



# Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT/MEIS) and overall, verbal, and nonverbal intelligence: Meta-analytic evidence and critical contingencies



Dejun Tony Kong\*

Jepson School of Leadership Studies and Robins School of Business, University of Richmond, Richmond, VA 23173, USA

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## ABSTRACT

Emotional intelligence (EI) has been widely used in psychological, managerial, and educational research. Among all the measures, MSCEIT (and its earlier version MEIS) has been widely used to assess EI ability. However, there is little systematic research regarding its relationship with overall, verbal, and nonverbal intelligence. The current research fills this gap in the literature by meta-analyzing the correlations between overall MSCEIT/MEIS and overall, verbal, and nonverbal intelligence. Additionally, the current research identified four critical contingencies: the type of an instrument for intelligence assessment, the study population, the average age of a sample, and the female percentage of a sample.

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## 1. Introduction

Emotional intelligence (EI), defined as the ability to recognize, use, understand, and manage emotions (Salovey & Mayer, 1990), has received explosive attention since the 1990s. It can facilitate sociopsychological functioning in various contexts (Joseph & Newman, 2010; Mayer, Roberts, & Barsade, 2008). EI (as an ability) is inherently related to intelligence, which refers to a hierarchy of mental ability (Carroll, 1993). Mayer et al. (2008) argued that EI is parallel to verbal, perceptual-organizational, and broad-visualization intelligence (p. 510). Verbal intelligence refers to “the ability to reason about words and the use of acquired verbal knowledge to promote such reasoning” (Mayer et al., 2008, p. 511). Considering that EI (as an ability) is claimed to be more closely related to verbal intelligence than nonverbal intelligence (Brody, 2004; MacCann, Roberts, Matthews, & Zeidner, 2004), I categorize intelligence into overall (both verbal and nonverbal), verbal, and nonverbal intelligence.

The most common ability-based measure of EI is the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, & Caruso, 2002) and its earlier version MEIS. Because EI is a form of intelligence, its relation to other forms of intelligence has been examined and discussed. For example, Mayer et al. (2008) claimed that overall MSCEIT/MEIS is positively correlated

with verbal intelligence ( $r \approx .36$ ) and is less correlated with other forms of intelligence ( $.10 \leq r \leq .20$ ) (p. 518). Yet these claims have not been rigorously tested. More systematic research on the moderators for the overall MSCEIT/MEIS-intelligence relationship is also needed for a more nuanced understanding of this relationship (e.g., Schulte, Ree, & Carretta, 2004; Van Rooy & Viswesvaran, 2004). Accordingly, the current research seeks to fill this gap by meta-analyzing previous findings. In doing so, the current research advances knowledge and facilitates the consensus building on this topic (Chan & Arvey, 2012) with “statistically valid conclusions” (O’Fallon & Butterfield, 2005, p. 405).

## 2. Hypotheses

EI entails both crystallized (largely verbal) components that require emotion knowledge accumulated over time and fluid (largely nonverbal) components that require reasoning; “crystallized emotional abilities may include knowing whether an emotion regulation strategy is effective, and fluid emotional abilities may include implementing that strategy effectively in a real, emotionally evocative situation” (Côté, 2010, p. 129). Therefore, overall MSCEIT/MEIS should be correlated with overall, verbal and nonverbal intelligence.

**Hypothesis 1.** Overall MSCEIT/MEIS is positively correlated with (a) overall, (b) verbal, and (c) nonverbal intelligence.

\* Tel.: +1 (314) 749 5753 (Cell)/(804) 287 6891 (Office); fax: +1 (804) 287 6062.  
E-mail address: [tkong@richmond.edu](mailto:tkong@richmond.edu)

The type of instruments for intelligence assessment should affect the relationship between overall MSCEIT/MEIS and intelligence. Intelligence tests are specifically designed to assess intelligence, whereas standardized/admission tests (e.g., Frey & Detterman, 2004) are designed to assess academic ability rather than merely intelligence. Therefore, standardized/admission tests have noise in intelligence assessment, attenuating the overall MSCEIT/MEIS-intelligence relationship.

**Hypothesis 2.** The relationships between overall MSCEIT/MEIS and (a) overall, (b) verbal, and (c) nonverbal intelligence are stronger when intelligence tests are used to assess intelligence than when standardized/admission tests are used to assess intelligence.

The study population (just university students versus otherwise) can also affect the overall MSCEIT/MEIS-intelligence relationship. University students are a common study population and yet they are systematically different from other populations (Henrich, Heine, & Norenzayan, 2010; Henry, 2008). University students “are concentrated at the upper levels of educational background” and “have been carefully preselected for having unusually adept cognitive skills” (Sears, 1986, p. 521) rather than EI ability. Therefore, the variance of university students’ intelligence scores is constrained whereas the variance of their MSCEIT/MEIS overall scores is less so. Accordingly, the overall MSCEIT/MEIS-intelligence relationship is more likely to be attenuated in samples of just university students than in other samples (see Hunter & Schmidt, 1990; Hunter, Schmidt, & Le, 2006 regarding range restriction).

**Hypothesis 3.** The relationships between overall MSCEIT/MEIS and (a) overall, (b) verbal, and (c) nonverbal intelligence are weaker in study samples of just university students than in other samples.

### 3. Method

#### 3.1. Sample

By (1) using the terms *MSCEIT*, *MEIS*, *cognitive ability*, *cognitive intelligence*, *mental intelligence*, *IQ*, *emotional intelligence*, and *EI* in search engines including ABI/Inform, EBSCO (PsycINFO, Academic Search Premier, etc.), Google Scholar, and ProQuest (Dissertations and Theses) and (2) using the references in four meta-analysis publications (Harms & Credé, 2010; Joseph & Newman, 2010; Van Rooy & Viswesvaran, 2004; Van Rooy, Viswesvaran, & Pluta, 2005), I identified 62 correlations between overall MSCEIT/MEIS and intelligence reported in 53 study samples (46 papers) and included them in the final sample. Noteworthy, the final sample excluded studies using (nonstandardized) GPA as the only measure of intelligence.

#### 3.2. Analysis

All correlations were corrected for attenuation (Hunter & Schmidt, 1990) and were converted to Fisher’s *z*s for calculation of error statistics (Lipsey & Wilson, 2001). Over half of the included papers failed to report the internal consistency of either MSCEIT/MEIS or intelligence measures, which could cause biased estimation of internal consistency based on the meta-analytic sample. Therefore, I used internal consistency statistics reported in previous test manuals to correct attenuation for the papers that failed to report internal consistency, despite some caution of doing so (Crocker & Algina, 1986).

The meta-analysis was conducted using MIX Pro 2.0 (Bax, Yu, Ikeda, Tsuruta, & Moons, 2006). Effect sizes were weighted by their inverse variances (Cohn & Becker, 2003). No considerable outlier

was detected using the exclusion sensitivity assessment and plot (Bax et al., 2006). I coded (without ambiguity) each instrument for intelligence assessment as either an intelligence test or a standardized/admission test and each study sample as either entailing just university students or otherwise.

In estimating the main effects, I used random-effects models when the assumption of sample homogeneity was violated (indicated by a significant *Q*) and fixed-effects models when the assumption of sample homogeneity was empirically confirmed (indicated by a nonsignificant *Q*) (Erez, Bloom, & Wells, 1996). Random-effects models allow for inferences to studies with different participants and measures than those in the sample (Hedges & Vevea, 1998). Because *Q* has low power when the number of studies and sample sizes within the studies are small (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006), I also included the inconsistency statistic  $I^2 = 100\% \times (Q - df)/Q$  with a larger value indicating more sample heterogeneity. To correct for publication bias, I adopted Duval and Tweedie’s (2000) trim-and-fill method to produce the publication-bias-adjusted estimates if necessary. The estimated Fisher’s *z* was converted back to *r* for interpretation with the corresponding 95% confidence interval (CI) indicating statistical significance only when zero was excluded in the CI. In estimating the moderating effects, I used fixed-effects models (Hedges & Olkin, 1985). A significant between-group homogeneity statistic ( $Q_b$ ) indicated a significant moderating effect.

## 4. Results

### 4.1. Main effects

Overall MSCEIT/MEIS was positively correlated with overall ( $\bar{r}_c = .30$ ), verbal ( $\bar{r}_c = .26$ ), and nonverbal intelligence ( $\bar{r}_c = .23$ ) (see Table 1). Therefore, Hypotheses 1a–1c were supported. When intelligence tests were used, overall MSCEIT/MEIS was positively correlated with overall ( $\bar{r}_c = .33$ ), verbal ( $\bar{r}_c = .26$ ), and nonverbal intelligence ( $\bar{r}_c = .27$ ). When standardized/admission tests were used, overall MSCEIT/MEIS was positively correlated with overall ( $\bar{r}_c = .21$ ) and verbal intelligence ( $\bar{r}_c = .28$ ) but not significantly correlated with nonverbal intelligence ( $\bar{r}_c = .05$ ). When study samples entailed just university students, overall MSCEIT/MEIS was positively correlated with overall ( $\bar{r}_c = .26$ ), verbal ( $\bar{r}_c = .21$ ), and nonverbal intelligence ( $\bar{r}_c = .17$ ). In other study samples, overall MSCEIT/MEIS was also positively correlated with overall ( $\bar{r}_c = .36$ ), verbal ( $\bar{r}_c = .39$ ), and nonverbal intelligence ( $\bar{r}_c = .36$ ).

Table 2 shows the estimated correlations (corrected for attenuation, and if needed, also publication bias using the trim-and-fill method) between overall MSCEIT/MEIS and intelligence assessed with specific instruments. Overall MSCEIT/MEIS was not significantly correlated with intelligence assessed with Quickie Test Battery verbal ( $\bar{r}_c = .12$ ) or SAT math ( $\bar{r}_c = .05$ ), but positively correlated, ranging from .24 to .40, with intelligence assessed with other instruments including Raven Advanced Progressive Matrices, Raven Standard Progressive Matrices, SAT verbal, Shipley Institute of Living Test, Wechsler Adult Intelligence Scale verbal, and Wonderlic Personnel Test.

### 4.2. Moderating effects

#### 4.2.1. Instrument type

The type of instruments for intelligence assessment moderated the relationships between overall MSCEIT/MEIS and overall ( $Q_b = 7.41$ ,  $p < .01$ ) and nonverbal intelligence ( $Q_b = 53.66$ ,  $p < .001$ ) but not the relationship between overall MSCEIT/MEIS and verbal intelligence ( $Q_b = .95$ ,  $p = .33$ ) (see Table 1), supporting Hypotheses 2a and 2c but not Hypothesis 2b.

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