Intelligence and Talent
"I hate it when people talk about kids on talk shows. I hate it, because every person who talks about their kids, their kids are obviously the most intelligent and the cutest. They're all very, very gifted children. Ask me about my kids. They're alright. Are they the cutest? Meh...They'll get by. I mean, they're not going to freak anyone out. In terms of intellect-it's like, Ehhh, you know. They're not going to be at the back of the class, not going to be at the front of the class-they'll be in the middle kind of looking out the window. They'll get by."
“Compared with what we ought to be, we are only half awake. Our fires are damped, our drafts are checked. We are making use of only a small part of our possible mental and physical resources... Of course there are limits: the trees don't grow into the sky. But the plain fact remains that men the world over possess amounts of resource, which only very exceptional individuals push to their extremes of use.” – William James
What is Intellectual Potential?
Chinese Philosophy

- Confucian perspective emphasizes benevolence and doing what is right
- Intelligent person enjoys learning and persists in life-long learning with enthusiasm
- Taoist emphasizes importance of humility, freedom from conventional standards of judgment, and full knowledge of oneself and of external conditions
What is intelligence?

From Dictionary.com:

Capacity for learning, reasoning, understanding, and similar forms of mental activity; aptitude in grasping truths, relationships, facts, meanings, etc.
History of IQ Testing

Original Goal: Identify students in need of alternative education (Binet & Simon, 1916)

Items designed to measure ability to profit from explicit instruction
How is intelligence measured?
Sample IQ test items

**Information**: On what continent is Argentina?

**Arithmetic**: If 4 toys cost 6 dollars, how much do 7 cost?

**Vocabulary**: What does “debilitating” mean?

**Comprehension**: Why are streets usually numbered in order?

**Picture Completion**: Indicate the missing part from an incomplete picture.

**Block Design**: Use blocks to replicate a two-color design.

**Object Assembly**: Assemble puzzles depicting common objects

**Coding**: Using a key. Match symbols with shapes or numbers

**Picture Arrangement**: Reorder a set of scrambled picture cards to tell a story

**Similarities**: In what way are “dogs” and “rabbits” alike?

Examples from Flynn (2008)
The *g* factor

365 Participants, Wechsler Adult Intelligence Scale-Revised

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Data from Deary (2000), Figure from Chabris (2006)
The $f$ factor

Decathlon

100-metre run, long jump, shot put, high jump, 400 metres, 110-metre hurdles, discus, pole vault, javelin, and 1500 metres.

General Fitness Factor?
Pattern Reasoning

Carpenter, Just & Shell, 1990
IQ and academic achievement

Developmental stability of IQ  
(Fullerton Longitudinal Study)

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A. Carroll Three-Stratum Model

Carroll and Cattell-Horn Broad Ability Correspondence (vertically-aligned ovals represent similar broad domains)

B. Cattell-Horn Extended Gf-Gc Model

80+ Stratum I (narrow) abilities have been identified under the Stratum II broad abilities. They are not listed here due to space limitations (see Table 1)

C. Cattell-Horn-Carroll (CHC) Integrated Model

(Missing g-to-broad ability arrows acknowledges that Carroll and Cattell-Horn disagreed on the validity of the general factor)

D. Tentatively identified Stratum II (broad) domains

CHC Broad (Stratum II) Ability Domains

<table>
<thead>
<tr>
<th>Gf</th>
<th>Fluid reasoning</th>
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<td>Gc</td>
<td>Comprehension-knowledge</td>
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<td>Gsm</td>
<td>Short-term memory</td>
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<td>Gv</td>
<td>Visual processing</td>
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<td>Ga</td>
<td>Auditory processing</td>
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<td>Gtr</td>
<td>Long-term storage and retrieval</td>
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<td>Gs</td>
<td>Cognitive processing speed</td>
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<td>Gt</td>
<td>Decision and reaction speed</td>
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<td>Gnw</td>
<td>Reading and writing</td>
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<td>Gq</td>
<td>Quantitative knowledge</td>
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</tbody>
</table>

| Gkn | General (domain-specific) knowledge |
| Gth | Tactile abilities |
| Gk  | Kinesthetic abilities |
| Go  | Olfactory abilities |
| Gp  | Psychomotor abilities |
| Gps | Psychomotor speed |

(see Table 1 for definitions)
HOWARD GARDNER

Frames of Mind
The Theory of Multiple Intelligences

With a New Introduction by the Author
Theory of Multiple Intelligences

- Gardner (1983) proposed that there is no single, unified intelligence but rather a set of relatively distinct, independent, and modular multiple intelligences
  - Linguistic (used in reading a book or writing a poem)
  - Logical-mathematical (deriving a logical proof or solving a mathematical problem)
  - Spatial (fitting suitcases into the trunk of the car)
  - Musical (singing a song or composing a symphony)
  - Bodily-kinesthetic (dancing or playing football)
  - Interpersonal (understanding and interacting with other people)
  - Intrapersonal (understanding oneself)
  - Naturalistic intelligence (discern patterns in nature)
  - Spiritual and existential intelligence?
Theory of Multiple Intelligences

- Criteria for identifying an intelligence:
  - Isolation by brain damage
  - Existence of exceptional individuals
  - Identifiable core operation essential to performance
  - Distinctive developmental history leading from novice to expert
  - Distinct evolutionary history
  - Supportive evidence from cognitive-experimental research
  - Supportive evidence from psychometric tests
  - Susceptibility to encoding in a symbol system
HOW PRACTICAL AND CREATIVE INTELLIGENCE DETERMINE SUCCESS IN LIFE

SUCCESSFUL INTELLIGENCE

ROBERT J. STERNBERG
Theory of Successful Intelligence

- Three broad abilities are important for successful intelligence:
  - Analytical – required to analyze and evaluation options in one’s life
  - Creative—generate problem-solving options in the first place
  - Practical—implement options and make them work
Emotional Intelligence
Why it can matter more than IQ
Daniel Goleman
Author of VITAL LIES, SIMPLE TRUTHS
Emotional Intelligence

- The ability to perceive accurately, appraise, and express emotion
- The ability to access and/or generate feelings when they facilitate thought
- The ability to understand emotions and emotional knowledge
- The ability to regulate emotions to promote emotional and intellectual growth
What other factors affect achievement?

- Academic intrinsic motivation
- Cognitively stimulating home environment
- Active learning strategies
- Self-Control
- Self-regulation
- Grit
- Creativity
- Social support in classroom
Identification of Gifted Students in the United States
McClain & Pfeiffer (2012)

Required Identification Methods and Domains

- Creativity: 30 (2000) vs. 27 (2010)
Talent Development
Gifted and talented children are those who demonstrate achievement and/or potential ability in any of the following areas:

1. General intellectual ability
2. Specific academic aptitude
3. Creative or productive thinking
4. Leadership ability
5. Visual and performing arts
6. Psychomotor ability (dropped)
Three-Ring Model (Renzulli, 1978)

“History tells us it has been the creative and productive people of the world, the producers rather than consumers of knowledge, the reconstructionists of thought in all areas of human endeavor, who have become recognized as ‘truly gifted’ individuals. History does not remember persons who merely scored well on IQ tests...” (Renzulli, 2005, p. 256)

- Two types of giftedness
  - Schoolhouse giftedness
  - Creative-productive giftedness
Three-Ring Model (Renzulli, 1978)

- Interaction of three characteristics:
  - Well above-average ability (general or specific, top 15-20% of any domain)
  - Creativity
  - Task Commitment (also see Dr. Angela Duckworth)
Giftedness is a synthesis of wisdom, intelligence, and creativity
- Wisdom (balance of self interests with interests of others and context)
- Intelligence (ability to achieve success in life)
- Creativity (Investment Theory)
Theory of Multiple Intelligences (Gardner, 1983)

- Linguistic
- Logical-mathematical
- Spatial
- Musical
- Bodily-Kinesthetic
- Interpersonal
- Intrapersonal
- Naturalist
The dramatic findings of a ground-breaking study of 120 immensely talented individuals reveal astonishing new information on

Developing Talent In Young People

BENJAMIN S. BLOOM, Editor
Figure 3. From ability to eminence in a domain
Talent Development (Subotnik & Jarvin, 2005)

- Based on more than 80 interviews with students at different stages of their musical training at three elite American conservatories
- Abilities → Competencies → Expertise → Artistry
Ability

- Intrinsic Motivation
- Charisma
- Musicality
From Abilities to Competencies
From Abilities to Competencies

- How fast students can learn ("talent")
  - Helpful but not essential to success in the early stages of talent development
  - Does not increase in importance over time
- Technical proficiency
  - Depends on skill of teacher and child’s commitment to practice
From Abilities to Competencies

- Parental support or pressure
  - Can be negative
    - Nagging
    - Restricting freedom of choice
    - Turning an initially pleasurable experience into a constraint
    - Sending mixed messages
  - Can be positive
    - Initial support
    - Insistence on a consistent practice schedule
From Abilities to Competencies

- “Teachability”
  - The child’s willingness and openness to being taught

- The quality of the student-teacher experience
  - Talented young musicians and their families choose their teachers carefully based on the teacher’s ability to maintain a rigorous curriculum and high expectations
From Abilities to Competencies

- The availability of external rewards such as praise and recognition
  - Recognition for one’s exceptional talent is an important external reward for young musicians
- Persistence through good and bad times
  - Positive reinforcement and parental pressure prepares young musicians for the inevitable rejections or failures that are part of the growth process in talent development
From Competency to Expertise
From Competency to Expertise

- Ability to learn quickly diminishes in importance and the other variables rise in prominence.
- Past a certain threshold of technical proficiency, a technical flaw can be “interesting”.
- One gatekeeper: “Somewhat flawed” is better than “push the play button”.
- Especially the case for vocalists who can make up for less than perfect technique with their stage presences or the timbre of their sound.
From Competency to Expertise

- Teachability
  - Over time during the conservatory years, teachers expected their best students to “bite back” and insist in cultivating their own style, voice, or message.
  - Although recognition is important, two other factors increase in importance:
    - Financial independence
    - Opportunities to perform (competitions and high-level performances become more important)
From Competency to Expertise

- Knowing your own strengths and weaknesses
- Self-promotion (resume, good headshot, agent, patrons, etc.)
- Learning how to play the game (being graceful in success and failure, building a good reputation)
- Social skills (arriving on time and well prepared, being courteous, learning to accept success gracefully and failure with resistance)
- Restoring self-confidence
From Expertise to Artistry
From Expertise to Artistry

- No longer played a role:
  - Talent
  - Technical proficiency
  - Parental support
  - Teachability
  - Quality of student-teacher experience
From Expertise to Artistry

- Persistence through good and bad times
- Intrinsic motivation
- Artist capitalizes on strengths
- Uses his or her weaknesses to advantage (e.g., singer using a technical flaw to display added charm)
From Expertise to Artistry

O Artist expected to have solicited the support of an agent who helps the musician “master the game”

O Social skills
  O Needs to engage and maintain the interest of patrons
  O Gatekeeper interviews suggest that diva behavior is not tolerated and talent is less likely than ever to neutralize the shortcomings in the nonmusical variables
From Expertise to Artistry

- Self-confidence
- Risk-taking
- Charisma
From Expertise to Artistry

- Two kinds of charisma: one centered on the artist and one centered on the music.
- Artists of the first kind draw people to them because their presence is larger than life.
- Another kind arises from the power of their performance.
“The most interesting artists are those who control audiences’ engagement in anticipation of the unexpected based on creative risk taking.” – Subotnik & Jarvin (2005)