The Nature and Nurture of Creativity in Science

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Nature and Nurture

• For nature I focus on personality dispositions and their biological basis
• For nurture I focus on organizational qualities of scientific labs
Personality Traits of Creative/Eminent Scientists

- Meta-analysis of 26 studies on personality and creativity (Feist, 1998)

<table>
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<tr>
<th>Scientists’ Traits</th>
<th>Social</th>
<th>Cognitive</th>
<th>Motivational</th>
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<tbody>
<tr>
<td>Dominant</td>
<td>Open</td>
<td>Driven</td>
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<tr>
<td>Arrogant</td>
<td>Flexible</td>
<td>Ambitious</td>
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<td>Hostile</td>
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<td>Self-confident</td>
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<td>Autonomous</td>
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<td>Introverted</td>
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Biology of Introversion: Eysenck

• Introverts have higher baseline cortical arousal than extraverts
• Introverts have lower sensory stimulation thresholds
• Therefore, they regulate optimal arousal levels by minimizing external stimulation
• Creative scientists seek these kinds of environments
Organizational Structure of Creative Science Teams

• Heinz et al. (2009)
  – Small group teams (4-6)
    • Curvilinear relationship, with peak at around 4-6
  – Effective mentor-mentee relationships
  – Research autonomy
  – Complementary variety of team members

• Hemlin et al (2004) (hinders scientific creativity)
  – Bureaucratic management
  – Narrow range of disciplinary expertise
  – Excessive evaluation and accountability
Continuum of Creativity and Team Size: Hypothesized Curvilinear Relationship

- Banal
- Mundane
- Normal
- Creative
- Transformative/Revolutionary

**Team Size**
- Large
- Medium
- Small

**Continuum of Scientific Creativity**

- Idea verification
- Idea generation
Discussion Questions

• How does solitude foster scientific discovery?
• Under what conditions does teamwork support scientific discovery?
• What are the advantages and disadvantages of individual vs. team approaches?