

Jensen, Jensenism, and the Sociology of Intelligence

LINDA S. GOTTFREDSON
University of Delaware

As a term of praise, "Jensenism" pays homage to Jensen's rigorous and imaginative research, which has transformed the study of intelligence during the last three decades. As a term of abuse employed in public debate, "Jensenism" reflects the anger directed at scholars who reveal stubborn realities that conflict with popular ideologies. Although Jensen himself has been most interested in the biological origins of the dispersion in *g*, his work provides a firm foundation for examining the consequences of it at the individual, interpersonal, and societal levels. Jensen's own work has contributed most to understanding the consequences of *g* level for individuals. The public controversy over it is an example of the third-order, sociopolitical consequences that can accompany the dispersion in *g* in a society, in this case one that would deny the biologically- rooted diversity in intellect.

Arthur Jensen is a masterful scientist whose work broke a social taboo. Jensenism refers to the aspect of his work that violated the taboo, specifically his conclusion that individual differences in intelligence are highly heritable and group differences may be too. For those who know the pertinent evidence and believe that science should pursue it, Jensenism is either a neutral descriptor or a term of praise. For those who don't know the evidence or would not make it known publicly, Jensenism is usually a term of rebuke.

As a neutral descriptor, Jensenism provides but an old snapshot of Jensen's science because it has moved far beyond the issue of heritability. As praise, however, it captures something essential about Jensen the scientist, because he has continued to blaze trails where others would not lead but many would later follow. As a term of abuse, Jensenism reveals most about the critics who wield it and the segments of society swayed by it. Indeed, as a sociologist, I find the reaction to Jensen's scholarship as intriguing as the work itself. What does it mean for a discipline when many of its practitioners fear to speak certain facts? Or for a society when it fears to hear them? And what do we owe a man who holds steady the scientific rudder during storms of political protest?

Direct all correspondence to: Linda S. Gottfredson, School of Education, College of Human Resources, Education and Public Policy, University of Delaware, Newark, DE 19716 <gottfred@udel.edu>.

INTELLIGENCE 26(3): 291-299
ISSN: 0160-2896

Copyright © 1998 by Ablex Publishing Corporation
All rights of reproduction in any form reserved.

Jensen, the Scientist

Had I been a student of Jensen's, I would claim the lineage proudly. However, I graduated from UC Berkeley in 1969 as a psychology major without even being aware that he was on its faculty. Nor did I see the storm over his 1969 *Harvard Educational Review* article, "How much can we boost IQ and scholastic achievement?," for by then I was worlds away working in a rural Malaysian health clinic.

A vivid memory from my studies at UC Berkeley, however, was discovering the elegance and power of some psychological research, specifically, that which ingeniously tested competing theories or isolated some key phenomenon. This was real science amid the mush! Three decades later, I can think of no equal to Jensen in formulating new questions, clever tools, and testable hypotheses to resolve old debates about intelligence and mental tests. One example out of many is Jensen's use of "pseudo-race age groups" (Jensen, 1974). This innovation is like many of his others for being simple, transparent, and compelling. It involves merely comparing younger and older white children who differ in average IQ raw scores (mental age) by the same amount as do the older white children and blacks of that same chronological age. Jensen had found, for example, that black children choose different distractors in wrongly answering IQ test items than do their white chronological age mates, which could be (mistakenly) interpreted as evidence for test bias. By showing, however, that the younger white children favored the same (less sophisticated) distractors as did the older blacks (but not the older whites), Jensen simultaneously provided evidence that bias was *not* the source of the race difference in distractor choice but that differences in mental development *were*. I still remember being awed by the elegance of this double demonstration.

No scholar of intelligence can look at Jensen's body of work and not appreciate his independence of mind. It is not the pseudo-independence of a contrarian, which he most certainly is not, but an impressive ability to see past opinions of the time (including his own) in order to ponder past and potential evidence. The independence is manifest not just in his willingness to follow the data where many others would not go, for example, in writing that average racial differences in IQ are probably partly genetic. It is also manifest in the very lines of inquiry he has initiated. Chronometric studies of mental ability are quite common now, as more investigators search for the elementary cognitive processes that may constitute intelligence. The idea that mental speed might reflect or be a component of intelligence, however, was generally considered "discredited" when Jensen embarked on his reaction time studies almost two decades ago. As he notes (Jensen, 1998), his efforts to study the relation of mental speed to intelligence "were disparaged as being impossible, trivial, laughable, or at best eccentric," ignorant of the "marvelous complexity of human intelligence," and oblivious to the last half century of psychology which had already concluded that there is no relation. Subsequent research has now shown that Jensen's self-described long-shot intuition was on target. His reductionist emphasis on the biology of intelligence has been shown fruitful as teams of investigators around the world pour out data about individual differences not only in elementary cognitive processing but also in brain physiology while processing information.

To some degree his independence of mind probably flows from the sheer power of his intellect. The radius of his sight seems much longer than most of ours, allowing him to scan and integrate far vaster territories of evidence. This would allow him to see emerging pat-

terms of evidence sooner and more clearly, and to suggest hypotheses that startled or unsettled the less prepared but that eventually became mainstream. Such is the history of the most disputed claims in his 1969 *Harvard Educational Review* article.

Many intelligence researchers can testify to Jensen's enormous influence on the field in the last three decades. I focus here on what he has contributed specifically to those of us who trace the meaning of general intelligence (*g*) outward into the social realm—or, as he would say, "horizontally." Jensen has helped provide us a solid platform, one well represented by his books *Bias in Mental Testing* (1980) and *The g Factor* (1998), on which to erect a sociology of intelligence. The sociology of intelligence refers most broadly to the ways in which a population and its members are affected (individually and collectively) by the dispersion in *g* in that population. It also refers to the ways in which a society responds to that dispersion in *g*, including beliefs and taboos concerning it, the evolution of institutions accommodating it, and social policies attempting to alter it.

The following few examples illustrate how Jensen's research has provided not only a solid empirical foundation for concluding that individual and group differences in *g* have a biological reality and social importance, but also some heuristics for following the footprints of *g* and the narrower abilities across social life. He himself has always preferred to pursue the biological rather than sociological aspects of intelligence, but his research has greatly assisted those of us who ponder the social riddles.

Test Bias. *Bias in Mental Testing* settled one major debate over the construct validity of intelligence, namely, whether the tests measuring it are culturally biased against American blacks. The book compiled all the pertinent research, some of the most ingenious being Jensen's own. The predictable attempts to discredit it were intellectually feeble and short-lived. An independent review of the evidence on test bias by the National Academy of Sciences (Wigdor & Garner, 1982) soon validated Jensen's conclusion (although carefully avoiding any mention of his work except to implicitly criticize him!). The new scientific consensus that the major mental tests are not biased against native-born English-speaking minorities has shifted even lay opinion to some extent. For instance, many critics of *The Bell Curve* (Herrnstein & Murray, 1994) accepted that the racial IQ disparities it discussed were real and objected instead on other grounds (for example, asserting that IQ is more malleable than the book claimed).

Claims of cultural bias had stymied discussion of intelligence in most of the social sciences, because anything that could be used to impugn the validity of tests for one group could be used to undermine their credibility for all groups. And as long as the whole notion of intelligence could be kept suspect, social scientists and policy makers could dismiss the vexing questions raised by individual and group differences in IQ. They could continue to disregard IQ differences as just another epiphenomenon of social class privilege and thus of no functional importance. Jensen's settling of the test bias issue in such a conclusive manner has eased the way for investigators who take seriously the reality and ramifications of intelligence in social and political life.

***g* as "Intelligence".** Jensen's resurrection of Spearman's concept of *g* has been extraordinarily important. Once critics were denied their trump card of purported racial bias, they fell back upon other supposed fatal flaws in the study of intelligence (e.g., that there is no agreement about what intelligence is) to deny either its importance or existence. By bringing greater precision to the measurement and conceptualization of psychometric

intelligence, the construct of *g* has helped moot these sorts of critiques as well as illuminated the nature and practical import of the general factor underlying all mental test performance. In *The g Factor* (1998) Jensen integrates the world literature on *g*, again, much of it his own.

The difficulties in defining intelligence and convincing skeptics of its "reality" were always aggravated by the plethora of tests purporting to measure it but yet ranking individuals somewhat differently. Jensen cut through those difficulties by focusing on measuring *g* instead of debating the verbal definitions of "intelligence," which he considers scientifically worthless. More specifically, he has led the way in determining the best methods for extracting the *g* factor from test batteries and in showing that the *g*'s from different batteries converge on the same true *g*. In short, *g* is a replicable, stable psychometric phenomenon in a way that IQ scores are not. The *g* factor is a much firmer foundation than is IQ for a science of mental ability.

Most evidence for the practical importance of intelligence has rested on the predictive validity of IQ scores. Absent some clear and compelling demonstration of what construct(s) IQ actually represents, critics could argue that the predictive validity of IQ does not prove that "intelligence" is important. Once *g* was isolated, the predictive validity of IQ tests could be decomposed into their *g* and non-*g* components. In large part through Jensen's efforts, it is now clear that *g* carries the freight of prediction in mental test scores. If *g* is accepted as a working definition of "intelligence," there is no question that intelligence is important in practical affairs and that IQ tests measure it well.

g vs. the Vehicles for its Measurement. Merely abstracting *g* from the vehicles (tests and items) that measure it is a crucial step for clarifying the sources and consequences of individual and group differences in *g*. Doing so has already demonstrated much about what *g* is not. It is not a function of the cultural content or manifest characteristics of a test. This "indifference of the indicator" undercuts strictly cultural interpretations of IQ scores that rely on particular features of a test, for example, that intelligence tests measure only "academic" skills (because items often involve reading and math) or certain cultural attributes (those presumably favored by the kinds of people who constructed the tests). Whatever *g* "is," it transcends any one type of item, test, or cultural knowledge. This is not true of the non-*g* components of tests. As Jensen (1998, ch. 10) explains, the decomposition of IQ into its *g* and non-*g* components is essential for understanding what exactly is changing, and why, when a group's mean or variance in IQ shifts over time or when interventions change individuals' IQ ranks within a group. For instance, the practical significance of both the secular rise in IQ and increments to IQ from educational intervention rests on whether they represent mostly a change in *g* vs. the non-*g* components of IQ.

Now liberated from the cultural specifics of its measurement, *g* is revealed to be a very general property of mind and thinking. As noted, Jensen and his collaborators in the "vertical" study of intelligence are beginning to plumb the physiological elements of *g*. For sociologists of intelligence, however, just knowing that *g* is a general, context-free ability or property of the mind is by itself crucial knowledge. Whatever their disagreements about the definition of intelligence, experts agree that it reflects differences in the ability to process information, for example, to think abstractly, solve problems, and learn moderately complex material. This very generality of *g* suggests that the practical value of higher *g* is ubiquitous, because virtually every aspect of life requires some learning, decision making,

and other processing of information. Sociologists of intelligence are alerted to look past the cultural content of life tasks to their cognitive processing demands when mapping the direct impact of higher vs. lower levels of *g* in individuals' lives.

***g* Loadedness of Tests and Tasks.** Characterizing mental tests according to their “*g* loadedness” (their factor loading on the *g* factor) prompted Jensen to invent the method of “correlated vectors.” The power of the method, yet to be exploited in the sociology of intelligence, is illustrated by Jensen’s using it to test the hypothesis—“Spearman’s Hypothesis”—that black-white differences are largest on the most *g* loaded tests. Repeated confirmation of this hypothesis, with both chronometric and psychometric data, proves that average black-white differences on mental tests represent a difference in *g* itself. This finding, in turn, constrains the range of plausible explanations for racial differences in IQ.

What may be less appreciated is the value of the concept of *g* loading itself, which can be generalized to life settings. It simultaneously highlights that tasks and environments differ in the demands they make for information processing and offers a simple way to conceptualize and quantify those demands. As such, it systematizes what might otherwise be a somewhat chaotic array of evidence from the many mental tests, for example, in personnel selection. For sociologists of intelligence, in particular, the concept of *g* loadedness suggests where they might watch for individual and group differences in *g* to create the biggest disparities in social outcomes, namely, wherever demands for information processing are more frequent and complex. Just as higher levels of *g* are a bigger advantage for performing well on more complex IQ test items, so too is higher *g* a bigger advantage when schooling, jobs, or life tasks are more complex. Similarly, more *g*-loaded settings are ones where racial differences can be expected to be especially striking. Complexity in the worlds of work and education have been mapped to some extent, but the rest of the social world remains to be so charted.

One of the most useful aspects of the concept of *g* loadedness may be simply that it calls attention to a fact that has been misunderstood by many social scientists, namely, that the importance of intelligence is not an either-or matter. It can vary from nil to overwhelming depending on the tasks in question. This insight will be crucial as the study of intelligence advances across the social sciences.

Biological Basis of g. Having freed “intelligence” from its presumed cultural moorings, Jensen has conducted and collated research showing that *g* is a biological phenomenon. It is highly heritable, more so than IQ or the narrower first- and second-order ability factors, and it is more depressed by inbreeding, itself a genetic phenomenon. Based on *g*’s many correlations with elementary cognitive processes (speed of reaction or inspection time) and physiological aspects of the brain (such as nerve conduction velocity, rate of glucose metabolism, complexity of brain waves, and brain size), Jensen concludes that *g* is not an ability per se but a general property of the brain, perhaps its efficiency. In short, psychometric *g* is not merely a phantasm of factor analysis, as some critics still assert, but represents a fundamental biological fact with important social consequences. Moreover, this conclusion holds for all races studied. To the extent that a society’s institutions are shaped by its dispersion in intelligence, they are rooted in a biological feature of that society.

The g Nexus. The last chapter of Jensen’s *The g Factor* describes how *g* sits at the center of a nexus of key social outcomes, including education, employment, income, and

crime. Social scientists have long been concerned with understanding this broad nexus but been reluctant to acknowledge any centrality for *g*. It is this nexus and its own higher-order sociopolitical effects that constitute the heart of the sociology of intelligence.

Sociologist Robert Gordon (1997), an early and close student of Jensen's contributions (e.g., Gordon, 1975/1980), has outlined the levels of analysis that a sociology of intelligence must explore: the individual, contextual, and population levels. Coming out of the individual differences tradition in psychology, Jensen's work on *g* exemplifies research on the impact of *g* at the individual level, as does *The Bell Curve* (Herrnstein & Murray, 1994). Gordon shows how this traditional individual-level approach can be extended sociologically by using classical test theory to develop the analogy of "life as a test." This analogy helps to illustrate why any analysis of the role of *g* in individuals' lives should examine the *cumulative* effects of intelligence on life chances over the life span. The cumulative *g*-related successes and failures of a lifetime may be much like the many lightly *g*-loaded items on an intelligence test that add up to constitute an excellent measure of *g*.

Jensen has broached the contextual level in his speculations about the importance of "critical mass." As he describes, the social or geographic aggregation of low-IQ persons can reach a critical mass where the interpersonal context of life (e.g., in a neighborhood or family system) becomes radically degraded and disorganized. Gazaway's (1969) sympathetic account of a low-IQ Appalachian community provides a graphic example. Gordon (1997) has begun to marshal evidence that the IQ composition of groups affects the subcultures they create and affects their members' behavior independent of the probands' own IQ level.

To my knowledge, Jensen has not himself investigated the population-level role of *g*. The public controversy over his work, however, constitutes a vivid case study in *g*-related processes at the population level, as I will discuss later. It illustrates the difficulties a society can have in coming to terms with genetic differences that conflict with cherished political beliefs. Other population-level processes include the political tensions and cultural shifts created when substantially IQ-discrepant racial groups regularly interact (Gordon, 1997) and compete for social advantage (Gottfredson & Sharf, 1988). They also include non-racial processes by which the dispersion in *g* constrains and organizes roles and relations within a society, for instance, the evolution of the occupational hierarchy (Gottfredson, 1985).

Jensenism, the Reaction

Fortunately for the science of intelligence, Jensen's intellectual integrity has been as dependable as his scientific acumen. The study of mental abilities has always been vulnerable to political pressure precisely because it deals with human differences that have major social consequences. Jensen's 1969 article in *HER* could hardly have been published at a time more likely to provoke violent controversy. The late 1960s were a time of unbounded hope, indeed of sure expectation, that federal funding and social engineering would eradicate poverty and racial differences. Naive environmentalism reigned. Jensen's paper surely came like a punch in the stomach for many people. There was sufficient evidence by 1969 for Jensen to conclude that then-current interventions for raising IQ did not raise *g*, and perhaps could not, but it was not a message that many opinion leaders were prepared to

hear. Some critics labeled the heresy "Jensenism," as if it were an ideologically motivated absurdity.

The specter that they too might be touched by public controversy drove many researchers from the field of intelligence. The controversy spurred a few incumbents to defend science and a good scientist against persecution, the first and most unhesitating being Hans Eysenck (1971), but it drew far more people into the field in order to disprove Jensen (e.g., Brody, 1992). Ironically, such researchers together built the massive body of evidence that would eventually prove Jensen right. All his most "controversial" claims in that 1969 article—that intelligence is highly genetic, not very malleable, and probably differs between races partly for genetic reasons—are now mainstream conclusions in the science of intelligence. This would not become apparent until 1988, however, when Snyderman and Rothman (1988) surveyed intelligence experts, giving them an opportunity to report their views anonymously.

For nearly twenty years Jensen would labor under the presumption that his was a minority view in the field of intelligence. And this was despite his knowing that there were many "closet Jensenists," sometimes eminent scholars who would agree with him privately but not in public or who would quibble with him sufficiently to create the false impression for non-experts that they rejected his ideas wholesale. Critics had a free ride in the public sphere despite ever mounting scientific evidence that they were wrong and Jensen right. With little fear of public contradiction, however, they could proclaim near and afar that Jensen was but a fringe character holding long-discredited ideas.

I did not know Jensen in the worst of these times, although I have read accounts of the abuse he experienced. A model of scientific integrity and professionalism, he has always responded with dispassionate reasoning to criticism of even the most scurrilous sort. And apparently never derailed by the tumult, even when losing access to his research samples, he continued to publish at a prodigious rate on the same matters that had thrust him into the public spotlight in 1969. I am sure that Jensen paid a steep price for his scientific integrity, because his wife once warned me that my going into matters of race and intelligence would cost me more dearly than I might imagine. But Jensen has never brought up the personal costs in the twenty years I have known him. In our conversations, even those concerning the special difficulties of conducting or publishing certain research, he has never fulminated or whined about his critics. At most he has seemed puzzled or disappointed by their frequent dishonesty and by the reticence of unnamed closet supporters. More than once I have been buoyed by his example.

Viewed in retrospect, the most controversial sentence in Jensen's 1969 HER article seems tame: "The preponderance of evidence [on racial differences in IQ] is, in my opinion, less consistent with a strictly environmental hypothesis than with a genetic hypothesis, which, of course, does not exclude the influence of environment or its interaction with genetic factors." That near hysteria should greet such a reasonable and scientifically-grounded hypothesis—and also *The Bell Curve's* cautious echo of it—shows that influential segments of American society are still deeply threatened by the possibility that social inequality (particularly racial inequality) may be rooted to some extent in biology. In my experience, those who are upset by such claims tend to become even more adamant if somehow convinced they might be true. The critics correctly sense that genetically-based inequalities undercut the legitimacy of social policies premised, as were some Marxist regimes, on the belief that people are infinitely malleable and the state can thus create

whatever sort of citizen or social order it wishes. For those who believe that nature imposes no constraints, the truth may indeed seem dangerous.

Driven by political fears, critics project onto Jensen political motives. Such attributions have been convenient for attempting to discredit his science, although a moment's thought would suggest that there are far easier and more comfortable ways of promoting political agendas than making oneself a pariah in political circles. The irony is that "Jensenism" actually results from the apolitical nature of Jensen's science. Anyone who follows the path of his career (Jensen, 1998) will be struck by his devotion to psychology as a natural science. His heroes are empiricists, his skills those of the experimentalist. As he says, his scholarly approach is quantitative, analytical, experimental, and reductionist. Anyone who thinks otherwise should be sentenced to read the works of behaviorist Clark Hull, 1943, which Jensen (1998) reports consuming so avidly as a young man.

To my knowledge, the closest that Jensen has come to expressing a political opinion in print has been to render the judgment that the environmentalist assumptions of extreme egalitarianism are inconsistent with the genetic evidence on human differences (and can thus do harm if enacted in social policy) and that individualism better accommodates such differences in personal traits. In other words, his so-called politics consist of little more than disputing the unfounded and false claims of the ideology that often seems to motivate his critics.

Jensen argues that the term intelligence is scientifically useless, partly because it carries so much social "baggage" with it. For those who study the psychology and biology of *g*, that is surely true. This baggage dogs all intelligence researchers who wish to work in peace. For those who investigate the sociology of intelligence, however, that baggage is itself a fascinating object of study. When Jensen broke the social taboo against discussing the genetic basis of individual and especially group differences in intelligence, he inadvertently provoked various segments of society into revealing their views and fears about certain matters concerning intelligence.

The critics' most general fear has always seemed to be that widespread belief in a genetic basis for IQ differences would undermine support for egalitarian social programs, because such a belief might legitimate social inequality as "natural." Much social policy and many professional reputations today do indeed rest on the presumption that unequal outcomes result solely from the exercise of unjust social privilege. However, evidence that some inequality is natural taps real anxieties that are integral to the American national character. The truth about intelligence will never be popular because it points to a dilemma that most Americans would fervently wish away. The unwelcome truth is that human freedom will never produce equality of outcome because people differ in native ability. This is the "democratic dilemma"—the tension between freedom and equality—about which John Gardner (1984) writes so eloquently (see also Gottfredson, *in press*).

It is all the more disturbing to Americans to contemplate that some group differences in outcome may be natural under conditions of equal opportunity. However, the sociopolitical dilemmas owing to genetic differences among individuals and groups do not disappear when we wish it so, no matter how comforting our myths or ignorance may be. By persistently pursuing the reality of intelligence, Jensen has done more than any other scientist to encourage the nation to confront its dilemma and deal with it more constructively. The sociology of intelligence can help take the measure of that challenge and the physio-

logical study of *g* may one day provide knowledge for ameliorating it somewhat. For this, Jensen deserves the gratitude of scientists and citizens alike.

REFERENCES

- Brody, N. (1992). *Intelligence*, 2nd ed. New York: Academic Press.
- Eysenck, H.J. (1971). *Race, intelligence and education*. London: Maurice Temple Smith. [American title *The IQ argument*, New York: The Library Press]
- Gardner, J. W. (1984). *Excellence: Can we be equal and excellent too?* (2nd ed.). New York: W.W. Norton.
- Gazaway, R. (1969). *The longest mile*. New York: Doubleday.
- Gordon, R.A. (1975/1980). Examining labelling theory: The case of mental retardation. In W.R. Gove (Ed.), *The labelling of deviance*, 2nd ed. (pp. 111–174). Beverly Hills, CA: Sage. (First published in 1975).
- Gordon, R.A. (1997). Everyday life as an intelligence test: Effects of intelligence and intelligence context. *Intelligence*, 24, 203–320.
- Gottfredson, L.S. (1985). Education as a valid but fallible signal of worker quality: Reorienting an old debate about the functional basis of the occupational hierarchy. In A.C. Kerckhoff (Ed.), *Research in the Sociology of Education and Socialization, Vol. 5* (pp. 123–169). Greenwich, CT: JAI Press.
- Gottfredson, L.S. (in press). Intelligence and the American ambivalence towards talent. In N. Colangelo & S.G. Assouline (Eds.), *Talent development: Proceedings from The 1998 Henry B. And Jocelyn Wallace National research Symposium on Talent Development, Vol. IV*. Dayton, OH: Ohio Psychology Press.
- Gottfredson, L.S., & Sharf, J.C. (Ed.). (1988). Fairness in employment testing. *Journal of Vocational Behavior*, 33(3). [special issue]
- Herrnstein, R.J., & Murray, C. (1994). *The bell curve: Intelligence and class structure in American life*. New York: Free Press.
- Hull, C.L. (1943). *Principles of behavior: An introduction to behavior theory*. New York: Appleton–Century–Crofts.
- Jensen, A.R. (1969). How much can we boost IQ and scholastic achievement? *Harvard Educational Review*, 39, 1–123.
- Jensen, A.R. (1974). How biased are culture-loaded tests? *Genetic Psychology Monographs*, 90, 185–244.
- Jensen, A.R. (1980). *Bias in mental testing*. New York: Free Press.
- Jensen, A.R. (1998). *The g factor: The science of mental ability*. Westport, CT: Praeger.
- Jensen, A.R. (1998). Jensen on "Jensenism." *Intelligence*, 26, 291–299.
- Snyderman, M., & Rothman, S. (1988). *The IQ controversy, the media and public policy*. New Brunswick, NJ: Transaction.
- Wigdor, A.K., & Garner, W.R. (Eds.) (1982). *Ability testing: Uses, consequences, and controversies. Part 1: Report of the committee*. Washington, DC: National Academy Press.