Revisiting the Bell Curve

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Abstract

Charles Murray, one of the authors of The Bell Curve Herrnstein & Murray, 1994), predicted that, even with further scholarly inquiry into the issues raised by the book, none of its conclusions would be overturned. Now, roughly five years after the publication of The Bell Curve, this target article reviews pertinent research published during the intervening time to assess Murray's prediction. Three primary areas are reviewed: the genetic contribution to intelligence, the relative contributions of intelligence and social factors to success in life, and the potential of educational experience to improve cognitive ability. The issue of genes and racial/ethnic differences in IQ is also examined. It is concluded that, contrary to Murray's prediction, many of The Bell Curve's arguments have been weakened.

Keywords: IQ, adoption studies, behavior genetics, bell curve, crime, education, intelligence, nature/nurture, poverty, twin studies, uterine environment

I. INTRODUCTION

1. In an afterword to the paperback edition of The Bell Curve (Herrnstein & Murray, 1994), one of its authors, Charles Murray, makes a bold prediction (the other author, Richard Herrnstein, died shortly before the initial release of the book in 1994). Murray states that:

"When the Sturm und Drang has subsided, nothing important in The Bell Curve will have been overturned. I say this not because Herrnstein and I were so brilliant or farsighted but because our conclusions were so conservatively phrased and anchored so firmly in the middle of the scientific road." (p. 556).

Furthermore, Murray suggested that anyone who attempted to refute the book's claims through further examination of relevant data would be embarrassed when the facts ultimately supported Herrnstein and Murray's (1994) thesis. Needless to say,
number of scholars were not deterred.

2. Roughly five years have now elapsed since the publication of The Bell Curve (TBC). Not only has the furor surrounding this book apparently subsided, but many new scholarly studies have come out in the intervening period. Some of these new studies were launched specifically to investigate claims and suggestions made in TBC. Others were perhaps underway before the publication of TBC, but could easily be used to address points raised by it. Further, unlike the initial wave of reviews of the book that had to rely on logical arguments and/or existing data, commentators today can make use of this new knowledge.

3. The goal of this target article is to examine some of the most important published scientific research of the last five years to see how well TBC stands up. Whether or not its major ideas deserve to be overturned is, admittedly, a matter of subjective opinion. However, it is the opinion of the present author that three major pillars of TBC - the genetic contribution to IQ, the importance of IQ (and lack of importance of other factors) for predicting life outcomes, and the relative fixedness of cognitive ability -- have sustained major damage during the past five years. The claims of TBC would at least appear to need some trimming back, if not a more substantial reclamation project. The topic of racial-ethnic test-score differences, given its prominence in scholarly and public reactions to TBC, is also discussed toward the end of this article.

4. Chabris (1998) published an article entitled "IQ Since 'The Bell Curve'" in the August 1998 issue of Commentary, with responses from nearly 20 individuals and a final rebuttal by Chabris appearing in the November 1998 issue of this journal. Chabris concentrated primarily on the several post-TBC books available at the time his article was published, hence there is not much overlap with the studies the present article reviews below.

5. Also, Chabris (1998) focused heavily on the concept of a general intelligence ("g") factor, which he deems "as sound and as meaningful as ever" (p. 39). The present article accepts, for the sake of argument, the use of a unitary measure of intelligence or cognitive ability. Not only does such an assumption simplify things, but also recent evidence showing correlations between psychometric intelligence and physiological measures (e.g., Jensen, 1998; Tan, 1999) seems consistent with the idea of a g factor.

6. One can, however, acknowledge the existence of g (or a g-like construct) while noting that other types of "intelligence" might still be able to show incremental predictiveness of real-world outcomes. Sternberg, Wagner, Williams, and Horvath (1995), for example, showed that even with IQ included in a regression model,
practical intelligence (tacit knowledge) accounted for significant additional variance in the criterion measure of managerial performance.

7. For simplicity's sake, the present review accepts the soundness of the data set used by Herrnstein and Murray (1994), the National Longitudinal Survey of Youth (NLSY), and assumes that most of the correlations demonstrated by Herrnstein and Murray reflect actual causation by intelligence, even though critics have raised objections to these aspects of TBC. For example, Fischer et al. (1996) develop an extensive argument for why the measure of intelligence in the NLSY, the Armed Forces Qualifying Test (AFQT), is really a test of schooling. Were these other critiques to be developed further and added to the present review, the case against TBC would be even stronger.

8. A comprehensive review of even five years' worth of research on intelligence, genes, and the environment would be a massive undertaking, well beyond the scope of the present essay. Of necessity, some selectivity must be exercised. In order to ensure some degree of balance in this review, however, a few steps were taken. First, a computerized literature search was done, using "Bell Curve" as a key term. Although relevant research could exist that does not mention TBC prominently enough to be detected, this approach does help keep the task more manageable and should pick up on most of the directly applicable research. Articles were selected for discussion in the present review to the extent that they appeared relevant; readers are welcome to conduct a search with the same (or similar) key words to see what I have omitted. As a way of tapping into additional research beyond the computerized search, two major recent books were consulted, Jensen's (1998) "The g Factor" [see also the ongoing Mutiple Book Review in psycoloquy, Jensen 1999] and Mackintosh's (1998) "IQ and Human Intelligence." Further, articles from authors whose views would appear to be congenial to TBC were also consulted (Chabris, 1998; Gottfredson, 1998).

9. Lastly, some may question the appropriateness of examining a particular five-year period of research, rather than seeking a longer-term perspective, unbounded by arbitrary cut-off dates. In general, this may be prudent advice. In this case, however, Murray's challenge does appear to call for an examination of research within a definite post-TBC period.

II. GENETIC CONTRIBUTION TO IQ

10. Two lines of recent research suggest that the genetic contribution to intelligence is lower than many previous estimates have suggested. Before delving further into this area, a brief clarification is in order. It must be remembered that heritability is a population-based statistic, referring to the proportion of phenotypic IQ variance
among individuals attributable to genes (Plomin & Petrill, 1997). Although some may object to the term "genetic contribution," it is used as a simplifying shorthand.

11. Herrnstein and Murray (1994) worked from the assumption that "the genetic component of IQ is unlikely to be smaller than 40 percent or higher than 80 percent" (p. 105). Some research emerging over the last five years tends to suggest that the genetic contribution to intelligence is closer to the low end of Herrnstein and Murray's range.

12. One important development that has gained increasing attention within the last five years is the role of environmental womb effects (EWE) on human development. These would include fetal exposure to nutrients, toxins, and hormones. One of the ways in which genetic contributions to intelligence are measured is by looking at the similarity of IQ in identical twins (who share all their genes) who have been reared apart. Herrnstein and Murray (1994) recognized that such twins would also share a womb environment, and Gardner (1995) discussed development in utero in his review of TBC. However, it was apparently not until an article by Devlin, Daniels, and Roeder (1997) that EWE were quantified and presented to a wide scientific audience. (The topic of EWE has now reached an even broader audience, as the cover story of the September 27, 1999 Newsweek reports on how one's risk for cancer and heart disease can be affected in the womb; Begley, 1999.)

13. Using elaborate statistical models to synthesize over 200 previous studies, Devlin and colleagues (1997) showed that the presence of substantial EWE results in a downward revision of the genetic contribution. They concluded that:

"broad-sense heritability, which measures the total effects of genes on IQ, is perhaps 48%; narrow-sense heritability, the relevant quantity for evolutionary arguments because it measures the additive effects of genes, is about 34%" (p. 470).

In an accompanying editorial, McGue (1997) stated that the narrow-sense percentage was "certainly too low to support the establishment of a high-IQ caste" (p. 417). Further, he added that,

"by the third or fourth generation, descendants of gifted individuals are not much more likely to be gifted than are descendants of ordinary people."

14. As with any research, cautions must apply to the findings of Devlin et al. (1997). They themselves state that, "Our statistical analyses cannot, of course, be considered definitive" (p. 470). Among the possible complicating factors they note are age affecting IQ heritability (discussed further below), and unmodeled effects of cultural inheritance and gene-environment interactions. McGue's (1997) adjoining
commentary also notes that direct measures of pre- and perinatal factors have shown only weak associations with IQ. (Interestingly, small effect sizes also appear to prevail in studies attempting to link specific genes to IQ [Plomin & Petrill, 1997] and in ones attempting to link specific measures of nonshared environment to nonshared variance in various outcomes [Turkheimer & Waldron, 2000].) Additional information on hormones and brain development can be obtained from Tan, Pence, and Tan (1998).

15. The second line of research suggesting lesser genetic effects than previously thought involves a different paradigm: adoption studies. Stoolmiller (1999) argues that because the types of homes into which individuals are adopted represent a relatively narrow stratum of society (tending to be white, older, and of higher socioeconomic status), the effects of shared family environment would be biased downward and the effects of genes biased upward. Stoolmiller suggests that:

"Corrections for range restriction applied to IQ data from recent adoption studies indicate that if adoptive families were representative of the U.S. census, [shared environment] could account for as much as 50% of the total phenotypic variance" (p. 405).

16. More specifically, what Stoolmiller (1999) did first was to review the literature to evaluate the range of home environments that exists in adoptive families, relative to the full population. By looking at studies' descriptive statistics on home environment measures, he could compute each study's variance ratio, "the ratio of the variance in the adoptive sample compared with the normative variance on the measure of interest" (p. 395). These variance ratios tended to be around one-third; alternatively, one could say that variance restriction or bias was 67%.

17. Applying this empirical estimate of home environment variance restriction, Stoolmiller (1999) yielded a formula (Equation 9) into which the IQ correlation for unrelated adoptive siblings could be inserted to yield an estimate of the proportion of variance due to shared environment.

18. Skeptics of shared environmental influences might counter with the finding that adopted siblings, by the time they reach adolescence, show zero correlation in IQ. Gottfredson (1998) and Plomin and Petrill (1997) cite this finding as one of the most noteworthy developments in IQ research in recent years.

19. Two responses can be given. First, although most studies do appear to show zero correlation for this type of design, not all do (Mackintosh, 1998; see pp. 83-84). Specifically, Scarr, Weinberg, and Waldman (1993) note that in their research, "The correlation for genetically unrelated siblings at adolescence (r = .19, p = .025) was
higher than IQ correlations of zero among genetically unrelated adolescent siblings previously reported in the literature" (p. 550).

20. Second, as Stoolmiller (1999) notes, "The observed correlations may be zero or even slightly negative precisely because of range restriction" (p. 406). Further, Stoolmiller points out that in two longitudinal sibling adoption studies testing the idea that the importance of shared environment for IQ declines from childhood to adolescence, the amount of change in shared environmental influence was insignificant, though in the predicted direction.

21. Stoolmiller (1999) does acknowledge that his findings depend on a number of assumptions, including one that there is no restriction to genetic variance in adoption samples. Ultimately, Stoolmiller notes, "I recommend treating my corrected estimates of [shared environment] as upper limits until more definitive data are available" (p. 406).

22. As noted above, an important potential phenomenon is age affecting IQ heritability. Gottfredson (1998) and Plomin and Petrill (1997) both cite as one of the most noteworthy findings of recent years the apparent discovery that IQ heritability rises with age. However, for whatever reason, commentators have offered a wide variety of characterizations of this finding.

23. Gottfredson (1998) refers to it as "In hindsight, perhaps... no surprise. Young children have the circumstances of their lives imposed on them by parents, schools and other agents of society, but as people get older they become more independent and tend to seek out the life niches that are most congenial to their genetic proclivities" (p. 27).

24. Plomin and Petrill (1997), in contrast, deem the finding of greater genetic influence on IQ later in life "counterintuitive", as "We would expect that environmental factors rather than genetic factors become increasingly important, for example, as accidents and illnesses accumulate" (p. 60); however these authors also acknowledge the possibility of a scenario similar to the one suggested by Gottfredson.

25. Devlin et al. (1997) and McGue (1997) appear more skeptical of whether age differences in IQ heritability truly exist. Devlin et al. write that "the large direct estimates derived from studies of adult twins raised apart have been explained by the conjecture that, as twins get older, IQ becomes more heritable. Evidence has been provided to support this 'age hypothesis', although the results are inconclusive and relationship unclear" (p. 470). Further, Devlin et al. estimated one of their models to include age effects, and found that "age-effects models fail to fit the data better than a simpler model that invokes maternal effects" (p. 470). McGue (1997) elaborates on
26. Clearly, much remains to be resolved in discovering the determinants of human behavior and its development. Turkheimer and Waldron (2000), who, as noted above, focused on nonshared environment, closed their article on the following note:

"some aspects of the development of complex human behavior may remain outside the domain of systematic scientific investigation for a very long time. Although developmentalists may be disappointed that a substantial portion of human development remains too complex, too interactive, and too resistant to controlled investigation and straightforward statistical methods to yield to systematic scientific analysis as we currently understand it, it must be remembered that the alternative -- a world in which human behavior could be understood all the way down in terms of correlations between difference scores -- would present its own gloomy prospects in the ethical evaluation of human agency" (p. 93).

27. Acknowledging all the aforementioned complexities, a recent major review (Plomin and Petrill, 1997) nonetheless concludes that about half of the IQ variance is due to genes, thus corroborating the studies reviewed above. Plomin and Petrill write that, "The reason for hoping that the pendulum is coming to rest at a point in between nature and nurture is not merely that we want everyone to be happy. It is what genetic research on intelligence tells us" (p. 55).

28. Mackintosh's (1998, Chapter 3) review of the heritability of IQ makes several points clear about this literature: many of the calculation models rest on assumptions that are at least questionable; often there are only five or fewer studies addressing a particular issue; and estimates of heritability from different approaches do not necessarily converge well. Mackintosh notes that many scholars have accepted the .50 estimate of heritability, although some believe it is higher. His own judgment is that: "The more reasonable conclusion... is that the broad heritability of IQ in modern industrialized societies is probably somewhere between 0.30 and 0.75, and that neither the data nor the models justify much greater precision" (p. 93).

29. Thus, with many of the above scholars converging on a heritability estimate of .50, it appears that the genetic contribution to IQ is on the low end of the range given by Herrnstein and Murray (1994), with the kinds of social consequences they suggest also being less likely.

30. Many Bell Curve critics may be pleased to see that some recent estimates of heritability are toward the low end of Herrnstein and Murray's (1994) range. Mackintosh (1998) cautions against having such an automatic reaction, when he writes:
"Other things equal, in a society where the heritability of IQ is low, this must be because that society permits significant differences in those environmental circumstances that affect IQ... In a society where many children are severely malnourished and live in grossly overcrowded slums, ravaged by infectious diseases; where relatively few children receive any formal education at all... there can be little doubt that differences in IQ scores will be partly a result of these environmental differences... A low heritability for IQ could be regarded as a mark of an unjust society" (pp. 66-67).

III. IMPORTANCE OF IQ AND OTHER FACTORS IN DETERMINING LIFE OUTCOMES

31. Comparing TBC's contentions about the importance of IQ in determining life outcomes to what newer analyses reveal is made somewhat difficult by the fact that observers exhibit a fair amount of disagreement over exactly what Herrnstein and Murray (1994) were saying. For example, Mackintosh (1998) writes that, "In their less guarded moments, Herrnstein and Murray (1994) give the impression that they believe the social consequences of differences in IQ to be of almost boundless significance" (pp. 377-378). At the other extreme, Gottfredson (1997a) characterizes Herrnstein and Murray's conclusion as simply being: "that (a) phenotypic intelligence has a greater impact than (b) parental social status (education and income) on whether (c) adults are poor" (p. 743). Fortunately, because some of the newer studies reanalyzed the same data set as was used in TBC, statistical results from the different research teams can be compared directly.

32. Even by the time TBC first came out, commentators had seized upon the fact that the statistical relationships reported by Herrnstein and Murray (1994) between IQ and outcomes such as poverty and crime were small or modest in magnitude (e.g., Gould, 1994). Further, two flaws were cited by critics at the time. The first was that a very weak measure of SES was used. The other was that in testing the role of IQ as a potential determinant of poverty, crime, and other outcomes (using multiple regression), Herrnstein and Murray omitted many other potential determinants. By committing the latter faux pas (known as "specification error"), they were likely to have given a misleadingly inflated picture of the potency of IQ.

33. Two teams of scholars -- Claude Fischer and colleagues (1996) from Berkeley who focused on predicting poverty, and Francis Cullen and colleagues from various universities who focused on crime outcomes (Cullen, Gendreau, Jarjoura, & Wright, 1997) -- set out to rectify matters in their respective areas using the same data source as was used by Herrnstein and Murray, the NLSY.
34. Fischer et al. (1996), in their book Inequality By Design, recalculated TBC's equation predicting the probability of being poor. They found that when a fuller set of potential determinants was included (whether someone was reared on a farm, came from a two-parent family, had been in an academic track in school, etc.), the social and environmental factors were more powerful predictors than IQ.

35. Cullen and colleagues (1997) noted that:

"In a normal scientific approach, Herrnstein and Murray would have first identified the known predictors of crime and then sought to demonstrate that IQ could explain variation above and beyond these criminogenic risk factors. These factors are identified in the readily available literature including Herrnstein's own [prior] work... By limiting their analysis primarily to three factors -- IQ, SES, and age -- they risk misspecifying their model and inflating the effects of IQ" (p. 393).

Reanalyses including additional predictors such as religious involvement and academic aspirations indeed showed IQ to have less of an impact on criminal behavior than did the original TBC analyses.

36. A related assertion by Herrnstein and Murray (1994) was that not only is IQ an important determinant of life outcomes now, but that during the course of the 20th century, it has been playing an increasing role in distinguishing the successful from the unsuccessful. Hauser and Huang (1997) put this idea to the test. They first scrutinized the bases of TBC's historical analyses and found many of Herrnstein and Murray's conclusions to be questionable.

37. Hauser and Huang (1997) then conducted their own statistical analyses, using existing data from the General Social Survey, a more- or-less annual study conducted by the University of Chicago's National Opinion Research Center (apparently for the purpose of increasing the sample sizes, the data sets were combined to form three period groupings: 1974-1982, 1984-1989, and 1990-1994) . The GSS protocol for these years contained a short verbal ability test, as well as extensive socioeconomic measures. This allowed Hauser and Huang to test whether the impact of cognitive ability on earnings would show an increase from the earliest time period to the latest, as would be predicted by TBC. No such trends were found. In other words, the value given to cognitive ability in the marketplace was no greater in the 1990s than in the 1970s.

38. Although multiple-regression analyses of the relative predictive potency of IQ and social-environmental factors -- the focal point of many of the above studies -- can appear dry and esoteric, Ceci and Williams (1997) illustrate the practical implications behind such statistics. These authors addressed the relative contribution of schooling
and "raw" intelligence to future earnings, an area made complicated by the reciprocal nature of schooling and intelligence (i.e., schooling can increase one's IQ, but higher IQ can lead a person to stay in school longer).

39. Herrnstein and Murray (1994) pondered this issue in the following quote: "If somehow the government can cajole or entice youths to stay in school for a few extra years, will their economic disadvantage in the new labor market go away? We doubt it. Their disadvantage might be diminished, but only modestly. There is reason to think that the job market has been rewarding not just education but intelligence" (p. 96).

40. While findings in the Ceci and Williams (1997) article do show cognitive ability to predict earnings even when education is statistically held constant, education also predicts earnings when cognitive ability is held constant. One of the more interesting findings was that individuals in the next-to-last quintile of cognitive ability who still managed to complete a four-year college degree earned more on average ($466 a week) than those in the top quintile of cognitive ability who completed only high school ($447).

41. Whereas the above paragraphs focus on apparent limitations of IQ in predicting real-world outcomes, there is also research that supports its role. Gottfredson (1997b), for example, has argued for the importance of measured intelligence to performance in real-world tasks. She reviews a great deal of validation evidence for IQ, focusing heavily on work-related outcomes, and covering some of the same territory as Herrnstein and Murray (1994). One interesting section of her review summarizes findings from the National Adult Literacy Survey (NALS). The NALS measured a number of "everyday" skills, such as locating an intersection on a street map and calculating postage and fees for certified mail. Gottfredson reports that a general literacy factor correlates .8 with the "academic G" factor from the GED exam (a test in the United States for a high school equivalency credential).

IV. MALLEABILITY OF COGNITIVE ABILITY

42. Before discussing recent research on the degree to which cognitive abilities can be raised through educational intervention, it is useful to review a distinction from Jensen (1998) between skills, which are conceived of as specific responses in specific situations developed through practice, and intelligence (g), which is conceived of as a more pervasive ability that permits "far transfer" of skills obtained in one setting to other, relatively different settings.

43. Jensen (1998) asks and answers a question about attempts to boost cognitive abilities:
"Aside from whether or not [participants'] level of g has been altered by the treatment, was any knowledge or set of skills inculcated that has practical utility for the treated persons in 'real life'? Skill training, the acquisition of a useful or employable skill, or of beneficial habits in the conduct of one's life, is valuable in its own right, regardless of any general carry-over to g" (p. 334).

44. Accordingly, the present review examines the impact of educational intervention both on what might be referred to as "skills" and on what might be referred to as "g". Although some researchers might not accept such a distinction, it is clear that, in some instances at least, education can boost cognitive abilities of some sort.

45. There appears to be a broad consensus that preschool Head Start-type programs -- as have been implemented in the past -- do not produce lasting improvements in cognitive ability, unless they are extremely intensive. One such intensive program, however, is the Abecedarian Project, the results of which showed a five-point IQ difference in favor of the treatment group at age 15. Writes Jensen (1998):

"Judging from a comparable gain in scholastic achievement, the effect had broad transfer, suggesting that it probably raised the level of g to some extent" (p. 344).

Nonetheless, typical early interventions appear to have more modest effects. The present review, therefore, focuses on how education may affect the cognitive abilities of older children (late elementary school and beyond) and young adults.

46. Herrnstein and Murray (1994) presented a picture of cognitive ability as largely unchangeable through education. Among their conclusions, they state the following: "Formal schooling offers little hope of narrowing cognitive inequality on a large scale in developed countries, because so much of its potential contribution has already been realized with the advent of universal twelve-year systems" (p. 389).

47. Later, when talking about affirmative action in higher education, Herrnstein and Murray raise a series of questions that again implies a static model of intelligence: "How much harm is done to minority self-esteem, to white perceptions of minorities, and ultimately to ethnic relations by a system that puts academically less able minority students side by side with students who are more able?" (p. 470). That minority students might gain in abilities during college and achieve positive outcomes in the areas mentioned above was apparently not considered by Herrnstein and Murray.

48. Like some of the other researchers cited above, Myerson, Rank, Raines, and Schnitzler (1998) went back to the same NLSY data set used by Herrnstein and
Murray to address an aspect of the malleability question. These investigators found results suggesting that, among individuals in the NLSY who ultimately graduated college, black students' scores on the Armed Forces Qualification Test (the same cognitive ability test used in TBC, and which Herrnstein and Murray described as "highly loaded on g", p. 73) rose sharply over the four years of college, in comparison to a relatively flat line for whites, resulting in a substantial narrowing of the race difference upon college graduation. This shows the apparent error in Herrnstein and Murray's characterization of cognitive ability as a relatively static entity.

49. Perkins and Grotzer (1997) review a variety of programs designed to improve thinking skills (which they acknowledge is not a comprehensive list of such programs), giving proper attention to both the persistence and transferability of the taught skills. In some cases, Perkins and Grotzer note that data on persistence are lacking. Other programs do appear, however, to have both persistence and transferability. One example is Adey and Shayer's (1993) Cognitive Acceleration through Science Education (CASE) program, conducted with 11-12 year-olds. This program taught scientific/methodological reasoning during a two-year intervention. Some program effects were present at a two-year follow-up, with transfer even to subjects such as English.

50. A more extensive detailing of evidence to the effect that schooling increases intelligence is available in the aforementioned Ceci and Williams (1997) article. Again, the evidence appears to contradict the thesis of TBC. As we have seen throughout this article, environmental exposures from the womb to college appear to affect individuals' cognitive abilities. Further, although cognitive ability does not appear to have the all-dominant impact on individuals' life success suggested by TBC, it certainly does play a role, arguing that efforts to improve cognitive abilities should be undertaken.

V. RACIAL-ETHNIC TEST SCORE DIFFERENCES

51. An area of TBC that generated as much or more reaction and debate than other parts of the book is that of racial-ethnic test score differences. A particularly contentious aspect of this debate is the degree (if any) to which black-white test score differences are genetically based.

52. Perhaps the most significant piece of work to come out in the past five years on the general topic of group differences is The Black-White Test Score Gap, an edited volume by Jencks and Phillips (1998a). In the introductory chapter, Jencks and...
Phillips (1998b) characterize the evidence on genes and the test score gap in the following quotations:

"despite endless speculation, no one has found genetic evidence indicating that blacks have less innate intellectual ability than whites" (p. 2).

"we find it hard to see how anyone reading these studies with an open mind could conclude that innate ability played a large role in the black-white gap" (p. 20).

53. Although a review of all chapters of the Jencks-Phillips book is well beyond the scope of the present article, a couple that cover recent theories of the test score gap will be mentioned. In one, Steele and Aronson (1998) present evidence in support of their "stereotype threat" model. In another, Cook and Ludwig (1998) present evidence that tends to go against the "acting white" theory. The latter authors write that: "While ethnographers observe that black adolescents sometimes taunt high-achieving black students for acting white, it appears that either these taunts do not inflict especially grievous social damage or high achievement has offsetting social benefits" (p. 391).

54. Fischer et al. (1996), in their own book, propound a social caste theory of test score differences. Building upon the work of other social scientists, such as John Ogbu, Fischer and colleagues focus on findings that, across the world, "ethnic groups that are inferior in status and caste position score worse on achievement and 'intelligence' tests" (p. 191; see especially their Table 8.1). Fischer et al. continue that, "A reading of the table shows that ethnicity or race, understood biologically, cannot be the cause of the test-score differences. Particularly striking are the substantial gaps in test scores between groups of the same ethnicity or race in countries like Israel, Japan, and South Africa" (p. 191). (In South Africa, the comparison is between high status individuals of English origin and their low status counterparts of Dutch origin.)

55. Fischer and colleagues (1996) propose that low ethnic caste or status position leads to low test scores through three mediators: socioeconomic deprivation, group segregation, and stigma of inferiority. Among the processes at work under the rubric of "stigma of inferiority", according to Fischer et al., are those of Steele's stereotype threat model.

56. Jensen (1998) has offered critiques of both stereotype threat and social caste theories. Regarding the former, Jensen claims that stereotype threat findings can be explained in terms of more basic test-anxiety principles. Regarding the latter, Jensen raises a number of objections to social caste theory, including the fact that the amount of psychometric evidence in some countries is relatively small (Fischer et al., 1996, themselves acknowledge similar limitations).
57. Jensen's (1998) preferred position is what he refers to as the "default hypothesis". This states that "human individual differences and population differences in heritable behavioral capacities, as products of the evolutionary process in the distant past, are essentially composed of the same stuff, so to speak, controlled by differences in allele frequencies, and that differences in allele frequencies between populations exist for all heritable characteristics, physical or behavioral, in which we find individual differences within populations" (p. 444).

58. Jensen (1998, p. 447) provides a theoretical equation for calculating between-group heritability from within-group heritability and other parameters, but notes that it is "not empirically applicable, because a single equation containing two unknowns... cannot be solved" (p. 448). Jensen then goes on to review numerous calculations and studies, which lead him to the following conclusion:

"[The default] hypothesis is consistent with a preponderance of psychometric, behavior-genetic, and evolutionary lines of evidence. And like true scientific hypotheses generally, it continually invites empirical refutation" (p. 515).

VI. CONCLUSIONS

59. Herrnstein and Murray (1994) essentially challenged social scientists who disagreed with TBC's conclusions to produce scientific results showing otherwise. Over the last five years, various scholars have done just that, as reviewed above. Just as an inoculation at the doctor's office leads the body to build resistance, TBC's claims that intelligence is predominantly due to genetic factors and largely unmodifiable appear to have stimulated a number of researchers to build up a body of scholarship reaching opposite conclusions.

60. Importantly, one could argue that the basis for supporting environmental enrichments in areas such as education and nutrition appears to be stronger now than when The Bell Curve was published. Although the new research studies on cognitive benefits of schooling and on environmental womb effects have their own limitations (as with any research), they do present an optimistic picture about environmental enrichment. At the same time, as argued above, some of TBC's claims appear to need at least some trimming back.

61. Chabris (1998), reflecting upon the writings of some of TBC's critics and upon Murray's responses, wrote the following:

"The conclusion one may reasonably draw... is that while intelligence may matter more or less than family background, it certainly matters, and that if it is not entirely
heritable, it is heritable in some degree" (p. 35).

Such a statement may have the potential to allow (at least some) Bell Curve supporters and detractors to find common ground.

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The Bell Curve is a highly controversial 1994 book by Richard Herrnstein and Charles Murray. It purports to show that intelligence is the most dominant factor in the trajectory of each person’s life, and it serves to predict such things as socioeconomic status and tendencies towards criminal behavior. Much of the research in The Bell Curve is not disputed, but the conclusions drawn from it (low IQ is to blame for the underclass) are frequently cited by eugenics and white nationalist movements. Their A reader writes: The latest flap with James Watson appears to be playing bigger in England than the US, and I think you are picking up on that. I was really surprised that Wikipedia had the scoop locally. Normally a story like this would be covered by all the MSM and the columnist would have material for weeks. But there is a caution here that traces itself back to the Bell Curve. I read The New Republic Bell Curve edition that you edited and had not read the book or been familiar with the authors. TNR pretty much ripped the book down and kept it out of the discussion for a long time. I have n The Bell Curve: Intelligence and Class Structure in American Life is a 1994 book by psychologist Richard J. Herrnstein and political scientist Charles Murray, in which the authors argue that human intelligence is substantially influenced by both inherited and environmental factors and that it is a better predictor of many personal outcomes, including financial income, job performance, birth out of wedlock, and involvement in crime than are an individual's parental socioeconomic status. They also argue