

Why is understanding the nature of intelligence important?

Intelligence is the ability to use knowledge to reason, make decisions, make sense of events, solve problems, understand complex problems, understand complex ideas, learn quickly, and adapt to environmental changes ([page 323](#)).

Historically, there has been a debate around the nature of intelligence. Is it a matter of heredity or environment?

- If it is due to heredity, some ethnicities are naturally more intelligent than others. In addition, public education is not necessary.
- If it is due to environment, then differences in intelligence are due to environmental factors and that we can change our institutions to improve intelligence.

Where Does Intelligence Come From?

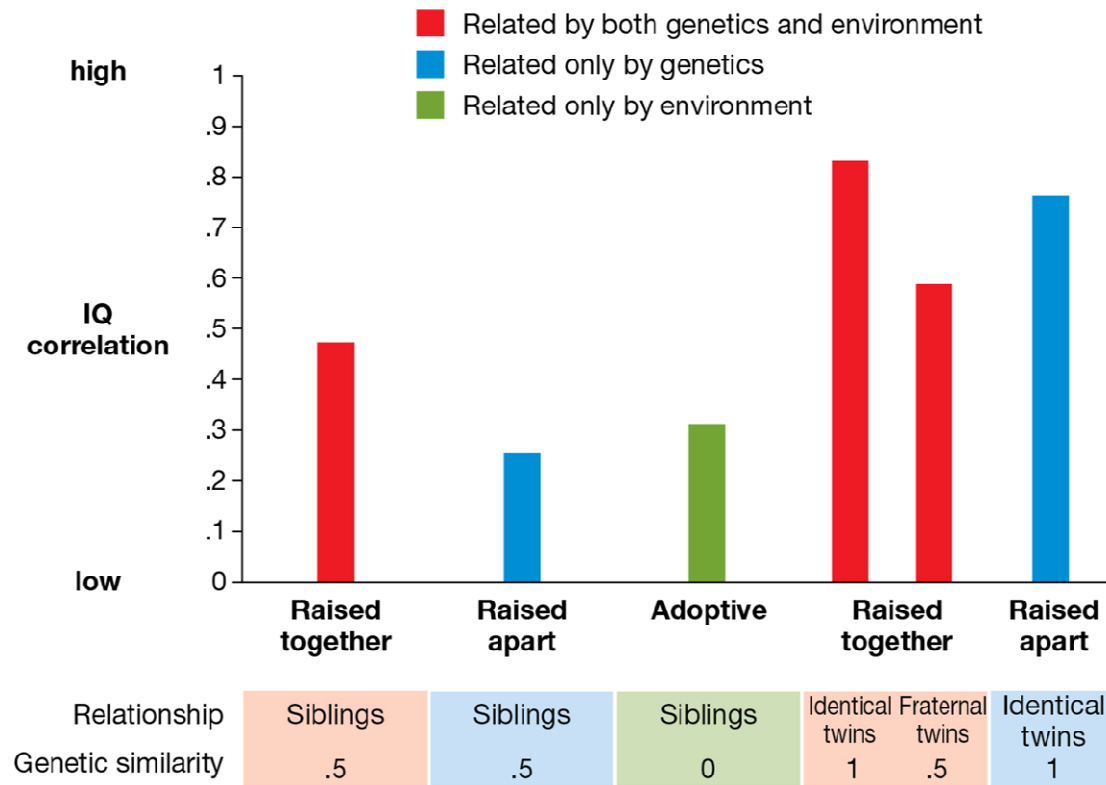


FIGURE 8.28

Where Does Intelligence Come From?

Figure 8.28 (reformatted): Genetics, Environment and IQ Scores

Genetic overlap	Relationship	Raised apart	Raised together
0%	Adopted children	.00	.02
0%	Adoptive parent and child	.00	.24
0%	Adopted siblings	.00	.32
50%	Biological parent and child	.24	.42
50%	Siblings	.24	.47
50%	Fraternal twins		.60
100%	Identical twins	.72	.86

Evidence for the Influence of Genetics on Intelligence

- As genetic overlap increases (reading from the top of the table to the bottom of the table), the correlation (similarity) of intelligence increases between siblings/parents increase.

Evidence for the Influence of the Environment on Intelligence

- As the environmental similarity increases (reading left to right of the table), so does the correlation of intelligence between siblings/parents increase.

Both genetic and environmental factors influence intelligence.

Environmental factors influencing intelligence

Many environmental factors can influence brain development and intelligence.

Average IQ scores, like height and weight, have steadily increased over the last 100 years. As a group, Black Americans once scored about 15 points lower than White Americans; however, this gap has narrowed over the past few decades to 10 points or less. Environmental changes occur much more drastically than the genetic variations in one or two generations.

The general factors are looked at to explain the increase in IQ scores

- Economics and Socio-economic Status (SES)
- Education
- Culture

Environmental factors influencing intelligence

Economics and Socio-economic Status (SES):

- The average IQ difference between being raised in a high-SES family compared to a low SES family is about 12 to 18 points of IQ (page 347).
- Siblings adopted by an upper-middle SES family had an average IQ of 109, while the sibling raised by a low SES family had an average IQ of 95.
- White families who are highly educated and above average in occupational status and income (families with a high SES) who raised Black children had IQ scores higher than the average scores of other black and white children.

It is hypothesized that a higher SES provides children with better nutrition, better medical care, lower stress levels, and less likely to be exposed to environmental toxins such as air pollution and lead (page 347). All of these can influence brain development.

In addition, children in a higher SES family are more likely to be breast fed, which is associated with a higher IQ, provide a more cognitively stimulating environment and caregivers who interact with their children more often.

Environmental factors influencing intelligence

Education:

- When schooling is delayed by war, political strife, or lack of qualified teachers, children show a measurable decline in IQ ([page 412](#)).
- African American children who were exposed to an intensive early-education program that began when they were 6 months old and lasted until they entered kindergarten showed higher IQ scores when compared to a control group of similar children.

Environmental factors influencing intelligence

Culture:

- In early childhood there is no difference in IQ between Chinese, Japanese and American children. However, Chinese and Japanese middle school children tend to score above White Americans on both math and reading. These differences appear to be due to different educational systems.
- The average IQ is lower for members of a discriminated-against minority group—even when the group is not racially different from the dominant group. The Buraku, the poorest people in Japan have lower IQs than the Japanese. However, when they are treated like "Japanese" in America, they score just as well as any other Japanese Americans.

It is argued that poor treatment of minority groups can make them pessimistic about their chances of success within their cultures, potentially making them less likely to believe that hard work will pay off for them (page

Intelligence and Intelligence Testing

Alfred Binet and Theodore Simon developed intelligence tests as an independent method to identify students who needed remedial education and those who excelled.

They viewed intelligence as something that can develop and improve over time with an education, training and practice and not something that was fixed and static.

However, as the intelligence tests came to the United States, they were used for purposes that they were not originally intended. At the turn of the 19th century, there was an anti-immigrant movement. To justify limiting immigration, it was argued that immigrants were less intelligent than Americans and the British. Intelligence tests were inappropriately used to support this claim.

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 early intelligence tests (The Mismeasure of Man, 1981, p 200).

- (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.)

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)?

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)?

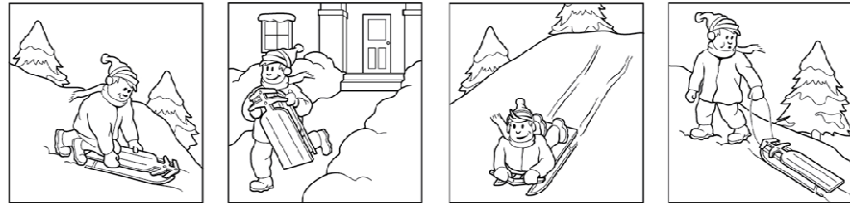
Some typical IQ items are based on knowledge of upper middle-class culture.

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.

Wechsler's Adult Intelligence Test Items

Wechsler's intelligence test was designed for adults, rather than children and provided scores on 11 subtests measuring 11 different abilities.

(a) **Picture Arrangement:** The pictures below tell a story. Put them in the right order to tell the story.



(b) **Object Assembly:** If these pieces are put together correctly, they make something. Put them together as fast as you can.



(c) **Digit-Symbol Substitution:** Using the code in the top line, fill in the missing information in the bottom test picture.

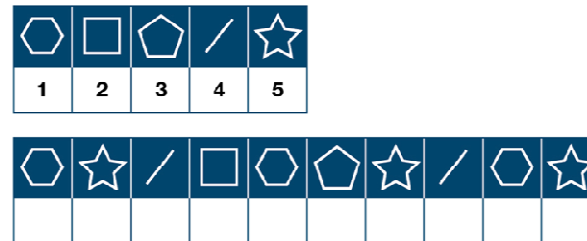


FIGURE 8.32

Wechsler's Adult Intelligence Test Items

VERBAL

General Information

What day of the year is Independence Day?

Similarities

In what way are *wool* and *cotton* alike?

Arithmetic Reasoning

If eggs cost 60 cents a dozen, what does 1 egg cost?

Vocabulary

Tell me the meaning of corrupt.

Comprehension

Why do people buy fire insurance?

Digit Span

Listen carefully, and when I am through, say the numbers right after me.

7 3 4 1 8 6

Now I am going to say some more numbers, but I want you to say them backward.

3 8 4 1 6

PERFORMANCE

Picture Completion

I am going to show you a picture with an important part missing. Tell me what is missing.

'85						
SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Picture Arrangement

The pictures below tell a story. Put them in the right order to tell the story.



Block Design

Using the four blocks, make one just like this.



Object Assembly

If these pieces are put together correctly, they will make something. Go ahead and put them together as quickly as you can.



Digit-Symbol Substitution

Code	△	○	▱	×	◇
	1	2	3	4	5

Test

1	5	4	2	1	3	5	4	1	5

Stereotype Threat

Standardized tests attempt to make the conditions in which people take the test as uniform as possible. However, it is impossible to standardize all conditions including expectations that we might have with regards to groups of people and their performances.

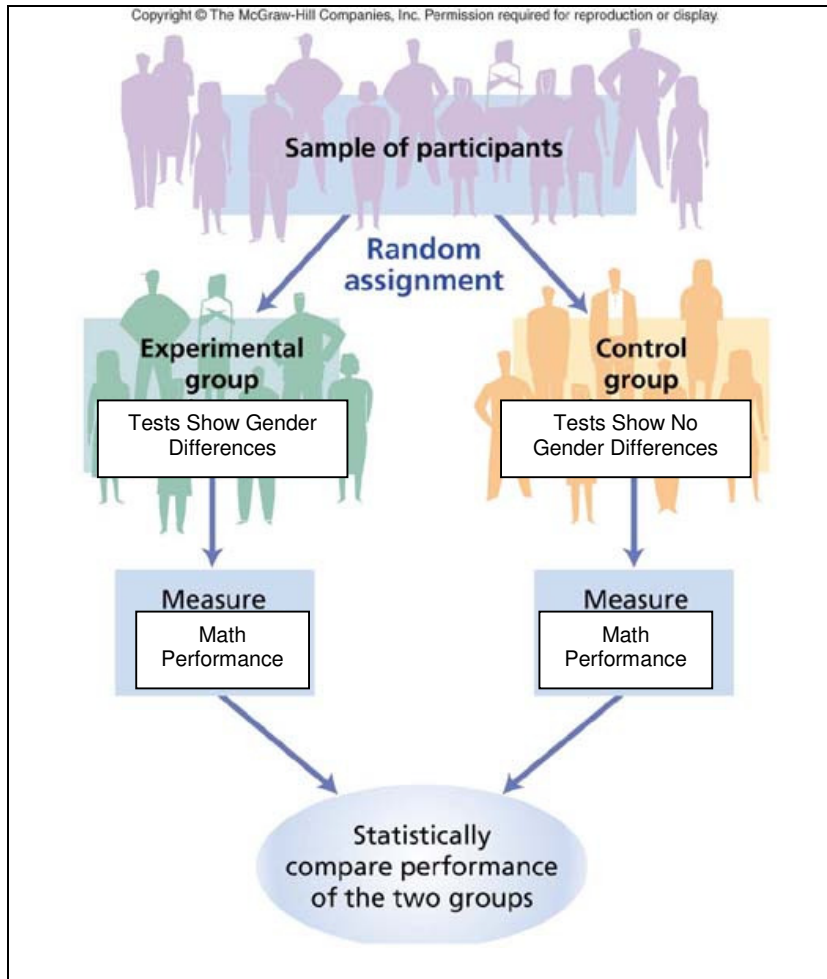
Stereotype Threat: A psychological predicament in which the fear that you will be evaluated in terms of a negative stereotype about a group to which you belong is activated, creates anxiety and self-doubt. This anxiety and self-doubt lower performance in a particular domain that is important to you.

For example:

- Women and math
- Minorities and academic performance
- Blonds and intelligence

These negative stereotypes that exist within a society can evoke anxiety and undermines performance on assessments of academic performance ().

Stereotype Threat

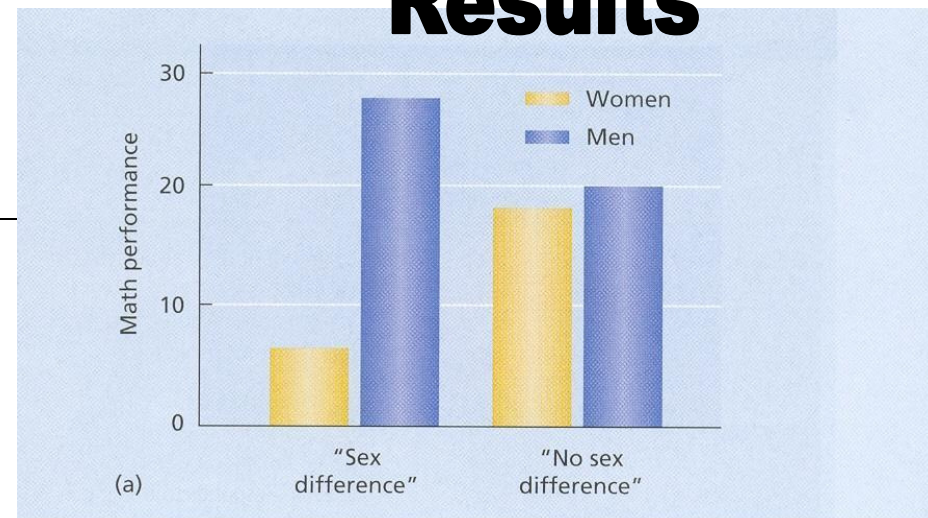


Men and Women who were good at math were selected. Both were equally capable.

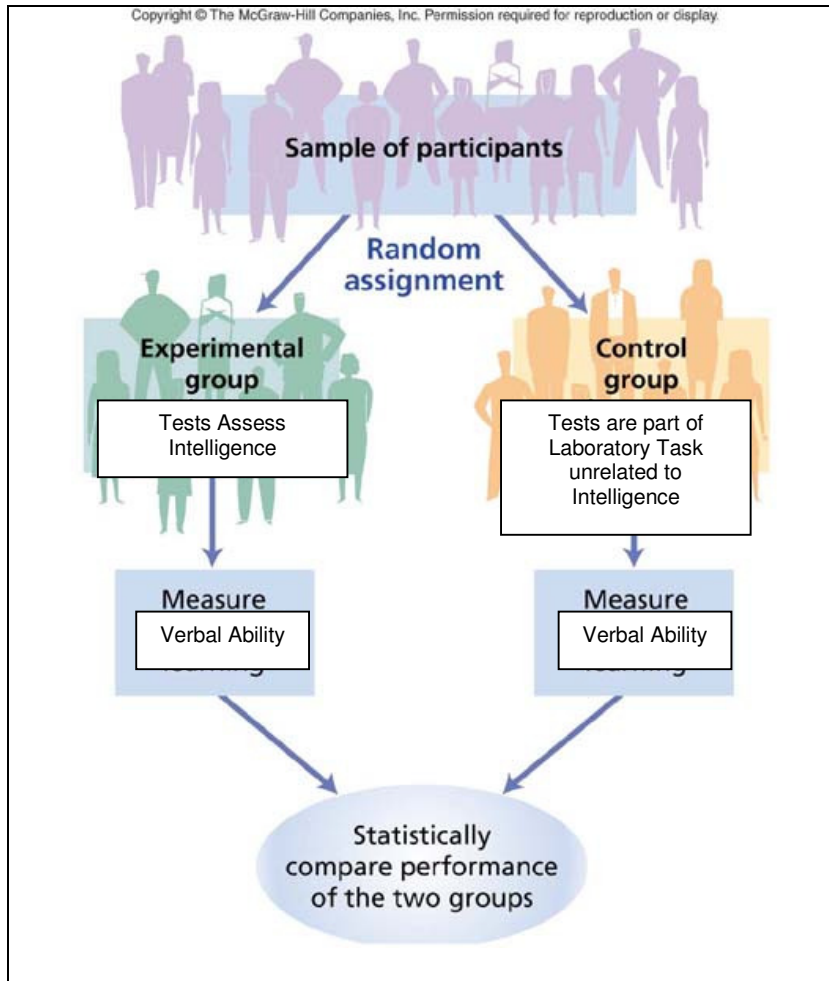
They were randomly assigned to the expectations about the exam (IV)

Their math performance was assessed (DV)

Results



Stereotype Threat

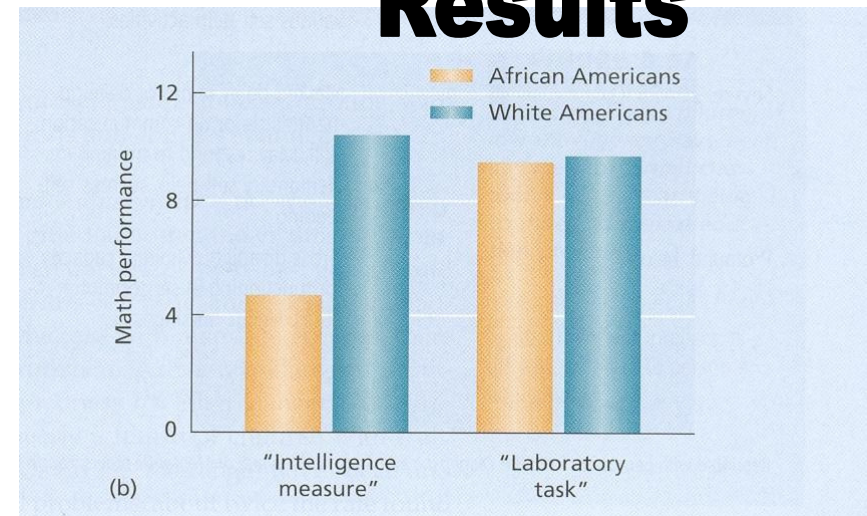


African Americans and White Americans were selected. Both were equally capable.

They were randomly assigned to the expectations about the exam (IV)

Their verbal ability was assessed (DV)

Results



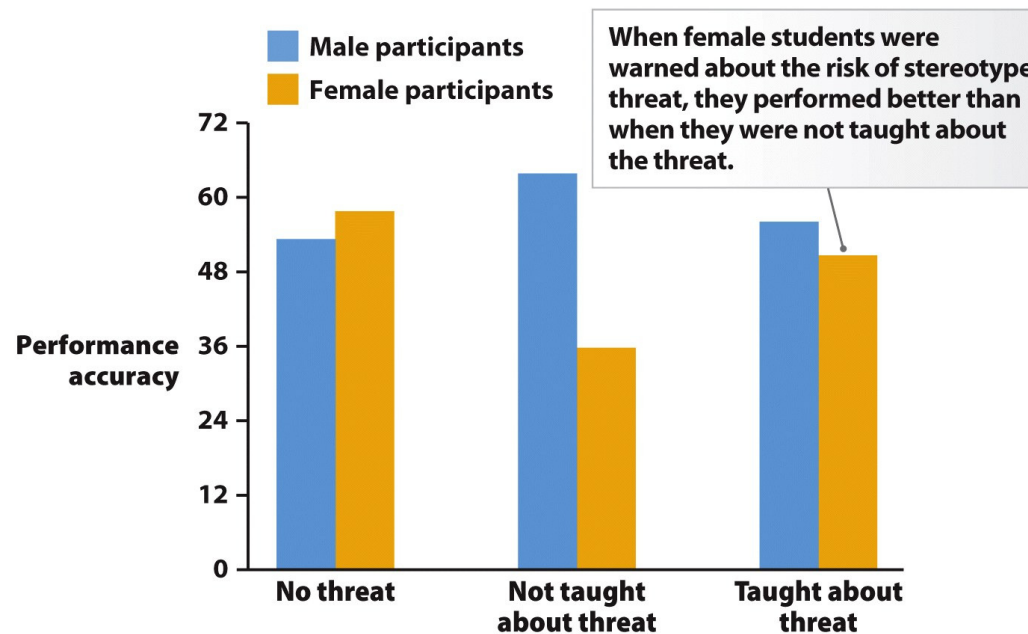
Stereotype Threat

Stereotype threat has been demonstrated from a range of stereotyped groups (e.g. Blacks, Latinos, Turkish Germans, women).

The stereotyped groups performed worse than the non-stereotyped groups in evaluative conditions, but not when an exam is presented as non-evaluative.

Stereotype Threat

Informing people about the negative consequences of stereotype threat can reduce its effect.



Psychological Science, 4/e Figure 8.41
© 2013 W. W. Norton & Company, Inc.

Focusing on your positive characteristics of your lives does also reduce the effects of the negative stereotypes of your group. Other studies have found that bolstering peer relationships reduces the stereotype threat ([page 351](#)).