

# Biological Traits

## Chapter 12



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### Hans Eysenck

#### The Four Temperaments

- Hippocrates (460? - 377? B.C.)
- Galen (130? - 200?) elaboration
  - Sanguine (Blood)
  - Phlegmatic (Mucus)
  - Melancholic (Black Bile)
  - Choleric (Yellow Bile)

#### Eysenck's Approach

- Considered scientific methods to be essential at a time when Psychology was a very "soft" science (think: philosophy)
  1. Factor analytic approaches
  2. Correlational methodology
  3. Experimental methodology

#### Identification of Super Factors

##### Three Main Superfactors

- Extraversion vs. Introversion
- Neuroticism vs. Emotional Stability
- Psychoticism

##### One Additional Superfactor: Intelligence

##### Eysenck vs. Cattell

##### Causal Agents of Behavior

Patterns of behavior associated with particular brain activation patterns

##### Psychotherapy

Limited evidence of psychotherapy's efficacy (1952)

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# Hans Eysenck



- 1916-1997
- Born Berlin, German
- Son of two actors, divorced when he was 2
- Left Germany for England at start of anti-Semitism and Nazi Era
- PhD from University of London (1940)
  - "What on Earth is Psychology?"

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## Historical Predecessors: The Four Temperaments

- Hippocrates (460? -377? B.C.)
- Galen (130? - 200?) elaboration
- Personality could be characterized by body fluids or humors
  - Sanguine (Blood) sturdiness, cheerfulness
  - Phlegmatic (Mucus) slow, solid, apathetic
  - Melancholic (Black Bile) depression
  - Choleric (Yellow Bile) irascible, violent
- NOT traits → typology
  - Distinct, discrete, separate categories to which an individual is assigned

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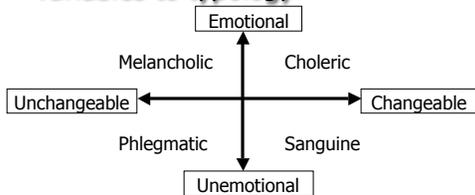
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## The Four Temperaments: Wundt

- Further elaboration by Wilhelm Wundt who applied continuous variables to typology



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## Eysenck's Approach

- Humans as biosocial animals
- Psychology, then, is the place that biological and social sciences converge
- Considered scientific methods to be essential at a time when Psychology was a very "soft" science (think: philosophy)
  - Factor analytic approaches
  - Correlational methodology
  - Experimental methodology

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# Eysenck's Approach

Eysenck applied the following methodology to his study of personality and human behavior:

- Hypothesize relationship between personality traits
- Conduct FA studies to identify clusters of traits
- Construct biological theory to account for behaviors associated with underlying factors
- Generate hypotheses from theory concerning specific testable components.
- Conduct experiments to validate theory
- Revise theory informed by findings (deviation OK)

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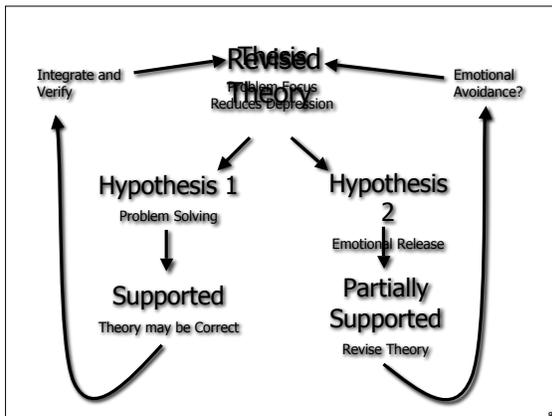
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# Identification of Super Factors

- Personality is a "more or less stable and enduring organization of a person's character, temperament, intellect, and physique which determines his unique adjustment to the environment"
  - Hierarchical organization and structure

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## Eysenck's Hierarchical Model

Specific Responses

Behaviors we can actually observe

Habitual Responses

Clusters of specific behaviors that recur in similar circumstances

- Buying groceries, giving parties

Traits

Clusters of habitual responses similar to Cattell's Source Traits

Types (Superfactors)

Broad general dimensions → goal of personality research

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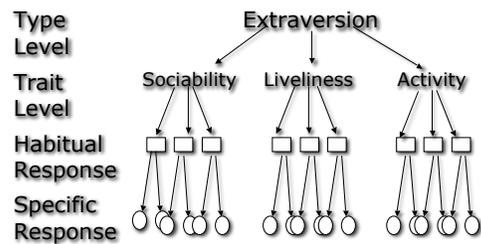
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## Identification of Super Factors



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## Three Main Superfactors

- Eysenck reviewed work on temperament literature and noticed recurring themes

### Extraversion vs. Introversion

- Degree to which a person is outgoing and participative in relating to others

### Neuroticism vs. Emotional Stability

- An individual's adjustment to environment and stability of behavior over time

### Psychoticism

- The loss of distortion of reality and the inability to distinguish between reality and fantasy
- Not a dimension like the other two—present in all individuals to some degree

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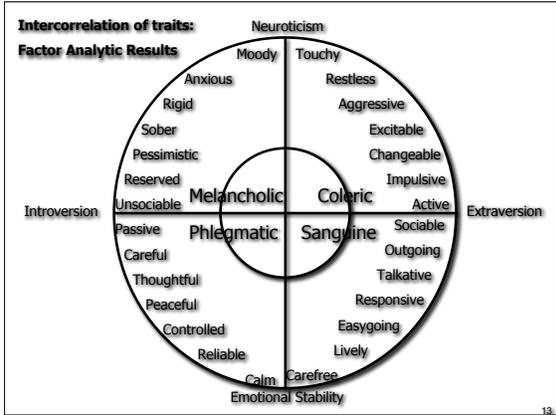
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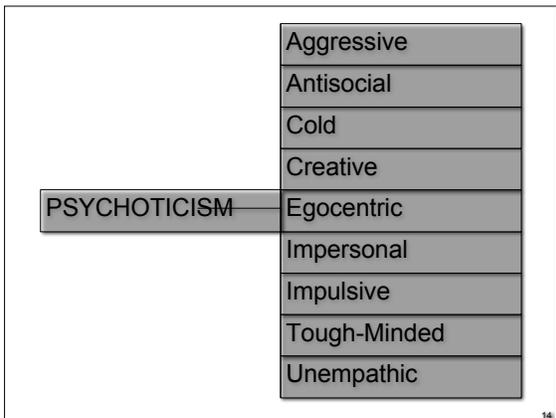
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## Eysenck Personality Inventory



- Do you usually take the initiative in making new friends? (E)
- Do ideas run through your head so that you cannot sleep? (N)
- Are you inclined to keep in the background on social occasions? (E)
- Do you sometimes laugh at a dirty joke? (L)
- Are you inclined to be moody? (N)
- Do you very much like good food? (L)
- Do you often make up your mind too late? (N)

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## One Additional Superfactor

### Intelligence

- Biological Intelligence the physiological, neurological and anatomical bases
- Psychometric Intelligence the numerical measure designed to reflect intelligence → IQ, Spearman's (*g*)
  - Biological, but socially influenced
- Practical Intelligence common sense
- Interface of personality superfactors and intelligence
  - Personality influences Psychometric Intelligence, but intelligence has a limited impact on personality

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## Superfactor Caveats

- Emotional stability, neuroticism, and psychoticism denote a *tendency* to behave in a certain way
  - NOT a psychiatric diagnosis
  - A disorder might occur if these tendencies were combined with genetic/environmental factors
- Believed that differences in superfactors mainly genetic

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## Eysenck vs. Cattell

- Significant differences between Eysenck and Cattell and Eysenck and Big Five
  - Traits vs. Supertraits
- Scope of theory
  - Cattell - very broad personality dimensions
  - Eysenck - few, narrowly focused superfactors
    - Representative of "second-order" factors in Cattell's Model → OCEAN
- Eysenck thought Cattell relied too much on factor analysis
  - At some point, factor analysis is arbitrary (axes)
  - Cattell oblique (correlated) factors
  - Eysenck orthogonal (uncorrelated) factors

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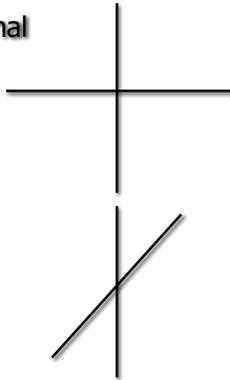
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Orthogonal



Oblique

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## Measurement of Traits

- Accurate measurement important to developing descriptive and causal theory
  - Self-report inventories
  - Observation of participant's behavior in controlled or naturalistic environment
    - Children
- Criterion analysis is Eysenck's way of testing the accuracy of measures
  - Have a hypothesis about your new measure
  - Compare groups using a gold standard
    - Single assessment measure given to an emotionally stable group vs. a neurotic group

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## Causal Agents of Behavior: A Primer of Brain Structures

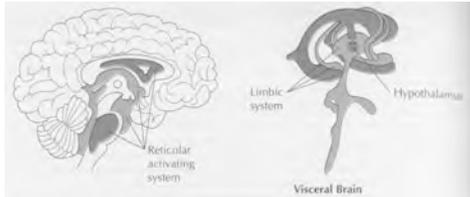


FIGURE 12.5 The Reticular Activating System and the Visceral Brain  
The anatomical structures that Eysenck hypothesizes may be responsible for inherited differences in introversion-extraversion and emotional stability-neuroticism.

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## Causal Agents of Behavior

- Patterns of behavior associated with particular brain activation patterns
- Introversion-Extraversion associated with ascending reticular activating system
  - RAS associated with arousal/sleep
  - Introverts have over excitation of RAS
  - Over activation —> restraint of behavior
  - Under activation —> absence of constraint
  - Some evidence in EEG/ECG studies

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## Causal Agents of Behavior

- Emotional Stability-Neuroticism associated with visceral brain activation
  - VB includes limbic system and hypothalamus
  - VB associated with motivation and emotion
  - Low threshold for VB activation (easily aroused) are more emotional and this more neurotic
- Psychoticism thought to be associated with hormonal imbalance (androgen) and neurotransmitter levels

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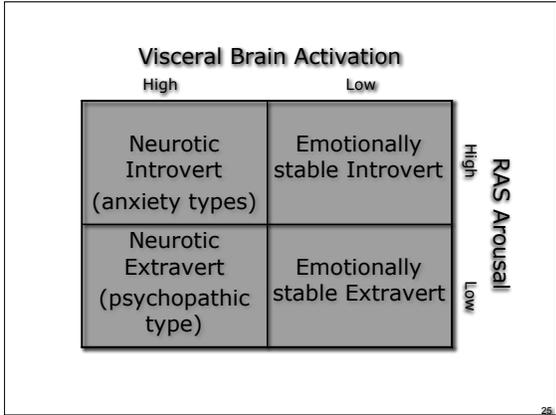
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**Introverts (Compared to Extraverts):**



- Faster brain waves
- > skin conductance
- > body temperature when 1<sup>st</sup> awake
- > pupil dilation
- > sensitive to pain
- Prefer < noise
- < sexual partners
- > sedative to knock out
- > alcohol to incapacitate
- < smokers
- < performance with caffeine

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**On Neurotic Introverts (1947)**

The neurotic introverts show a tendency to develop anxiety and depression symptoms ... they are characterized by obsessional tendencies, irritability, apathy ... and they suffer from lability of the autonomic system. According to their own statement, their feelings are easily hurt, they are self-conscious, nervous, given to feelings of inferiority, moody, day-dream easily, keep in the background on social occasions, and suffer from sleeplessness. In their body-build, vertical growth predominates over horizontal growth; their effort response is poor, and their choline esterase activity is high. Salivary secretion is inhibited. Their intelligence is comparatively high, their vocabulary excellent, and they tend to be persistent. They are generally accurate, but slow; they excel at finicking work. Their level of aspiration is unduly high, but they tend to under-rate their performance. Withal, they are rigid, and show little interpersonal variability. Their aesthetic preferences are towards the quiet, old-fashioned type of picture. They do not appreciate jokes very much, and sex jokes in particular are not favoured.

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## On Neurotic Extraverts (1947)

The neurotic extraverts show a tendency to develop hysterical conversion symptoms, and an hysterical attitude to their symptoms. Furthermore, they show little energy, narrow interests, have a bad work-history, and are hypocondriachal. According to their own statement, they are troubled by stammer or stutter, are accident prone, frequently off work through illness, disgruntled, and troubled by aches and pains. In their body-build, horizontal growth predominates over vertical growth; their effort response is quite good, and their choline esterase activity low. Salivary secretion is not inhibited. Their intelligence is comparatively low, their vocabulary poor, and they tend to show extreme lack of persistence. They tend to be quick but inaccurate; they are bad at finicking work. Their level of aspiration is low, but they tend to over-rate their performance. They are not very rigid, and show great interpersonal variability. Their aesthetic preferences are towards colourful modern type of picture. They appreciate jokes and are particularly fond of sex jokes.

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## Psychotherapy

- Eysenck maintained that much of behavior is determined by genetic factors
- Limited evidence of psychotherapy's efficacy (1952)
  - Spontaneous remission just as likely as cure in psychotherapy
  - Smith and Glass, then Seligman, counter (1990s)
- Proponent of behavior therapy (Classical Conditioning)
  - Experimental evidence, no longer emulating the methodology of classical psychoanalysis

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## Psychotherapy

### Treatment matching

- Extraverts to group therapy
- Introverts to individual therapy
- Some personalities may respond better to medication than do others (biological factors)

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