



## Guest Editorial

## An endless cycle of ignorance is the consequence of not offering classes on IQ and human intelligence



## ARTICLE INFO

## Keywords

Intelligence

IQ

Teaching

Science communication

I received a Ph.D. in *Experimental Psychology* (emphasis intended) in the late 1980's, after receiving Master's and Bachelor's degrees in Psychology at different institutions. All of my degrees were granted by "major American Universities", and all had large, content-diverse faculties. Given these many years of education in psychology, you might expect that I had been exposed to material relevant to human intelligence and IQ testing, but you would be wrong. I never had a dedicated course, nor even a formal discussion of the topic within a larger course. (In the interest of full disclosure, I do recall a brief discussion of the Stanford-Binet methods in my undergraduate Introductory Psychology class.) Was my lack of exposure to intelligence research and IQ testing a case of benign neglect on the part of my professors, or was it a case of active avoidance? As described below, my recent experiences strongly suggest the later.

Although intelligence (and more generally, differential psychology) was of principal interest to early psychologists (see devoted chapters in our earliest textbooks, e.g., [Seashore, 1923](#)), its inclusion in the curriculum fell out of favor by the 1940s. This shift in emphasis can be traced to two factors (see [Sauce & Matzel, 2013](#), for an extensive discussion). First, prominent psychologists in the early 20th century had begun to eschew correlational methods (essential to differential psychology) in favor of experimental manipulations. In a rare moment of agreement, prominent researchers including Clark Hull ([Hull, 1951](#)) and Edward Tolman ([Tolman, 1924](#)) rejected the value of correlational psychology, with Tolman stating that "individual difference variables [were] average standard values" and that factor analyses (critical to differential methodologies) "do not seem to suggest simple or agreed-upon results, for instance, in the case of intelligence research". More critically, early intelligence research was plagued by overt racism and sexism, which contributed to the emerging eugenics movement ([Rose, Kamin, & Lewontin, 1984](#)). While these influences are no longer commonplace (any more than they are in *any* societal endeavor), their legacy is

engrained in popular culture, and has led to widespread misperceptions about the contemporary field. While the study of intelligence and IQ testing thrives in 2024, it remains an isolated discipline that is widely misunderstood and undervalued by both academics and the general public.

In 2013, a review of our curriculum at my home institution (Rutgers University) revealed that many (or most) of our 36,000 undergraduates received their degrees without *ever* having *written* anything! Our classes are large (I regularly teach sections with 200+ students), which usually necessitates multiple-choice exams, and an inclined student can obtain his/her degree without ever being burdened with writing. Consequently, we instituted a new program in which all graduating seniors were required to take at least one "writing-intensive" course. I was recruited to develop and teach such a course, with the promise of enrollments capped at 25 students. This was a welcome opportunity to teach a smaller class limited to seniors and to develop a new course devoted exclusively to human intelligence.

To begin preparation for my course (*The Architecture of Intelligence*; syllabus available on request), I spent several days looking for similar courses offered by our large public and private U.S. colleges and universities. I was able to identify only *four* relevant courses, but none were currently offered, and two of them had not been offered in years. This was entirely consistent with my experience as both an undergraduate and graduate student, and left me without any real foundation from which to proceed. Fortunately, by 2014 I *had* learned something about the field, and moreover, knew of two excellent textbooks with which could supplement my own material. (I considered texts by [Mackintosh, 2011](#) and [Hunt, 2011](#), and ultimately chose Mackintosh for my own parochial reasons.)

I wondered whether current senior Psychology students would, like me as an undergraduate, lack prior exposure to the contemporary field of IQ and human intelligence. So, I decided to start gathering "data" with

<https://doi.org/10.1016/j.intell.2024.101827>

Received 5 March 2024; Accepted 5 March 2024

Available online 29 March 2024

0160-2896/© 2024 Elsevier Inc. All rights reserved.

a short student survey comprised of six, mostly open-ended and intentionally vague questions. My only goal was to understand what *opinions* students had prior to this class. Because opinions emerge out of experience, it would be possible to get some sense of their prior exposure to the material. Below is copied verbatim the survey that was administered to my first class:

Here are a few open-ended questions (requiring 1–3 sentence responses). Your responses are NOT going to be graded, and there may not be a single “right” answer. Provide honest answers, i.e., don’t tell me what you think I want to hear, rather, tell me what you *believe* or what you may have previously learned. I WANT TO KNOW WHAT YOU BELIEVE. Having not studied this subject before, I expect that your answers will be no more than general impressions.

1. Write a brief definition of “intelligence”.
2. Do intelligence tests (i.e., “IQ” tests) measure anything useful? In one or two sentences, support your answers.
3. Is intelligence testing a good thing or a bad thing? Why?
4. What is an IQ score, i.e., how is it computed?
5. Do group (e.g., sex, nationality, race, economic status...) differences exist in performance on IQ tests? Are these differences *real*? Are they *meaningful*?
6. Does education cause a significant increase in intelligence?

In general, senior psychology majors knew very little about the topic of intelligence, but more importantly, they were grossly *misinformed* and had overwhelmingly negative views of the field. After this first experience, I decided to administer this same survey (with no revisions) the next eight times that I offered the course. In total, I collected responses from 230 students (I ultimately capped enrollment at 30, and the class filled every time that it was offered).

Below, I’ll provide both qualitative and quasi-quantitative summaries of the responses to each of the above six questions. Of course these “results” are not necessarily representative of *all* university students, but given other evidence (described below) and my own academic history, they are certainly cause for concern.

### 1. Question 1. Write a brief definition of “intelligence”

The by-far most common response was a variant of the following: “How much knowledge a person has.”

Variants:

- “Intelligence is what you have learned throughout your life.”
- “How much information you have.”
- “How much information you have been exposed to.”
- “Having knowledge and skills.”
- “A person’s general knowledge.”
- “The knowledge and skills of an individual.”
- “How much you have learned.”
- “Having valuable knowledge.”
- “Knowledge about a particular topic.”
- “Depth of knowledge.”

The suggestion that intelligence was synonymous with acquired knowledge accounted for 52% (118/230) of the responses. Only 18% (41/230) of respondents wrote variants of the idea that intelligence reflected something analogous to an individual’s capacity for reasoning or problem-solving. Examples include:

- “The ability to think critically and solve problems.”
- “The capability to acquire and use knowledge effectively.”
- “The ability to solve novel problems.”
- “Problem solving and how fast you can see relationships.”

“The ability to use logic and reason.”

Most of the remaining responses referred vaguely to “mental capacities or abilities”, were not easily classified, or were simply circular in nature. Examples include:

- “Intelligence refers to mental capacities.”
- “The formation of different skill sets.”
- “How smart a person is.”
- “There are many forms, including emotion, social, and mental.”
- “Something that is measured to tell a person’s ability.”
- “Intelligence is synonymous with common sense.”
- “The IQ that you are born with.”
- “An arbitrary notion of cognitive processes.”
- “The baseline of aptitude.”

We recognize that even among “experts” in the field, intelligence is difficult to define, and no single definition prevails. Of 230 respondents, about ten *did* provide definitions that approached common or widely cited definitions (e.g., [VandenBos, 2015](#)), including:

- “The ability to see connections and formulate solutions to novel problems.”
- “The capacity to process information in a way that it allows the individual to solve cognitive problems or find solutions quickly.”
- “The ability to reason, problem-solve, and formulate abstract ideas. This influences the general ability to solve cognitive tasks.”

In summary, most senior psychology majors at Rutgers University are of the opinion that intelligence is synonymous with acquired knowledge. Only two students of the sample of 230 explicitly stated that intelligence might be an ability that could impact the acquisition of knowledge. For the vast majority, the direction of cause-and-effect was entirely ignored. This naturally leads to an assumption that the students who equate knowledge and intelligence will also believe that intelligence is solely a product of experience or opportunity, i.e., more experience (e.g., as might accompany higher economic status) leads to more opportunities to obtain knowledge. This single assumption will likely lead to downstream errors in response to subsequent questions, and as you will see, it did.

### 2. Question 2. Do intelligence tests (i.e., “IQ” tests) measure anything useful? In one or two sentences, support your answers

Here, responses were somewhat more difficult to classify, but only 37/230 students explicitly wrote that intelligence tests measured something “useful”. Overwhelmingly, responses generally reflected the opinion that IQ tests measured something artificial (e.g., “society’s ideas”), told us little about “real” intelligence, and the very popular “do not measure all forms of intelligence”. Typical responses took the form of “They only measure how well an individual understands what is expected by the dominant culture” and “They are not useful because they only measure one type of intelligence (which may not be important)”. Variants of these responses included:

- “They can help to measure knowledge, but that’s pretty much it. They don’t really measure intelligence.”
- “I don’t believe that if a person has low IQ that they are not intelligent. Society shouldn’t decide what is intelligent.”
- “No. Comprehending how to ignite firewood is not the same as being able to.”
- “I personally never believed in them. Real intelligence is different for every person. Each person has unique traits, abilities, and knowledge. IQ tests don’t measure any of that.”
- “It isn’t ‘meaningful’ to conclude that a person’s capacity is determined based on one score.”
- “IQ tests only measure what society thinks is important.”
- “No, because intelligence tests don’t measure real intelligence.”

*"They only measure performance on that test and don't generalize. I guess they are relatively useless."*

*"For parents that only hope their children grow up with health and happiness, IQ tests are not useful."*

*"No, because there is not a standard for measuring the test."*

Of the 37 students who responded that IQ tests were useful, 19 of them wrote some variant of them being useful because *"they measure the knowledge that you have"*.

A large percentage of students (70/230) wrote that IQ tests only reflect test-taking ability. Examples include:

*"A person could be smarter than Albert Einstein but may not be a good test taker"*.

*"You can do poorly on IQ tests just because you are bad at tests."*

*"The only thing that IQ tests are good for is measuring test-taking skills."*

*"Someone could be a genius but if they are bad at tests they will have a low IQ"*.

*"No. They measure how well you do on tests."*

Somewhat more beguiling answers included:

*"They don't measure anything useful, only where someone's intelligence is relative to other people."*

*"No. They focus too much on content and not on simpler things."*

*"They are not useful because you can improve after measuring mistakes on the first one."*

*"They only provide comparative statistics which are not really about intelligence."*

*"IQ tests only tell how well you memorize."*

*"They are not useful because some questions are out of the ordinary."*

Apparently, students were generally unaware of the actual content and structure of modern IQ tests, and had no explicit knowledge of the predictive utility of IQ tests. Overwhelmingly, they had a generally negative opinion of IQ testing.

In retrospect, I wish I had included on my survey the simple question "Have you ever heard of the Ravin's Progressive Matrixes (RPM) IQ test?". Many students seem to think that IQ tests are necessarily culturally-loaded (e.g., the Stanford-Binet), leading to their misperception that IQ tests measure only "what you have learned" and reflect norms that are culturally-determined. As I introduce modern testing methods in my class, I begin the discussion of the RPM by asking students whether they have had any prior discussion of the test in any of their classes. The answer is universally "no", and in fact, I don't recall a single student in the last 10 years having even heard of the test. Even the most rudimentary exposure to the test or its design would moderate their opinion that IQ tests necessarily measure only "knowledge" and that their content is necessarily biased to particular populations or cultures. Students should realize that intelligence researchers and the designers of IQ tests are well-aware that some IQ tests are culturally-loaded. This is not a novel observation (although I think that it is often presented as such by professors in other classes), and the designers of these tests (as well as the researchers who use them) have considered it and debated its ramifications for over 100 years. There is a place for culturally-loaded tests (we know which ones they are), and there is a place for tests with minimal cultural saturation (we know about those too). Students will understand these differences only if they are exposed to the material. (The same argument applies to students' "insight" that there are "multiple types of intelligence".)

### 3. Question 3. Is intelligence testing a good thing or a bad thing? Why?

Here, I had hoped to stimulate some thoughts about how intelligence test results might properly be utilized, but instead, the responses to the prior questions (and this question's lack of specificity) may have cast a different die.

Responses were very mixed, with most students seeming to split the

baby. Of 230 students, 106 responded that IQ testing could be good or bad, 66 responded that it was a bad thing, and 58 responded that it was a good thing. For those who took the position that it was either "good" or "bad", their justification for these positions was not based on serious considerations or was a reiteration of their responses to prior questions. Some examples include:

*"Bad thing. IQ tests do not properly measure all forms of intelligence."*

*"It's a bad thing because it only measures one type of intelligence."*

*"It's a bad thing because it over-emphasizes intelligence and ignores hard work."*

*"It's a bad thing because you cannot truly test what a person knows based on a set of standard questions."*

*"It's a good thing because it measures how much information a person retains"*.

*"It's a good thing because it proves to others what you know."*

*"It's a good thing if it makes you use your brain in new ways."*

*"It can be good or bad, but it depends on what an IQ score is used for."*

A small minority of students (~20/230) responded in a way that suggested they were thinking about the broader implications of IQ testing and understood the complications inherent in the use of IQ test scores. Examples include:

*"IQ testing can be good for placement in classes. However, we have to be careful that students aren't branded and then trapped based on an early IQ score."*

*"IQ test results can be useful, but they can't be used in a way that discourages an individual or makes an individual think that school will always be easy."*

*"IQ testing is good for the purpose of making sure that individuals of the same ability are grouped together so that teachers can teach effectively. However, it can be bad if a student gets stuck at a level just because of the teacher's expectations."*

*"Somewhat good, somewhat bad. If a person scores low it can bring down their expectations and their teachers' expectations. If someone scores high, their teachers might be biased to promote them unfairly."*

In summary, it seems most undergraduates had not been exposed to any serious discussion of the way in which IQ tests could be used effectively, although many seemed to think IQ testing should simply be avoided.

### 4. Question 4. What is an IQ score, i.e., how is it computed?

Here, I wanted to discern whether students understood that IQ tests were standardized for age and that an IQ score of 100 was the mean. Maybe (I hoped) some students might note that while raw performance could increase early in life and decline in old age, the IQ score would remain stable. This later hope was ill-founded, as almost no students could communicate the nature of the IQ score, and the single dominant response (69 of 230) was a variant of "I'm not sure". Examples of responses include:

*"It's an intelligence quotient, but I have no idea how it is computed."*

*"I think it's some average divided by 100."*

*"It's a series of questions that a subject fills out."*

*"It's a quotient measured by completing a test."*

*"It's a total added from test answers."*

*"I'm assuming there's an algorithm to do it, but I don't know."*

*"A subject takes the test, and their score is placed within the bell curve."*

*"It is just the number of right/wrong answers."*

*"I don't know how it's computed."*

Only a few students indicated any familiarity with the concept of an age-standardized quotient. Examples included *"After taking an*

established test, the score is compared to others of the same age and divided by 100” and “An IQ score is how well you do on a cognitive test compared to people in your age group by creating a bell curve.” Five students provided variants of these responses, although none of them described the scoring method in a way that suggested any real understanding of the underlying methodology.

Again, my question may have been too vague to illicit exact responses. However, given that only five students mentioned anything related to standardization, I have to assume that most had never been exposed to this concept. This is particularly revealing, because if they had been exposed to any discussion of IQ testing, it likely would have been in the context of history and a description of the early Stanford-Binet test and Terman’s development of a standardized “IQ” score. Either my students had never heard this discussion, or it was too superficial for them to retain any useful understanding.

##### 5. Question 5. Do group (e.g., sex, nationality, race, economic status) differences exist in performance on IQ tests? Are these differences real? Are they meaningful?

The answer to this question is obviously complicated (e.g., [Sauce & Matzel, 2018](#)) and controversial, but I felt confident that of all the questions posed, this one would elicit strong opinions that would reflect popular opinion if not prior exposure to these issues in formal classes. Surprisingly, the overwhelming consensus was that group differences do exist, with 209 of 230 students responding “yes” to this question. (Of the 21 students who responded “no”, only six of them provided an explanation for their response. Those explanations suggested a conflation of scores with potential underlying causes for group differences, e.g., “No. The tests are biased.”) Of the students who responded “yes” (group differences do exist), there was a roughly even split between those who thought those differences reflected the influence of environment and those who thought those differences reflected a bias in the test design. Examples of these two classes of responses included:

*“The questions are geared toward certain groups, and this accounts for group differences.”*

*“People want to see higher scores in certain groups to prove that group is ‘smarter’. They make the tests to prove that. I believe that all groups are really equal.”*

*“Real differences exist but they are due to social stigmas/prejudices and differences in access to resources.”*

*“They do exist, but this doesn’t take into account the way the tests are scored.”*

*“The design of the test is skewed toward information that one group will understand better than other groups.”*

*“Yes, but it’s because of the amount of extra help that some groups get.”*

*“Definitely yes, but it’s entirely due to the impact of different environments.”*

*“Group differences exist, but only because of differences in background.”*

*“The tests are built so that some groups will look smarter.”*

*“They exist, but these tests are given in a way that ignores cultural differences.”*

The good news is that students were at least willing to accept that scores can differ while the interpretation of those differences might be complicated. The overwhelming consensus was that if differences exist, those differences must reflect the nature of the test (and its biases) or environmental disparities across test-takers. The bad news is that so many students believed that test design is *deliberately* biased to favor certain groups.

##### 6. Question 6. Does education cause a significant increase in intelligence?

Given the nature of responses to previous questions and the open-

ended nature of this question, one would correctly expect that the majority of students would respond “yes”. That was indeed the result, with (excluding “maybe”), 172 of 180 students responding in the affirmative. Notably, familiar themes emerged that suggested that the students had had no serious prior exposure to the topic, or worse, had been explicitly misinformed. Most who responded in the affirmative stated a variant of either “education leads to more knowledge so that you can answer more questions”, or that “education prepares you to take the test”. Some examples include:

*“Probably, since educated people are used to taking tests.”*

*“Yes, since educated people are trained in critical thinking.”*

*“Yes, but it depends on the education and if those questions are asked on the test.”*

*“Yes, because when you learn things new neurons are born that can carry more information.”*

*“Yes, but it depends on the intelligence that you are looking for.”*

*“Yes, because education prepares you to take tests”.*

*“Yes, because it gives us the knowledge to answer the questions.”*

*“Yes, because it allows us to learn the concepts covered on IQ tests.”*

*“Yes: education = knowledge = IQ.”*

*“Yes, because you’ve had practice taking tests.”*

There were only a few contrary views:

*“Most intelligence is determined by age 5 or 6, so education probably has nothing to do with it.”*

*“No, because although education increases knowledge it doesn’t increase intelligence, which is how someone can apply the knowledge that they already have.”*

*“Yes, but not nearly as much as heredity.”*

No students suggested any knowledge of the interplay between genes and environment, much less the complex nature of cause-effect relationships. For instance, not a single student suggested the possibility that higher intelligence might lead to more education. Of course, the question was not framed in such a way that I would necessarily expect such responses, although had there been any serious discussion of the material in prior classes, I would certainly expect some students to refer to it. In summary, the overwhelming majority of students believe that education can influence IQ, but only to the extent that it provides the test-taker with more “knowledge” or better “test-taking skills”.

##### 7. Summary of responses

The answers to my survey suggest that psychology students do not simply lack a proper background in the science of intelligence, but instead (and worse), have been exposed to superficial (but often dogmatic), outdated, and misleading claims. Despite *knowing* very little, my students expressed strong opinions that suggested that they believed that IQ tests were necessarily biased, might be used for nefarious purposes and/or provide misleading results, don’t really measure “intelligence”, only measure knowledge, are explicitly designed to support preconceptions about group differences, do not predict any functionally useful outcomes, only measure “one type” of intelligence, and favor those with prior practice taking tests.

Based on the above (and the scarcity of formal classes in the United States), I must conclude that our teaching and communication about the nature of intelligence and IQ testing has been woefully inadequate and/or overwhelmed by ill-informed “experts”. Again, my survey was administered only to Rutgers undergraduates, but as I describe below, they are not alone in their misperceptions of IQ testing and human intelligence.

### 7.1. A solution in the form of a parable

My maternal and paternal grandparents immigrated to the U.S. from Eastern Europe in 1918. Had they attempted to immigrate just six years later, they likely would have been denied entry owing to the national origin restrictions on immigration imposed by the Immigration Act of 1924. A major impetus for that Act was the concern that immigrants from Eastern Europe were of low intelligence (an assumption based in part on the WW1 Army Alpha IQ tests). Much as today, a widespread belief had emerged that “intellectually inferior” immigrants would “dilute our gene pool” (c.f., “poison our blood”). Coupled with their low economic status (which, along with religious beliefs limited their use of birth control), it was widely assumed that an influx of Eastern Europeans and other similar groups would contribute to a decline in national IQ.

Like many immigrants from Russia and Poland, both of my grandfathers found employment in coal mines when they reached the United States (and both died of mining-related accidents and illness). Unlike my grandparents, my own parents lived comfortable middle-class lives, during which my father served in WW2 and was employed as an army orthopedic technician for several decades after the war. Two generations after my grandparents’ arrival in this country, I received a doctorate in Psychology in 1988.

My family’s generational experience is far more a rule than an exception. What is striking is that *it could be predicted* by research conducted in the field of IQ and human intelligence. By 1988, it was widely understood (based on James Flynn’s observations, e.g., Flynn, 1984) that IQ in industrialized nations increased tremendously in the 20th century, a product of the feedback loop created when cognitive opportunities were matched to cognitive abilities. This increase in national IQ happened *despite* the repeal in 1927 of national origin restrictions imposed in 1924. Moreover, we know that the IQ of immigrants from impoverished countries tends to rise toward the level of the IQ of the more wealthy countries that they immigrate to, i.e., large IQ gains are associated with trans-national adoption of young children (see van Ijzendoorn, Juffer, & Poelhuis, 2005, for a meta-analysis), and smaller, but still significant gains are seen among adult immigrants (Rindermann & Thompson, 2014). Research studies, the accumulation of data, and active communication (e.g., through our classes) are our best tools against ignorance and preconception. Rather than being the impetus for discrimination and prejudice, contemporary intelligence research provides an empirical basis from which to argue against them. *These* are messages that can be conveyed in our classes and communicated with the broader public.

Seemingly, we avoid teaching classes on IQ and human intelligence to avoid its many controversies, including those associated with the eugenics movement, self-fulfilling prophecies engendered in WW1 Army IQ testing, and the social movements that superseded the Immigration Act of 1924. Rather than avoid these topics, they should be embraced and countered with the great successes of intelligence research. The scientific method is one of humanity’s great achievements. Of course, *scientists* can be flawed, and the “truth” can be obscured during the process of trial-and-error. In the end though, the application of the scientific method ultimately reveals the “truth”. In 1924, it was reasonable to fear the effects of immigration on national IQ. Although history seems to repeat itself in popular culture, we now have data from which to make rational arguments that prove the contrary. *These* are the stories that needs to be conveyed to our students. Students who are exposed to contemporary research and rational discussion will be immediately dissuaded from their unfounded beliefs about the nefarious intentions of IQ testing and intelligence research.

Ignorance and misinformation about the nature of intelligence and IQ testing is not limited to undergraduates. In a grant review that I received in 2012, an “expert” reviewer wrote that “*Intelligence is a social construct and it’s study has no place in biology.*” Similarly, I was once told by a dean of my division that “*Intelligence is a very difficult topic. Maybe it is time to ‘tweak’ your research program.*” A prominent social psychologist

recently told me “*I have no idea what an intelligence test measures. They should just be banned.*” They are all wrong, but they don’t know better and are repeating what they have heard (as are many of my undergraduates). These are the immediate and broad consequences of a lack of exposure to the contemporary field and instead, a reliance on old, outdated, superficial, and misleading opinions.

### 7.2. What to do?

The reluctance to offer courses on the topic of IQ and variations in human intelligence must end. Yes, there will be opposition from our faculties (my own course was never “approved”, and instead was offered under the rubric of “special topics”). We will find antagonism in popular culture, popular press, and from funding agencies. This opposition can be countered with a ground-up approach, with undergraduates in the early mix. These students are adults and they *like* being exposed to adult content (my teaching evaluations for *The Architecture of Intelligence* were universally excellent). When I was developing my class, I was naturally apprehensive, but nevertheless addressed topics such as “racial” differences, sex differences, the predictive capacity of IQ tests, and the early misuse of IQ test results. Rutgers University is one of the most diverse public institutions in the country and I never detected a hint of reluctance from any of my students to address these topics. Quite the opposite, I feel certain that several hundred Rutgers graduates now have a better understanding of this field and are prepared to discuss the topic from a more informed perspective.

In response to the question “Do intelligence tests (i.e., ‘IQ’ tests) measure anything useful?”, a student wrote “*No. Comprehending how to ignite firewood is not the same as being able to.*” Here, the student was on to something important, if not a little misguided. Intelligence tests don’t measure fire-starting abilities, but comprehending how to ignite fire is a good head start for actually making it. Maybe after a semester-long course, the implications of IQ test results are now more obvious.

### CRedit authorship contribution statement

**Louis D. Matzel:** Conceptualization.

### Declaration of competing interest

The author has no financial interest in the comments he has provided.

### Data availability

No data was used for the research described in the article.

### Acknowledgements

Thanks are extended to Tracey Shors and Bruno Sauce for their many helpful comments on a draft of this paper. Special thanks to Bruno Sauce for his advice while I developed the course described here.

### References

- Flynn, J. R. (1984). The mean IQ of Americans: Massive gains 1932-1978. *Psychological Bulletin*, 95, 29–51.
- Hull, C. L. (1951). *Essentials of behavior*. New Haven: Yale University Press.
- Hunt, E. (2011). *Human Intelligence*. Cambridge: Cambridge University Press.
- van Ijzendoorn, M. H., Juffer, F., & Poelhuis, C. W. (2005). Adoption and cognitive development: A meta-analytic comparison of adopted and nonadopted children’s IQ and school performance. *Psychological Bulletin*, 131(2), 301–316. <https://doi.org/10.1037/0033-2909.131.2.301>
- Mackintosh, N. J. (2011). *IQ and human intelligence* (2nd ed.). Oxford: Oxford University Press.
- Rindermann, H., & Thompson, J. (2014). The cognitive competencies of immigrant and native students across the world: An analysis of gaps, possible causes and impact. *J. Biosoc. Sci.*, 1–28.
- Rose, S., Kamin, L. J., & Lewontin, R. C. (1984). *Not in our genes*. London: Penguin Books.

- Sauce, B., & Matzel, L. D. (2013). The causes of variation in learning and behavior: Why individual differences matter. *Frontiers in Psychology, 4*, 395.
- Sauce, B., & Matzel, L. D. (2018). The paradox of intelligence: Heritability and malleability coexist in hidden gene-environment interplay. *Psychological Bulletin, 144*, 26–47. <https://doi.org/10.1037/bul0000131>
- Seashore, C. E. (1923). *Introduction to Psychology*. New York: Macmillan.
- Tolman, E. C. (1924). The inheritance of maze-learning ability in rats. *Journal of Comparative Psychology, 4*(1), 1–18. <https://doi.org/10.1037/h0071979>

VandenBos, G. R. (Ed.). (2015). *APA dictionary of Psychology* (2nd ed.). Washington: American Psychological Association.

Louis D. Matzel  
Department of Psychology, Rutgers University, Piscataway, NJ 08854,  
United States of America  
E-mail address: [matzel@psych.rutgers.edu](mailto:matzel@psych.rutgers.edu).