 2-3 hours) and use representative content
- Continued performance across many situations is a continuing test of ability
- (see L. Gottfredson)
Life as a intelligence test (adapted from Gottfredson, 2002)

Relative risk (odds ratio) of this outcome for “dull” (IQ 75-90) vs. “bright” (IQ 110-125) persons: Young white adults

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school dropout</td>
<td>133.9</td>
</tr>
<tr>
<td>Chronic welfare recipient (female)</td>
<td>10.0</td>
</tr>
<tr>
<td>Ever incarcerated (male)</td>
<td>7.5</td>
</tr>
<tr>
<td>Lives in poverty</td>
<td>6.2</td>
</tr>
<tr>
<td>Had illegitimate child (women)</td>
<td>4.9</td>
</tr>
<tr>
<td>Unemployed 1+ mo/yr (male)</td>
<td>1.5</td>
</tr>
<tr>
<td>Out of labor force 1+mo/yr (male)</td>
<td>1.4</td>
</tr>
<tr>
<td>Divorced in 5 years (ever married)</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Life as an intelligence test
(adapted from Gottfredson, 2002)

**Common subtests**, e.g.
- Elementary, secondary school
- Law-abiding, employed, married
- Rung on occupational & income ladders
- Daily self-maintenance (functional literacy)
- Personal health & safety

**Different subtests**, e.g.
- Tertiary education & training
- Job performed
- Hobbies
- Type of civic participation
3. How Does Our Own g Level Affect the Life Tests We Take?

Applicants for:

- Attorney, Engineer
- Teacher, Programmer
- Secretary, Lab tech
- Meter reader, Teller
- Welder, Security guard

IQs: Middle 50%

- 108-128
- 100-120
- 96-116
- 91-110
- 85-105
$g$-Related Relative Risk Varies by Kind of Outcome
The Scottish Longitudinal Study

• June 1, 1932, all children age 11 attending school in Scotland (N=87,498) took a 45 minute IQ test (Moray House Test)
• Followup studies from Ian Deary and his colleagues (N>600) have examined mortality risk, test retest correlations, MRI scans, Alzheimer onset, etc.
Scotland Longitudinal Study

• Test retest (age 11 to age 77) $r = .63$, corrected for range restriction $= .73$

• Mean scores on Moray House Test increased from age 11 to age 77 (43 to 54, sd = 11).

• IQ at age 11 predicted relative risk of dying before 80
Intelligence and Mortality
Descriptive vs. Causal Structure

• Descriptive: the Big 5
• Integration of causal theories of
  – Affect
  – Cognition
  – Desires/Goals
  – Behavior
Causal Models

• Biological models of approach/avoidance
  – Eysenck
    • Description and explanation
    • Arousal Theory
  – Gray
    • Reinforcement sensitivity theory
• Cognitive models of approach/avoidance
  – Atkinson, Raynor, Kuhl, etc.
  – Elliot, etc.