

Teaching Current Directions in Psychological Science

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C. Nathan DeWall, University of Kentucky, and renowned textbook author and APS Fellow David G. Myers, Hope College, have teamed up to create a series of Observer columns aimed at integrating cutting-edge psychological science into the classroom. Each column will offer advice and how-to guidance about teaching a particular area of research or topic in psychological science that has been the focus of an article in the APS journal Current Directions in Psychological Science. Current Directions is a peer-reviewed bi-monthly journal featuring reviews by leading experts covering all of scientific psychology and its applications, and allowing readers to stay apprised of important developments across subfields beyond their areas of expertise. Its articles are written to be accessible to non-experts, making them ideally suited for use in the classroom.

Thinking Smarter About Intelligence

by David G. Myers

[Tucker-Drob, E. M., Briley, D. A., & Harden, K. P. \(2013\). Genetic and environmental influences on cognition across development and context. *Current Directions in Psychological Science*, 22, 349–355.](#)

Elliot Tucker-Drob and colleagues at the University of Texas at Austin (2013) offer a compelling synopsis of how genes and environment conspire to influence intelligence. To set up students' reading or discussion of these principles — which educated people should understand — we suggest starting with a little multiple choice test:

1. Cognitive ability in the industrialized world “is approximately 50% to 70% heritable,” reports the Tucker-Drob team. This means that
 - a. 50% to 70% of one’s cognitive ability is attributable to one’s genes.
 - b. 50% to 70% of the variation among individuals is attributable to their genes.
2. The genetic influence on intelligence scores (heritability) is greatest
 - a. early in life (for example, at age 3), before varied experiences diverge our life courses.
 - b. later in life (for example, at age 50 and beyond).
3. The genetic influence on intelligence scores is greatest among those
 - a. at lower socioeconomic levels.
 - b. at higher socioeconomic levels.
4. Increasing the quality and availability of educational opportunity serves to
 - a. decrease the genetic influence on intelligence scores.
 - b. Increase the genetic influence on intelligence scores.

Surprisingly — to most of your students? — the answer to each is “b.”

To explain each item . . .

Heritability rivals negative reinforcement as a candidate for psychology’s most frequently misunderstood concept. As we teach our students, if the heritability of height is 90%, this does

not mean that a 60-inch-tall woman can credit her genes for 54 inches and her environment for the other 6 inches.

Early environments vary. And people vary — in abilities, interests, and motivation (all genetically influenced traits). With time and age, people with differing traits will select, and be selected into, different environments. High-aptitude people find their way into more educationally enriched environments, which strengthen their preexisting aptitudes. This gene-environment transaction helps explain why, across 11 longitudinal twin and adoption studies, genes accounted for 25% of the variation in infant cognitive ability and 70% of the variation in adolescent cognitive ability. (Puberty may also “trigger changes in gene expression,” report Tucker-Drob et al.)

Enriched environments are less available to people at lower socioeconomic levels, providing less opportunity for traits to influence opportunities. In higher socioeconomic contexts, children have greater opportunities “to select and evoke positive learning experiences” based on their genetically influenced abilities and motivation.

Environmental quality, such as universal education, maximizes the genetic influence on human differences in cognitive ability. Tucker-Drob et al. offer an example: In 1960, the average Norwegian adult had a sixth-grade education. (Educational attainment was dependent on socioeconomic class.) By 2000, the average person had a high school degree. Over this period, the heritability of educational attainment nearly doubled — from 40% for twins born before 1940 to 70% for those born after 1940. Universal education increased the possibility of people selecting environments which maximized their potential.

Ergo, conclude the Tucker-Drob team: Forget the idea that if cognition is heritable, then environments don’t matter. The truth is quite the opposite: “*Genetic influences on cognition are maximized by environmental opportunity.*”

To generalize, forget genes *versus* environment. Think — and teach students to think — genes interact with environments.

References

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