Personality, Motivation, and Cognitive Performance: a theory of individual differences in cognitive performance
Personality, Motivation, and Performance

• The who, what, where, why, and when of behavior
• Who (individual differences)
• What (task variables)
• Where (situational variables)
• Why (motivational variables)
• When (temporal sequencing and cumulative performance)
Personality traits and individual differences (Who)

American taxonomies - The Big 5
- Surgency or extraversion
- Agreeableness
- Conscientiousness
- Emotional Stability
- Culture/Openness

European biological taxonomies - “Giant 3”
- Introversion/extraversion (Sociability, Impulsivity, Surgency)
- Neuroticism (anxiety, emotionality)
- Tough mindedness (Aggression, Masculinity?)
Background variables

• **Biological bases**
  - Genetic predispositions
  - Biological substrates

• **Past history**
  - Knowledge
  - Past history of reinforcement leading to current expectations
Biological bases

A. Genetic predispositions
   polygenetic inheritance
   moderate heritabilities

B. Biological substrates
   1. Conceptual Nervous System
      Behavioral Activation System
      Behavioral Inhibition System
      Fight/Flight/Freezing System
   2. Arousal System (one or many?)
      energetic arousal tense arousal
   3. Sensitivities to reinforcement
      sensitivity to rewards
      sensitivity to punishments
Past history

Knowledge
   Declarative
   episodic memories (of)
   semantic memories (that)
Procedural (how)
   Skills
   Classical conditioning
Past history of reinforcement leading to current expectations
   expectations of rewards
   expectations of punishment
Situational variables (Where)

- primary effects on direction
- primary effects on intensity
- Mixed effects
Situational effects on direction

Expectancies of success and failure
  task difficulty
  comparison level
Extrinsic demands
  rewards
  threats
Public versus private feedback
Situational effects on intensity

time of day
stimulant drugs
depressant drugs
exercise
Effects on direction and intensity

Noise

time pressure

presence of others
Motivational Variables (Why)

Motives (see also personality traits)

  need for achievement

  need to avoid failure

  need affiliation

  need for stimulation?
Motivational variables (why)

Motivational level:
  Directional
  approach
  avoidance

Intensity
  energetic arousal
  tense arousal
Task Variables (What)

Multiple types of demands
  Detection
  Encoding
  Storage
  Retrieval
  Processing
Task variables (what)

Attentional demands
- Detecting
- Filtering
- Sustaining

Memory demands
- Immediate versus delayed processing
- Capacity of immediate memory
Outcome measures

Immediate measures
Task choice
Time spent
  latency of choice
  persistence of choice
Intensity
Efficiency
speed/accuracy/quality of performance
rate of acquisition of task
asymptotic level
Cumulative achievement

Ability
  knowledge base
  application of knowledge

Efficiency
  curvilinear function of motivation?
  function of task difficulty?

Time spent
Efficiency of performance
Curvilinear function of motivation?
Humphreys-Revelle model
arousal facilitates attention
arousal facilitates long term memory storage
arousal hinders immediate (working) memory
Anderson-Revelle model
  beneficial effects of energetic arousal
  detrimental effects of tense arousal
  optimal and non-optimal performance
Yerkes-Dodson Law and the function of task difficulty
Control systems and feedback

• Short term feedback loops
  – Motivational carryover
    • motivation for incomplete acts persists
    • completion quenches motivational state

Task choice as function of time and alternatives
Control systems and feedback

• Long term feedback loop

  expectancy of success = f(history of success, sensitivity to success)

  expectancy of failure = f(history of failure, sensitivity to failure)

  self efficacy = balance of expectancy of success and failure
Strategic tradeoffs

Speed versus accuracy
Time spent to achieve goal 1 is time not spent to achieve goal 2
studying versus socializing
career versus family
Personality and Performance

• Interplay of the who, what, where, why and how.
• To study personality we need to answer all of these questions.
Humphreys and Revelle, Psychological Review, 1984
Yet another “plumbing diagram” relating personality, affect, and cognition
Personality and Performance:
Another perspective

- Personality as coherent pattern over time of Affect, Behavior, Cognition and Desire
  - Affect/Energy
    - Positive, Negative, Energetic, Tense
  - Behavior
    - Approach, Withdrawal, Inhibition
  - Cognition
    - Knowledge Structures, breadth
  - Desires and Goals
    - Needs, Wants
Traditional Model: Causal factors

Extraversion
Impulsivity

Approach
Positive Affect

Neuroticism
Anxiety

Negative Affect
Withdrawal
Alternative Model
Descriptive summaries

Extraversion
Impulsivity

Approach
Positive
Affect

Negative
Affect
Withdrawal

Neuroticism
Anxiety
Achievement Motivation and the ABCDs

• Achievement as positive Affect upon success
• Achievement as approach Behavior
• Achievement motivation as Cognitive appraisals of task difficulty
• Achievement motivation as Goal setting
Extraversion and the ABCDs

- Extraversion as positive Affect
- Extraversion as approach Behavior
- Extraversion as cognitive bias towards rewards
- Extraversion as performance approach Desires
Anxiety and the ABCDs

• Anxiety as negative Affect
• Anxiety as avoidance Behavior
• Anxiety as cognitive bias towards threats
• Anxiety as performance avoidance Desires
Ways of studying Personality coherence and Affect, Behavior, Cognition, and Goals

• Between individual differences across items
• Between individual differences across situations and across time
• Within person variation across items, situation and time
• Are within person patterns different across people?
The ABCDs of personality

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# The Big 5 and the ABCDs

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