CHAPTER EIGHT

CATTELL AND THE BIG FIVE: FACTOR ANALYTIC TRAIT THEORIES

CHAPTER OVERVIEW

- Illustrative Biography: Albert Einstein
- Factor Analysis
- The 16 Factor Theory: Cattell
- Personality Measurement and the Prediction of Behavior
  - Personality Tests
  - Beyond Personality Tests
- Because Personality Is Complex: A Multivariate Approach
  - Surface Traits and Source Traits
  - Measurement of Source Traits: The 16PF
  - Five Second-Order Factors
- Psychological Adjustment
Chapter Overview

- Three Types of Traits
  - Ability Traits
  - Temperament Traits
  - Dynamic Traits
- Predicting Behavior
  - The Specification Equation
  - Nomothetic and Idiographic Approaches: R-Technique and P-Technique
- Syntality
- Determinants of Personality: Heredity and Environment
- The Role of Theory in Cattell’s Empirical Approach
- The Five Factor Theory: McCrae and Costa

Preview of Factor Analytic Trait Theories

<table>
<thead>
<tr>
<th>TABLE 8.1 Preview of Factor Analytic Trait Theories</th>
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<tbody>
<tr>
<td>Individual Differences</td>
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<tr>
<td>Adaptation and Adjustment</td>
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<tr>
<td>Cognitive Processes</td>
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<tr>
<td>Society</td>
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<td>Biological Influences</td>
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Illustrative Biography: Albert Einstein

- Development
- Description
- Adjustment
ILLUSTRATIVE BIOGRAPHY:  
ALBERT EINSTEIN

- Cognition
- Society
- Biology

FACTOR ANALYSIS

Correlation Coefficient: A measure of the association between two variables, in which 0 indicates no association, and +1 or -1 a strong association (positive or negative)

Examples:
- Correlation of +.68 between extraversion test score and number of times a person talks in class
- Correlation of - .25 between anxiety and self-rated confidence

SCATTER PLOTS ILLUSTRATING POSITIVE AND NEGATIVE CORRELATIONS

Figure 8.1 Scatterplots illustrating positive and negative correlations

Positive Correlation

Negative Correlation
RAYMOND CATTELL

• Born in England, 1905
• Science major at the University of London, Doctorate in Psychology at 23 from King’s College
• Professorship at Clark and Harvard University
• University of Illinois in 1945
• Wrote 55 books and about 500 journal articles
• Retired to Hawaii
• Died in 1998

PERSONALITY MEASUREMENT AND THE PREDICTION OF BEHAVIOR

“PERSONALITY IS THAT WHICH PERMITS A PREDICTION OF WHAT A PERSON WILL DO IN A GIVEN SITUATION.” (CATTELL, 1950, P. 2)

TRAITS: PERMIT PREDICTION

• Personality Tests
  • 16PF
  • Intelligence Tests
• Beyond Personality Tests
  • Three Sources of Data
    • Q-data: questionnaire data
    • T-data: objective test data
    • L-data: life record data

BECAUSE PERSONALITY IS COMPLEX: A MULTIVARIATE APPROACH

✓ Surface Traits & Source Traits
✓ Measurement of Source Traits: The 16PF
✓ Five Second-Order Factors
Surface Traits and Source Traits

✓ **Surface Traits:**
  ✓ Traits as defined simply at the level of observable behavior

✓ **Source Traits:**
  ✓ Basic, underlying personality traits

Measurment of Source Traits: The 16PF

✓ Multiple Choice
✓ Derived from Factor Analysis
✓ Profile: the pattern of a person's scores on several parts of a personality test (such as the 16 scales of the 16PF, as diagrammed on page 230 of the text)

16 Source Traits Measured by the 16PF

<table>
<thead>
<tr>
<th>Cattell's 16 Personality Factors (16PF)</th>
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<tbody>
<tr>
<td>A</td>
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<tr>
<td>B</td>
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<tr>
<td>C</td>
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<td>Q1</td>
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<td>Q2</td>
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<tr>
<td>Q3</td>
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<tr>
<td>Q4</td>
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</tbody>
</table>

Note: The number of these factors were identified as Cattell's original 16 options. These names correspond to the current edition of the 16PF as introduced by P. T. Cattell in 1973 (1973).
Five Second-Order Factors
- Extraversion
- Anxiety
- Tough-mindedness
- Independence
- Self-control

Psychological Adjustment
- Neurosis
- Psychosis

Three Types of Traits
- Ability Traits
- Temperament Traits
- Dynamic Traits
ABILITY TRAITS

- Fluid intelligence: use alternative tests to assess different types of learning
- Crystallized intelligence: includes effects of education

TEMPERAMENT TRAITS

- Style and tempo of behavior
- Biological influence

DYNAMIC TRAITS

- ERGS
  - Dynamic, constitutional source traits
  - Anger, fear, sex, etc.
- MetaERGS
  - Environmental-mold (learned) dynamic source traits
  - Sentiments & attitudes
- Subsidiation
- The Dynamic Lattice
  - Confluence learning
**THE DYNAMIC LATTICE**

Figure 9.3: The Dynamic lattice

**Predicting Behavior**

- **The Specification Equation**
  \[ P = s_1 f_t + s_2 f_t + \ldots + s_N f_t + s_j t_j \]

- **Nomothetic and Idiographic Approaches**
  - **R-technique** Nomothetic, studies groups
  - **I-technique** Idiographic, studies individuals

- **Syntality** Group differences in personality

**Determinants of Personality: Heredity and Environment**

- **Constitutional Traits**
- **Environmental-Mold Traits**
- **Multiple Abstract Variance Analysis (MAVA)**
- **Heritability**
  - Extent to which a trait is influenced by genetics
The Role of Theory in Cattell’s Empirical Approach

Many of Cattell’s concepts are similar to those of other theories (ego strength, ergic tension, and others).

“I have always felt justifiably suspicious of theory built too much ahead of data.”

- Cattell

The Five Factor Theory: McCrae and Costa

The BIG Five
- OPENNESS
- CONSCIENTIOUSNESS
- EXTRAVERSION
- AGREEABILITY
- NEUROTICISM
The BIG Five

More About These Five Factors

Each of the 5 factors has 6 "facets"

More About These Five Factors
More About These Five Factors

<table>
<thead>
<tr>
<th>Values</th>
<th>Competence</th>
<th>Order</th>
<th>Dutifulness</th>
<th>Achievement striving</th>
<th>Self-discipline</th>
<th>Deliberation</th>
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</thead>
<tbody>
<tr>
<td>Extraversion (C)</td>
<td>.36</td>
<td>.28</td>
<td>.31</td>
<td>.28</td>
<td>.46</td>
<td></td>
</tr>
</tbody>
</table>

Heritability of the 5 factors

.36 extraversion
.28 agreeableness
.31 neuroticism
.28 conscientiousness
.46 openness

(Loehlin, 1992, p. 67)

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