

gences (Mayer, Salovey, & Caruso, 2008; Mayer, Panter, & Caruso, 2012; Weis & Süß, 2005). Emotional intelligence concerns the ability to identify emotional information, to reason about emotions, and to use emotions to solve life problems. Personal intelligence involves the ability to identify information about personality, to reason about one's own and others' personalities, and to use that knowledge to make personal choices and to systematize one's plans. Social intelligence is a parallel construct that concerns the ability to reason about such social information as the power of situations, group status and memberships, and group dynamics. Each of these intelligences can be measured with psychometrically validated, ability-based intelligence measures, with test takers' responses being keyed to expert-determined correct and incorrect (or better and worse) answers. Such ability measures constitute the "gold standard" in the area because intelligence is a mental ability and mental abilities are measured by comparing a person's performance against the criterion of correctness.

The most well studied of these intelligences, emotional intelligence, is now widely measured by ability-based methods. A search delimited specifically by the terms "emotional intelligence" and "ability measure" in PsycINFO yielded just over 120 studies as of March 26, 2012. Validity studies with the ability scales indicate considerable and diverse evidence for the construct (Mayer, Roberts, & Barsade, 2008). Measured as an ability (as opposed to a mixed group of traits), higher levels of emotional intelligence correlated with better social outcomes for children and adults, people's lowered social deviance, greater likability as evaluated by observers, better family and intimate relationships, higher student performance (perhaps due to emotional intelligence's overlap with general intelligence), better social relations at work and in negotiations, and overall psychological well-being (Mayer, Roberts, & Barsade, 2008). Personal intelligence is a very new construct that, early findings suggest, may allow for a broadening of such predictions (Mayer et al., 2012). Measures of social intelligence have yet to be employed in large-scale studies, although findings have thus far seemed promising (Weis & Süß, 2005).

Analytical intelligence, measured by traditional IQ tests, is a critically important attribute to explore and a powerful predictor of life outcomes, as indicated in Nisbett et al.'s (2012) review. It is our hope that the next review of what we know about intelligence will integrate coverage of traditional intelligence with the path-breaking new findings arising from the study of hot intelligences.

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## Group Differences in IQ Are Best Understood as Environmental in Origin

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In his comment on our review of new findings and theoretical developments in the field of intelligence (Nisbett et al., February–March 2012), Rushton (2012, this issue) maintained that our claim that Blacks have reduced the IQ gap by more than 5.5 IQ points ignored Rushton and Jensen's (2006) objections to the original contention by Dickens and Flynn (2006). Readers who wish to see why we ignored their objections are referred to Dickens and Flynn (2006), who spelled out the errors in the Rushton and Jensen analysis.

In support of his contention that Blacks have not gained in intellectual capacity relative to Whites, Rushton (2012) maintained that there has been virtually no closing of the Black/White gap in scores on the National Assessment of Educational Progress (NAEP) long-term assessment tests from 1975 to 2008. He presented a graph collapsing math and reading scores for 17-year-olds and provided only the means of the resulting score. Of course, means by themselves tell us little. It is gap reduction in terms of effect size that we care about, and gap closing has been very substantial in effect size terms. For reading, the degree of closing on the NAEP tests between 1971 and 2008 (using the standard deviations for Whites) was 0.54 *SD* for 9-year-olds, 0.58 for 13-year-olds, and 0.58 for 17-year-olds, for an average gap reduction of 0.57 *SD*. For math, the degree of closing between 1973 and 2008 was 0.25 *SD* for 9-year-olds, 0.40 for 13-year-olds, and 0.25 for 17-year-olds, for an average gap reduction of 0.30 *SD*.<sup>1</sup> Averaging over the six indices of gap reduction, we get an IQ gain equivalent of 6.45 points—somewhat higher than the 5.5-point gain for IQ found by Dickens and Flynn (2006) for the period 1972–2002. The academic achievement gains are particularly remarkable in view of a complete reversal over the past 50 years of the magnitude of the socioeconomic status (SES) gap in academic achievement compared to the Black/White gap. Analyzing a wide variety of tests of

<sup>1</sup> In these calculations we used the *SD* for Whites, but the conclusions would be little affected if we were to average the White and Black *SD*s. For the 1971 and 1973 data, *SD*s were not available, so we used the earliest available *SD*s, which were from 1975 for reading and from 1978 for math. *SD*s varied little from year to year.

academic achievement, Reardon (2011) found that 50 years ago the Black/White gap was more than 1.5 times (in *SD* terms) the SES gap. Today the SES gap is nearly twice as large as the Black/White gap.

Rushton (2012) asserted that the fact that Black performance falls further behind White performance on subtests and items that have a higher *g* loading is an indication of a genetic contribution to the Black/White IQ gap. He believes that a genetic hypothesis about the origin of the racial IQ gap would predict this pattern of larger differences for more heritable, heavily *g*-loaded items, and that environmental ones would not. This belief is mistaken. The construct of *g* would have no significance if it were not a measure of cognitive complexity. If a group is environmentally disadvantaged, its performance in comparison to nondisadvantaged groups will be greater on more complex tasks than on less complex ones. If you have not played basketball for many years, your performance will be closer to what it was previously for layups than for fade-away jump shots. See Flynn (2012) for a detailed discussion of this issue. For an extended discussion of Rushton's errors in maintaining that heritability differences in IQ test items can establish that group differences in ability are due to genetics, see Wicherts and Johnson (2009).

In response to our report that some developing countries are experiencing larger IQ gains than is now characteristic of more developed countries, together with the speculation that developing country and developed country IQs may be converging, Woodley and Meisenberg (2012, this issue) argued that the genetic inferiority of people in developing countries places a limit on how much gain there can be for adults. They reported that although there have been significant gains for younger Saudi Arabian children, the gains for 18-year-olds have been minimal (Batterjee, 2011). This pattern is scarcely surprising given the poor quality of Saudi secondary education, which allows high school students to forgo difficult subjects such as science and mathematics in favor of religious instruction (Batterjee, 2011). Woodley and Meisenberg noted that the large gains in Kenya might be due to environmental changes. It is certainly possible that physical environmental changes, as well as cognitive environment changes, contributed to Kenyan gains. Woodley and Meisenberg attributed

the large gains in Dominica (Meisenberg, Lawless, Lambert, & Newton, 2005) to a massive expansion of the school system. This is of course just the sort of environmental change that could be expected to produce changes in cognitive abilities. Indeed, in our view, the school system is likely to be a major recipient of economic gains as well as a major driver both of further intelligence gains and further economic gains. Woodley and Meisenberg introduced a report of Draw-a-Man test changes for children ages 7 to 11 in the city of Belo Horizonte in Brazil, which found a gain equal to only 2.36 points per decade. Human figure drawing, however, is a poor measure of intelligence and correlates only very weakly with IQ (Motta, Little, & Tobin, 1993).

Woodley and Meisenberg (2012) noted that *g* loadings on IQ subtests do not correlate with temporal gains on subtests and speculated that the citizens of developing countries, because of their genetic inferiority, will show lower gains on high *g*-loaded tests (for which scores are more heritable) than on low *g*-loaded tests. Small gains for highly *g*-loaded tests seem unlikely to us. Gains in sub-Saharan African countries of 0.50 to 0.70 *SD* in response to a few months of Western-style education have been reported for heavily *g*-loaded fluid intelligence tests (McFie, 1961). And a brief training session on Raven's Progressive Matrices—often regarded as a virtually pure measure of *g*—increased the scores of Black Africans by 14 points while increasing the scores of Whites by only 4 points (Skuy et al., 2002).

We agree with Mayer, Caruso, Panter, and Salovey (2012, this issue) that many types of abilities can be thought of as intelligence of a kind, but it has proved hard to show that measures of emotional intelligence or social intelligence contribute to behavior we would want to call intelligent over and above their correlation with conventional IQ tests.

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