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What Cognitive Intelligence Is and What Emotional Intelligence Is Not

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My commentary deals with the Mayer, Salovey, and Caruso (this issue) article. I substantially agree with the views of Matthews, Roberts and Zeidner. My commentary considers three issues. First, I indicate that there are fundamental distinction between tests of cognitive intelligence and the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) of emotional intelligence (EI). Second, I sketch a brief outline of some properties of cognitive intelligence construed as a latent trait and I review empirical studies that provide insights into the variable relation between the latent trait for cognitive ability and psychometric measures of intelligence. And, I indicate that the research reported by Mayer et al. does not indicate that MSCEIT assesses a construct that has isomorphic characteristics. Third, I review the studies presented by Mayer et al. purporting to demonstrate that MSCEIT has predictive validity.

Fundamental Distinctions

Tests of cognitive ability are measures of performance. They assess the ability to solve problems in various cognitive domains. MSCEIT tests knowledge of emotions but not necessarily the ability to perform tasks that are related to the knowledge that is assessed. The distinction is fundamental. Consider a test of vocabulary. No one would doubt that a person who has a high score on a test of vocabulary has a large vocabulary and excels in the ability to define and understand the meaning of words. Consider, by contrast, scores on a test of the ability to manage emotions. A person who has expert knowledge of emotions may or may not be expert in the actual ability that is allegedly assessed by the test. A person may know the correct answer to a question about the appropriate way of responding to the grief of a bereaved person. Such a person may or may not be skilled in the actual performance of the task of comforting a bereaved person. To argue that tests of knowledge about emotion translate into skilled behaviors with respect to one's emotional life is, in effect, to argue that the experts in the study of emotion who were consulted by Mayer et al. were all highly skilled in the management of their own emotional lives. I do not find the concept of an emotionally unintelligent person who possesses expert knowledge of emotion oxymoronic.

There is a fundamental distinction between expert scoring and consensus scoring of tests. Mayer et al. (this issue) have convincingly demonstrated that consensus scoring of nonexperts is congruent with the consensus scoring of experts. What they do not indicate is the degree of agreement among experts. Do their experts disagree? Although it is theoretically possible for experts to disagree about the correct answer to an item on a test of cognitive ability, it is sufficiently rare to render such disagreements of negligible importance. Lexicographers would rarely, if ever, disagree about the correct definition of a word used in a test of vocabulary. By contrast, experts may very well disagree about the correct answer to an item designed to assess knowledge about managing emotions on the MSCEIT. The existence of correct answers to cognitive ability items implies that it is possible for a person with unusually high cognitive ability to provide a response to an item that is nonconsensual and correct. By contrast, responses to the MSCEIT can only be correct if they are consensual.

Theoretical Properties of Cognitive Intelligence

Cognitive ability is a latent trait that is assessed by psychometric tests—the latter is a manifestation of the former but the test and the latent trait are not identical. There is an extensive body of research that provides insights into the characteristics of the latent trait for cognitive ability and permits one to ascertain the empirical relations between the latent trait and psychometric tests. EI may also be construed as a latent trait. Owing, in part, to the relatively brief history of research on this topic, it is not possible to document a nomological network of laws and relations defining the conceptual and empirical relations that obtain between tests of EI and the latent trait of which they are alleged manifestations.

Psychometric test scores are predictable from measures that do not appear to assess complex developed intellectual abilities. Performance on measures of infant information processing abilities is related to childhood IQ. Infant information processing measures may account for as much as 60% of the variance in childhood IQ (Columbo, 1993). Psychometric tests are related to performance on a variety of simple information processing tasks that, on the surface, do not appear to measure complex intellectual skills. For example, Deary, Der, & Ford (2001) obtained a correlation of –.49 between a four-choice reaction time measure and IQ in a large representative sample of

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middle aged adults. Measures of relatively simple information processing skills are substantially related to a general cognitive ability factor (Luo & Petrill, 1999). In addition, basic information processing components explain much of the covariance between psychometric ability and academic achievement (Luo, Thompson, & Detterman, 2003). Measures of general cognitive ability that are based on both psychometric indexes and information processing indexes add incremental validity to the prediction of academic performance over and above the prediction obtained from psychometric measures alone (Luo & Petrill, 1999). These results imply that general cognitive ability may be construed as a latent trait that is not identical with the attained intellectual ability assessed by psychometric tests of intelligence.

Cognitive ability is assessed by tests that change over time. Items on a test that assess ability in a 4-year-old are not used on tests of adult intelligence. Nevertheless, there is considerable continuity in the latent trait assessed by measures of intelligence. For example, Deary, Whalley, Lemmon, Crawford, & Starr (2000) found that a Moray House IQ tested administered to a population of 11-year-old Scottish children correlated .48 with Ravens Progressive Matrices Test scores obtained 66 years later at age 77. Age 77 Moray House scores were correlated with age 77 Ravens scores .57. The small difference in magnitude between the time-lagged and concurrent test scores implies that the latent trait assessed imperfectly by the Moray House test and the Ravens remains relatively invariant over the life span. Psychometric tests may provide measures that may have variable relations to cognitive ability construed as a latent trait. Campbell (in press) reported analyses of outcomes for the Abecedarian Project in which children assumed to be at high risk for the development of low intelligence were randomly assigned to an intervention starting shortly after birth and continued as a full time University-based day care intervention for the entire preschool period or a control group. She performed regression analyses in which childhood verbal ability was entered as a variable in the regression prior to the entry of the dummy coded experimental variable. The experimental variable had effect sizes for measures of cognitive ability of .10 at age 6.5, –.21 at age 12, and –.38 at age 21. The negative effect sizes indicated that the experimental group had lower scores on the tests of cognitive ability than the control group. By contrast, the experimental group had higher scores than the control group if the dummy coded experimental variable was not entered after scores for childhood verbal ability. The effect size of the experimental variable was .19 at age 21. These results may be explained by assuming that measures of childhood verbal ability obtained from children exposed to intensive early childhood interventions contain two components of variance. One component constitutes a latent trait for general intellectual ability that is relatively invariant and a second component constitutes a variable component that decreases from early childhood to adulthood. The psychometric scores on the test of intelligence derived from children exposed to the intervention therefore overpredict adult intellectual performance relative to the predictions obtained from children in the control group. Thus, in this instance, the psychometric indexes are imperfect measures of the latent trait.

Phenotypic measures of intelligence also may exhibit variable relations to the genotypic characteristics of latent traits. Spinanth and Plomin (2003) reported behavioral genetic analyses for a large cohort of English twins in a longitudinal study in which intelligence was measured at ages 2, 3, 4, and 7. They estimated the magnitude of shared family influences for a composite measure of intelligence based on performance at ages 2, 3, and 4 as .75. The comparable analysis for these children at age 7 yielded an estimate of .31. Estimates of the heritability of intellectual ability increased from .22 to .57. These data indicate that the relative importance of genetic and shared environmental influences on intelligence can change dramatically as children age. These results also imply that changes in measured intelligence from early childhood to the early school years are those that lead phenotypic scores to be more congruent with a historically prior latent trait for cognitive ability that is present in nascent form at the moment of conception. Thus the composition of phenotypic scores may have a variable relation to a latent trait construed as being more heritable than its phenotypic manifestations.

In this section I argue that cognitive intelligence may be construed as a latent trait that may have a variable relation to psychometric measures of intelligence. Mayer et al. (this issue) do not provide evidence indicating that it is possible to identify a latent trait of EI that may have variable relations to the test that is used to assess the trait.

Predictive Validity of the MSCEIT

Mayer et al. (this issue) present convincing evidence that MSCEIT may be scored using consensus measures and that the test has adequate reliability. Although this evidence is necessary, it is not sufficient. Does the test measure an important individual difference dimension? To answer this question I analyze the studies cited by Mayer et al. that are alleged to provide evidence for the predictive validity of MSCEIT. In my opinion, an ideal study demonstrating the predictive validity of the test would have all or most of the following characteristics:

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1. The study would be published in a peer reviewed journal. Some of the studies cited by Mayer et al. (this issue) are not published in peer reviewed journals and are not easily accessible.

2. The study should include a demonstration that the test has incremental predictive validity over and above the predictive validity of standard tests of intelligence and of the Big Five personality traits. Few of the studies reported meet this criterion.

3. The studies should use orthogonal test components derived from the MSCEIT. The MSCEIT permits the derivation of a total score and four scores for each of the branches for measuring EI. Predictive validities are sometimes reported in terms of the total score and sometimes reported in terms of one or more of the branch scores. This increases the probability of erroneously reporting significant relations because there are five different tests scores that can, in principle, relate to any outcome measure. It would be reasonable to conduct a Schmid-Leiman type factor analysis and extract a general factor and orthogonal residualized factors possibly representing each of four branches. A multiple regression analysis could then be used in which the general score is added prior to the component scores. None of the studies reported provide an adequate partitioning of the structure of MSCEIT to ascertain the independent contributions of general and specific factors to an outcome.

4. The dependent variable studied should be based on objective indexes rather than on self-reports. Some of the studies cited rely on self-report outcome measures.

5. The test should account for more than a trivial amount of variance in the outcome measure. There is, of course, no definition or criterion for specification of the term trivial used in this context. But, the magnitude of predictive variance is important. Many of the significant increments to predictability cited by Mayer et al. (this issue) may, without hyperbole, be described as trivial.

With these criteria in mind it is possible to examine the specific studies dealing with predictive validity cited by Mayer et al. (this issue). Mayer et al. state that EI is not related to academic achievement if general intelligence is controlled.

EI is said to be related to deviancy, drug use, and problem behavior. Several different studies are cited in support of this assertion and some of the relevant data in support of the assertion are presented Table 7 of their article. The data reported in Rubin's (1999) article are contained in an unpublished thesis. The description of the data does not indicate that the correlation of –.45 that is reported is a partial correlation controlling for intelligence and personality. In addition, the phrase "for example" following the reported correlation suggests that the correlation reported is selected from a large set of correlations. Were there other results and what were their values? The Brackett and Mayer (2003) study as reported in Table 7 obtained four correlations for relevant outcome measures controlling for Verbal SAT and the Big Five. The correlations were –.07, –.01, .02 (a negative correlation was theoretically expected here) and –.20. Thus, the mean predictive validity for these theoretically meaningful outcomes was .05—indicating that the MSCEIT does not predict these outcomes. The one significant correlation obtained may well be inflated by chance selection from a group of four. The Trinidad and Johnson (2002) study did report a significant correlation between MSCEIT scores and self-reported tobacco and alcohol use. Contrary to the description of the study provided in Table 7 of the Mayer et al. (this issue) article, Trinidad and Johnson did not control for the Big Five. They did use self-reported grades as a crude control for intelligence. The significant correlation between overall EI and drug use is not replicated in the Brackett and Mayer study also reported in Table 7—the partial correlations between overall EI controlling for SAT and the Big Five for alcohol use and smoking are –.01 and .02, respectively, for the data obtained by Brackett and Mayer.

MSCEIT is assumed to be related to life space dimensions. Mayer et al. (this issue) present data from an unpublished senior honors thesis by Formica (1998). The study does not control for personality but only for Verbal SAT and sex. Five partial correlations are reported. The correlation with destructive behavior changes sign after controlling for Verbal SAT and sex going from –.33 to .19. Although it is not clear from the information reported in Table 7, I assume that the measure used is one of time because a destructive behavior occurred. If so, the theoretically expected correlation is negative, not positive. If the correlation reported in my version of Table 7 is not a typographical error, the results obtained would appear to be opposite of those that are predicted. Ignoring the direction of the relation, five partial correlations were obtained and, assuming that the nonsignificant partial correlations are zero, the mean obtained partial correlation was .13. The dependent variable in this study was based on self-reports. Significant results are cited for the Managing Emotion scale but not for the total score.

Three studies are cited indicating that EI relates to prosocial behavior. The Lopes et al. (in press) study is under review. Correlations are not reported for this study and, as described, it includes controls for personality but not for intelligence. The Coté, Lopes, Salovey, & Beers (2003) study that provides support for these results is in preparation. It, too, apparently involves controls for personality but not for intelligence. And, significant results are reported for Branch 4 and not for total EI. The partial correlation values controlling for personality are not described. The Gohm,

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Corser, and Dalsky (2004) study is in preparation. The brief description of the study does not indicate that controls for intelligence and personality were used. The description of the study indicates that EI may not have been related to stress management among college students as a main effect variable. The relation between EI and stress management was apparently moderated by dimensions of response to emotion that were not assessed by MSCEIT. The measure of stress management used was not described—it may or may not have been a self-report measure.

Mayer et al. (this issue) present a number of findings relating EI to leadership and organizational behavior. Five studies are briefly described—none are published in peer-reviewed journals. One study apparently involved controls for intelligence (Janovics & Christiansen, 2002) and one study used controls for the Big Five (Coté, Lopes, & Savoley, 2003). Apparently, none of these five had controls for both personality and intelligence. Ex post facto hypotheses are presented to explain results that are not always consistent with prior theoretical expectations. Collins (2001) is described as having found that EI was inversely related to the managerial status of one's job. Giles (2001) is reported to have found a positive relation with one of the branches of the MSCEIT for one organization and a significant relation for a different branch for another organization. Results for the total EI score are not presented. Rice (1999) is described as having found a positive relation between EI and customer relations for claims adjusters and an inverse relation between EI and customer relations for team leaders. Janovics and Christiansen are reported to have obtained a positive correlation of .22 between EI and supervisor ratings of employed undergraduates that remained significant after controlling for intelligence (the partial correlation is not reported). Note that in this instance significant results are reported for total EI scores and not for branch scores. Finally, Coté et al. are reported to have found that EI relates to the quality of "vision statements." The results remained significant after controlling for the Big Five. The partial correlations are not reported. And, apparently, controls for intelligence were not used in this study.

The studies cited by Mayer et al. (this issue) do not satisfy the criteria outlined at the start of this section. There is not a single study reported that indicates that EI has nontrivial incremental validity for a socially important outcome variable after controlling for intelligence and personality. Too many of the studies are not published in peer-reviewed journals. Too often isolated correlations are presented without reported replications or presentation of the panoply of additional relations examined that would permit one to assess the overall significance of the results. And, too often, ex post facto reasoning is required to rationalize results that are not invariably consistent with theoretical expectations. There is no evidence that the constructs measured by the test are related to important social outcomes.

Conclusion

Three conclusions may be derived from my analysis of the MSCEIT.

First, the items used to assess EI are fundamentally different from items used to assess cognitive intelligence. Second, measures of cognitive intelligence may be construed as measures of a latent trait. Psychometric tests of intelligence may have variable and complex relations to the latent trait of which they are a manifestation. Mayer et al. (this issue) have not provided us with clear evidence that establishes a clear conceptual and empirical distinction between their measure and a latent trait of EI. Third, there is no convincing evidence that the MSCEIT provides incremental predictive validity over and above standard measures of intelligence and personality for important socially relevant outcomes. Thus, there is no foundation for the use of the test in applied settings nor is there evidence indicating that the test measures an important dimension of individual differences.

Note

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