Why is understanding the nature of intelligence important?

Is intelligence a produce of genes (nature) or nurture (the environment)?

Intelligence is a complex concept. There are three major controversies involved with intelligence:

(1) To what degree intelligence is due to heredity or to the environment (is it inherited or learned)
   • Should we collect sperm from Nobel Prize winners
   • Should we sterilize “morons” to keep them from the possibility of producing other “morons”
   • Should we improve public education and strive to create a positive learning environment?

(2) To what extent does ethnicity and culture play in intelligence and intelligence testing?
   • For example, this chapter will look at a phenomenon known as stereotype threat. This can relate to Chapter 12: Social Psychology
   • How do different cultures perform on American intelligence tests?
   • How do Americans perform on different cultures’ intelligence tests?

(3) What are the appropriate and inappropriate uses of intelligence tests?

If we know very little on the topic, we are more likely to use heuristics such as representative or availability
Why is understanding the nature of intelligence important?

These controversies over the nature of intelligence were seen in the book *The Bell Curve* (Hernstein and Murray, 1994). These authors basically argue that minorities are intellectually inferior to Caucasians due to genetic differences. Their argument rests on four assumptions:

- Intelligence must be expressed as a single number (such as IQ).
- You are able to rank people in linear order based on this single number.
- Intelligence is genetically based.
- Intelligence is immutable by the environment, intervention programs, etc.

In order to understand and assess these assumptions, they should be put to an empirical test.

- What does the evidence suggest?
- Why is understanding the outcomes of these empirical tests important, especially in terms of public policy?
What is intelligence?

Your book defines intelligence as the global capacity to think rationally, act purposefully, and deal effectively with the environment (page 305).

Although there is disagreement about the nature and definition of intelligence, experts generally agree on the following:

- Abstract thinking, problem solving and the capacity to acquire new knowledge are important elements of intelligence, which are typically assessed in intelligence tests.
- Creativity, achievement motivation, and goal-directed behavior are other important aspects of intelligence that are not assessed by intelligence tests.
- Adapting to one’s environment is a significant factor in intelligence, but ¾ of those who agreed with this statement said intelligence test do not measure it.
Theories of Intelligence

Charles Spearman (1863-1945):
• Single, general intelligence

As one of the first people to examine intelligence, Spearman noticed that school grades in different subjects such as English and mathematics were almost always positively correlated (page 311) and concluded that there is a general intelligence, the g factor, that influences intellectual performance.

Louis Thurstone (1887-1955):
• Multiple intelligences (seven)

While Spearman focused on the finding that scores on different mental tasks are correlated, Thurstone focused on the finding that the correlations are far from perfect (see chapter 1 and chapter 3 about how beliefs influence what we consider important). Thurstone believed that intelligence depends on different abilities and not on a general factor as Spearman believed.

Thurstone identified seven primary mental abilities such as verbal comprehension, numeric ability, reasoning, and perceptual speed that are elements of intelligence. The g factor that Spearman refers to is an average of these seven abilities.
Theories of Intelligence

Howard Gardner (1943-__):  
- Multiple intelligences (eight)

Gardner believes that there are multiple “intelligences”. He looked at the skills and products that are valued by different cultures, and are independent of each other. Gardner believes that intelligence must be defined within a culture. (see page 312).

<table>
<thead>
<tr>
<th>Intelligence</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal-Linguistic</td>
<td>Reading comprehension Writing</td>
</tr>
<tr>
<td>Logical-Mathematical</td>
<td>Solving math and logic problems</td>
</tr>
<tr>
<td>Bodily-Kinesthetic</td>
<td>Balance Strength Endurance</td>
</tr>
<tr>
<td>Visual-Spatial</td>
<td>Judging distance Map reading Geometry</td>
</tr>
<tr>
<td>Musical-Rhythmic</td>
<td>Appreciating and creating music Music theory</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Listening Cooperation Sensitivity to others</td>
</tr>
<tr>
<td>Intrapersonal</td>
<td>Knowledge of self</td>
</tr>
<tr>
<td>Naturalistic</td>
<td>Appreciate nature Ability to work with plants and animals</td>
</tr>
</tbody>
</table>

- poet, writer, public speaker, native storyteller
- scientists, mathematician, navigator, surveyor
- athlete, dancer, craftsperson
- sculptor, painter, expert chess player, architect
- Musician, composer, singer
- politicians, clinical psychologist, salesperson
- essayist, philosopher
- ecologist, zoologist, botanist
Theories of Intelligence

Robert Sternberg (1949-      ):  
• multiple intelligences (three)

Sternberg believes that there are three forms of intelligence, and cannot be summarized by one number. He disagrees with Gardner and believes some of his “intelligences” are talents or skills. Intelligence is a much more general quality and something that exists independent of culture (such as the ability to reason). He believes that successful intelligence involves three distinct mental abilities:
**Sternberg’s Triarchy of Intelligence**

<table>
<thead>
<tr>
<th>Intelligence</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytic</td>
<td>Analyzing, Comparing, Evaluating</td>
</tr>
<tr>
<td>Practical</td>
<td>Applying, Using</td>
</tr>
<tr>
<td>Creative</td>
<td>Inventing, Designing</td>
</tr>
</tbody>
</table>

- **Analytical intelligence**: The ability to solve problems. These skills are what are traditionally assessed by traditional intelligence tests.
- **Practical intelligence**: The ability to adapt to the environment, skills necessary to cope with everyday demands, and to manage oneself and others effectively. It often reflects what is commonly called “street smarts”.
- **Creative intelligence**: The ability and skills to deal with novel situations by drawing upon existing skills and knowledge.
How do you measure intelligence?

- Alfred Binet
- Lewis Terman (Stanford-Binet test)
- David Weschler (Weschler Adult Intelligence Scale (WAIS))
Early Intelligence Test Items

In the Army mental tests R.M. Yerkes attributed the low scores of recent immigrants to innate stupidity. However, there was a strong cultural bias in the test. The following are examples of the multiple choice items on the intelligence test (p 200, Gould, The Mismeasure of Man, 1981).

(1) Crisco is a: patent medicine, disinfectant, toothpaste, food product.

(2) The number of a Kaffir’s legs is: 2, 4, 6, 8.

(3) Christy Mathewson is famous as a: writer, artist, baseball player, comedian.

(Gould only got one correct, and his intelligent brother did not get any correct.)
**Principles of test construction**

<table>
<thead>
<tr>
<th>Principle</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardization</td>
<td>The administration of a test to a large, representative sample of people under uniform conditions for the purposes of establishing performance norms.</td>
</tr>
<tr>
<td>Reliability</td>
<td>The ability of a test to produce consistent results when administered on repeated occasions under similar conditions.</td>
</tr>
<tr>
<td></td>
<td>• If you are given an I.Q. test, then you should get a similar score if you take it 3 months from now, or even 1 year from now.</td>
</tr>
<tr>
<td>Validity</td>
<td>The ability of a test to measure what it is intended to measure.</td>
</tr>
<tr>
<td></td>
<td>• If it is designed to measure intelligence, it measures intelligence and not cultural knowledge, problem solving, basic knowledge, logic, etc.</td>
</tr>
<tr>
<td></td>
<td>• If a test is designed to measure honesty, it should measure honesty, and not social desirability.</td>
</tr>
</tbody>
</table>

These principles applies to tests of intelligence, SAT’s, personality tests, honesty test, multimeters, speedometers, etc.
Based on the definitions of reliability and validity, what should a pattern of “hits” look like on each target for the combination of validity and reliability?

<table>
<thead>
<tr>
<th>Low reliability</th>
<th>High reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
</tbody>
</table>

Based on the definitions of reliability and validity, what should a pattern of “hits” look like on each target for the combination of validity and reliability?

<table>
<thead>
<tr>
<th>Reliability:</th>
<th>The ability of a test to produce consistent results when administered on repeated occasions under similar conditions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validity:</td>
<td>The ability of a test to measure what it is intended to measure. Think of this as precision.</td>
</tr>
</tbody>
</table>
Critical Thinking: Symptoms of Repressed Memories

A number of books have popularized the notion that repressed memories of childhood abuse are actually very common. One feature that many of these books have in common is a checklist of symptoms to help you determine whether you are a repressed memo victim. Psychologist Elizabeth Loftus (1994) has collected a number of “symptoms” from checklists in these books. What do you think about the following items?

- Do you have trouble knowing what you want?
- Do you follow other people’s suggestions as if they were orders to be observed?
- Do you wear a lot of clothing, even in summer? Do you favor baggy clothing?
- Have you ever had a period of sexual promiscuity in your life?
- Do you often have nightmares?
- Do you have difficulty falling or staying asleep?
- Do you “space out” or daydream?
- Do you feel different from other people?
- Do you have trouble feeling motivated?
- Do you use work or achievements to compensate for inadequate feelings in other parts of your life?

Questions to ask yourself:
- Do you believe that a person who answers “yes” to most of these questions is likely to be suffering from repressed memories?
- Suppose that someone tells you that 75% of incest survivors exhibit these symptoms. Would this convince you? Why or why not?
- Imagine that a friend has one of these books, and is now worried that she might have forgotten acts of abuse in her past. How would you counsel her?
Alien Abductions

Personal accounts of alien abductions have increased since the publication of Bud Hopkin’s books *Missing Time* (1981) and *Intruders* (1987) and Whitley Strieber’s *Communion* (1987).

The claim that 3.7 million Americans have been abducted was based on a Roper Poll conducted between July and September 1991 and published in 1992. The authors were Bud Hopkins, a painter and sculptor; David Jacobs, a historian; and Ron Westrum, a sociologist.

In this case, a representative sample of 5,947 adults were given a card listing eleven experiences and were asked to say whether each had happened to them more than twice, once, or twice, or never. Of these eleven were five “indicator experiences”:

1. Waking up paralyzed with a sense of a stranger person or presence or something else in the room (18%).
2. Feeling that you were actually flying through the air although you didn’t know where or how (10%).
3. Experiencing a period of time of an hour or more, in which you were apparently lost, but you could not remember why, or where you had been (13%).
4. Seeing unusual lights or balls of light in a room without knowing what was causing them, or where they came from (8%), and
5. Finding puzzling scars on your body and neither you nor anyone else remember how you received them or where you got them (8%).

The authors decided that when a respondent answered yes to at least four of these five indicator questions, there is a strong possibility that individual is a UFO abductee. The only justification given is that Hopkins and Jacobs worked nearly 500 abductees over a period of 17 years. 119 of the 5,947 people (2%) had four
of the five indicators. Extrapolating to the population of 185 million, that total number in America abducted by aliens is about 3.7 million people.
**Early Intelligence Test Items**

The following is one of Terman's original questions (Gould, *The Mismeasure of Man*, 1981, page 176):

> An Indian who had come to town for the first time in his life saw a white man riding along the street. As the white man rode by, the Indian said-- "The white man is lazy; he walks sitting down."

What was the white man riding on that caused the Indian to say, "He walks sitting down."?

Write your answer down on the margin of a piece of paper. DO NOT share your answer until everyone has an answer.

Terman accepted “bicycle” as the only correct answer— not cars or other vehicles because legs don’t go up or down in them; not horses (the most common incorrect answer) because any self respecting Indian would have known what he was looking at. (Gould answered “horse” because he saw the Indian as a clever ironist, criticizing the effete city relative). Such original responses as “a cripple in a wheel chair,” and “a person riding on someone’s back” were also marked wrong. (Gould, *The Mismeasure of Man*, 1981, page 176):
Items No Longer Included in Intelligence Tests

Runner : Marathon
(a) envoy : embassy
(b) martyr : massacre
(c) oarsman : regatta
(d) referee : tournament
(e) horse : stable

What is the bias in this question (what group of individuals does this question favor)?

Some typical IQ items are based on knowledge of upper middle-class culture.

If standardized tests reflect white, middle-class cultural knowledge and values, minority-group members might do poorly on the tests not because of lower intelligence, but because of unfamiliarity with the white middle-class culture.
Early Intelligence Test Items

Early intelligence tests were culturally biased, favoring people who were from urban, rather than rural environments, middle-class rather than lower class, and White rather than African-American.

An early test question:

(1) What should be done if you find a 3-year old child in the street?

The correct answer was “call the police”.

Children from inner-city families who perceive the police as adversaries are unlikely to choose this answer. Likewise, children from rural areas might not choose this answer if there is no police force nearby.
Items from the Army Alpha Subtest on “Common Sense”

The Army Alpha was given to World War I army recruits in the United States as a way to identify potential officers. In these sample questions, note the curious mixture of folk wisdom, scientific information, and moralism (Kessen and Cahan, 1986). Other parts of the test were more like modern intelligence tests.

1. If plants are dying for lack of rain, you should:
   [ ] water them
   [ ] ask a florist’s advice
   [ ] put fertilizer around them

2. If the grocer should give you too much money in making change, what is the right thing to do?
   [ ] buy some candy for him with it
   [ ] give it to the first poor man you meet
   [ ] tell him of his mistake

3. If you saw a train approaching a broken track, you should
   [ ] telephone for an ambulance
   [ ] signal the engineer to stop the train
   [ ] look for a piece of rail to fit in

4. Some men lose their breath on high mountains because
   [ ] the wind blows their breath away
   [ ] the air is too rare
   [ ] It is too cold out

5. We see no stars at noon because
   [ ] they have moved to the other side of the earth
   [ ] they are much fainter than the sun
   [ ] they are hidden behind the sky
Is there a cultural bias in IQ tests?

Do I.Q. tests favor one culture over the other?
- What have we looked at that might suggest that intelligence is affected by your culture?
- How do expectations affect performance on IQ tests.
- What are the consequences?

Take the Dove counterbalance tests.

Why didn’t any criticisms of the valid arguments for the cultural bias in IQ tests affect its use?

People do not take into situational factors that occurred in the United States at that time (the fundamental attributional error). There were strong anti-immigrant sentiments and thus the IQ tests reflected current belief in “the public mind”. Evidence supporting the belief that IQ tests were culturally fair was given light scrutiny and evidence counter to this position was harshly criticized (____-___)