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-James Flynn

The Plastic Nature of Intelligence: The Flynn Effect and the Effects of Environment on IQ

Jay Hutchins interviews
James R. Flynn, author of
“What is Intelligence: Beyond
the Flynn Effect.”

In their controversial book, “The Bell Curve,” (1994) Charles Murray and Richard Herrnstein coined the term “Flynn Effect,” in reference to James R. Flynn’s work on the generational rise of IQ test scores. At the time, Murray and Herrnstein discounted the importance of the Flynn Effect, which first was observed in 1948 by R.D. Tuddenham when he compared mental test scores between American soldiers who fought in the two world wars.

James R. Flynn, who has studied rising IQ scores for more than 25 years, and William T. Dickens of The Brookings Institution in Washington, D.C., have developed a mathematical model, the Dickens/Flynn Model, to explain an unresolved paradox in IQ research: If study after study shows that IQ or general intelligence is highly heritable, what explains the Flynn Effect?

In his book, “What is Intelligence,” and in the interview that follows, Flynn says that as we develop and gain exposure to different environments, we tend to gravitate to those that suit our levels of intelligence, but cognitive functioning also can be greatly enhanced by consciously seeking out educational opportunities and other stimulating environments. Conversely, people whose environments lack sufficient cognitive stimulation can score lower on IQ tests than they might otherwise—an effect previously unacknowledged in IQ research. Flynn believes the Flynn Effect indicates that the social utility of cognitive skills has a powerful effect on intellectual development.

Sockeye: Professor Flynn, you explain in your book that current environment trumps past environment and that this affects our levels of cognitive functioning, which affects measures of general intelligence, or “g” on IQ tests. Please explain the concept of g.

Flynn: The concept of a general intelligence, or g, captures the fact that if one person outperforms another person on one kind of conceptually demanding task, that advantage is likely to persist over a whole range of other cognitive tasks. IQ tests measure this general cognitive advantage.

Sockeye: Why do people think this measurement is useful?

Flynn: The average full-scale IQ of two groups on a good IQ test often predicts things like their occupational profiles, as various occupations tend to have average minimum IQ thresholds. IQ is a reasonably good predictor of academic success.

Sockeye: I understand that there are different tests for measuring IQ.

Flynn: That’s right. An example of a good IQ test is the WISC, the Wechsler Intelligence Scale for Children. Its value is that its 10 subtests have enough cognitive complexity that a high-IQ person tends to beat the average person by a handy margin on all 10.

Sockeye: I think it will surprise many people that IQ tests such as the WISC are normed so that average IQ does not increase numerically over time. Your research shows that Americans would have shown massive IQ gains on the WISC since 1947 if those tests had not been normed.

Flynn: Yes, but since 1972 the big IQ gains have been on certain subtests and not others. The fact that gains in full-scale IQ amount to about 18 points masks differential gains on the 10 sub-

tests. These gains ranged from only two points on the WISC subtest called Information—which tests factual knowledge, such as, ‘What continent is Argentina on?’—to 24 points on the subtest called Similarities, which asks questions such as, ‘What do dogs and rabbits have in common?’ The correct answer is supposed to be that they are both mammals. Different results on the subtests indicate different cognitive skills, despite the fact that all have the cognitive complexity that makes them good measures of g.

Sockeye: As measured in studies of identical twins conducted by behavioral geneticists, genes get all the credit for intelligence. What explains the high IQ gains across generations?

Flynn: Thanks to their identical genes, twins raised apart who, for example, have slightly better genes than average get more teacher attention, do more homework, get into a top stream, and go on to create environmental histories that are very similar. The environmental factors operating here are not feeble, they just tend to be similar for identical twins raised apart, which makes them look feeble.

Sockeye: I have been reading that behavioral geneticists call this “indirect genetic effects”—when our genes affect our social environment. What about the environment that parents impose?

Flynn: For most people, in their early lives, there is a tug of war between two environments: the environment parents impose, which is not directly correlated with the child’s unique genetic endowment and the environment the child creates by interacting with the world, which tends to match that child’s unique genetic endowment. With each passing year, a child transcends parental influence and becomes an autonomous actor, acting on his or her widening environ-

ment and being influenced by it at the same time. The social utility of certain skills decreases or increases accordingly.

Sockeye: What about the intervention of preschool as a factor in increasing cognitive skills?

Flynn: Preschool interventions are a good example of the tension between environment and genetic effects. They may impose an environment on children that is uncorrelated with their genes, usually a uniformly enriched one that includes stimulation through educational toys, books, and contact with sub-professionals. If this stimulation is terminated as children enter elementary school, the intervention is likely to lose the tug of war even earlier than a child’s parents do. The child’s unique genetic endowment will tend to match some environment that is below the quality provided by an enriched preschool. In this way, current environment trumps past environment.

Sockeye: Much has been written about the weak effects of the adoptive family environment on a child’s personality and general intelligence. How do your ideas about current environment apply to adoption?

Flynn: The most radical form of intervention is adoption into a privileged home. Adoptive parents often wonder why the adopted child loses ground on their natural children. If their own children inherit above average genes for intelligence and the adopted child has average genes for this trait, then as parents slowly lose the ability to impose an equally enriched environment on both, the individual differences in genes begin to dominate.

Sockeye: Does the trumping of past environments mean that interventions do not have long-term effects?

Flynn: No, none of this means that interventions have no lasting effect. But their non-IQ effects are likely to be more permanent than their IQ effects. If parents can encourage persistence, honesty, and self-esteem, their children have a good start in life that may prove far more important than their gaining a few jumps on the IQ hierarchy. This “life prospects enhancement” has been claimed for intervention programs like Head Start.

Sockeye: In “What is Intelligence,” you explain how the brain is plastic throughout life and that being in a stimulating environment actually increases intelligence in adults as well as children.

Flynn: The brain is much more like our muscles than we had thought, even in the sense that specialized exercise affects different parts of the brain. One interesting example is that MRI scans show that the brains of London taxi drivers are peculiar. They have an enlarged hippocampus, which is the brain area used for navigating three-dimensional space. The more experienced the driver the larger the hippocampus. Here we can see spatial abilities being developed without comparable development of other cognitive skills. To develop a wide variety of cognitive skills you need a wide variety of cognitive exercises. To increase the IQ of adults you have to change their environment.

Sockeye: Would you please describe the work you did comparing Chinese American and European American IQs? I think it explains the implications of the Dickens/Flynn Model very well.

Flynn: The work showed the significance of carefully re-norming IQ tests. The Chinese-American population I studied was in the generation born between 1945 and 1949. What I eventually figured out was that in many of the later studies

claiming superior IQ for students of Chinese descent, the data for Chinese Americans were created from tests that were not normed during the early 1950s. I found the Chinese-American IQ scores were similar to white Americans when I addressed the issue of obsolete norms used in other studies. But even when Chinese-American scores were not as high as white Americans’ scores, their academic and occupational achievement was significantly higher on average. The Dickens/Flynn model attributes these gains to a unique cultural environment—high expectations and the more demanding occupational and social environments of a large portion of Chinese-Americans.

Sockeye; I think people would like to have a little more detail about this. What made you concerned about the data that everyone else had accepted, claiming a genetic advantage by Chinese in general intelligence?

Flynn: My suspicions about the data used in many IQ studies were raised by the Coleman report.

Sockeye: The Coleman Report that was used to promote busing in the 70s?

Flynn: Yes. Among other things, it showed that socially disadvantaged black students profited from schooling in racially mixed classrooms. The Coleman report, as late as 1965, put Chinese and Japanese average nonverbal IQ at 100—the same as European Americans. The Chinese scores had been highly inflated by the Flynn Effect when compared to the scores of white students whose tests had been normed. I go into this in great detail in my book. In my study, after controlling for norming, my Chinese population—I call them the class of 1966—scored no higher than 100 at graduation from high school. As adults, they may have scored about three points higher than whites thanks to their elite

cultural and professional environment.

Sockeye: Please explain what happened with the children born to the class of 1966.

Flynn: Their children were raised in largely upper-class environments that provided enriched home and preschool experiences. Their preschool children attained a mean IQ almost nine points above the white average. When they entered elementary school much of the parental influence was diluted. It declined further to about three points as these children entered adulthood—the same as their parents. Chinese Americans are an ethnic group for whom high achievement preceded high IQ. It was only when we corrected the obsolete norms used to test for g that we really appreciated the accomplishment of Chinese immigrants.

Sockeye: What do your critics say about how some measures of general intelligence change more over time than others?

Flynn: My critics—some call themselves the g men—claim that if all complex cognitive skills do not move together, the gains cannot represent g and therefore are “hollow.” This is the saddest result of an obsession with g. It makes the limitations of the concept no longer a matter of evidence. Any evidence that challenges the supremacy of g is not good evidence because it challenges the supremacy of g. We would not reason in this way in other areas.

The focus on g, assumed to represent a facet of brain physiology, leads to the assumption that if IQ gains are significant, they must be due to physiological factors such as enhanced nutrition. This distracts people from the true significance of the gains, which is that they are cultural.



General Intelligence—the Flynn Effect

An IQ test called “Raven’s Progressive Matrices,” developed in the United Kingdom by John Raven in 1938 is considered a pure measure of *g* (general intelligence) because it is based on logic and not on information. James Flynn points out in his book, “What is Intelligence,” that Dutch 18-year-olds in 1982 scored much higher on Raven’s than their counterparts in 1952—by about 20 points—indicating that advances in education in Holland have dramatically influenced scores on Raven’s. According to James Flynn, this Flynn Effect may demonstrate that when a child measures 85 on an IQ test, he or she may actually have average general intelligence but have experienced an inferior educational environment.

Sockeye: You and Dickens have a concept that describes your approach of looking at *g* and the increasing of cognitive abilities that does not fit the *g* theory’s basic element—that *g* is immutable.

Flynn: That’s right. We are calling it BIDS, and it stands for “Brain physiology, Individual Differences, and Social trends.” With BIDS, we are trying to explain how it is possible for people to make gains in important problem-solving. Scientists who are *g* fundamentalists—the *g* men—discount the social utility of problem-solving gains made by individuals as reflected by gains on the subtests in WISC. In the Dickens/Flynn model, we are hypothesizing that each of the BIDS levels has its own organizing concept.

Sockeye: But BIDS is not really a theory?

Flynn: That is correct. We are observing that intelligence can act like a highly correlated set of abilities on one level and like a set of functionally independent abilities on others. It is a notion we have that, at this point, adds nothing to our knowledge of intelligence. It is a piece of advice for theorists about how to proceed.

Sockeye: Would you explain the concept of *g* loadings and its relation to the Dickens/Flynn model, and how these apply to the arguments of your *g* men?


Flynn: The 10 subtests on WISC, for example, can be ranked according to their *g* loadings—their degree of complexity. You can rank the tests for their *g* loading by how high-IQ people beat the average person, and then rank the tests on down to the subtest on which high performers excel the least. An analogy for the utility of this ranking is that a talented cook is more likely to shine making a soufflé than scrambled eggs because it is easier to make scrambled eggs.

Sockeye: Professor Flynn, is there such a thing as general intelligence?

Flynn: Yes there is, and it is a useful concept. We are not trying to abolish the concept of *g*. But, as the *g* men have it, if *g* were to increase over time, we would expect gains on each of the WISC Subtests to be in accord with their *g* loadings. Similarities and Information have very high *g* loadings, yet one, Similarities, over the last 30 years, has had much higher gains than the other. We have by analogy made increases in

the skill of making soufflés and we don’t know why, and the *g* men can’t explain it

Sockeye: Any final comments?

Flynn: Gains made on intelligence tests in the last 30 years have real-world problem-solving utility. We are proposing that these gains were made because of the cultural environment. It does not make sense to discount them. 

Eric Turkheimer, a psychology professor at the University of Virginia, and his colleagues, have found that the studies in behavioral genetics that find extremely high correlations between genetic similarities and IQ primarily have used identical twins raised in middle-class homes. According to Turkheimer, a study conducted by examining identical twins adopted into different socio-economic environments may indicate that genes’ effects vary with class. The study is “Socioeconomic Status Modifies Heritability of IQ in Young Children,” published in “Psychological Science,” Vol. 14, issue 6, pp. 623-628.
-Jay Hutchins