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The factor structure and cross-test convergence of the Mayer–Salovey–Caruso model of emotional intelligence

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ABSTRACT

A series of studies over the past decade has examined empirical evidence of the validity of the Multifactor Emotional Intelligence Test (MEIS) and the Mayer–Salovey–Caruso Emotional Intelligence Scale (MSCEIT), concentrating in particular on whether these tests' internal structures are consistent with the theory on which they are built. Such evidence has been equivocal, and previous studies have noted the number of indicators per factor as an analytic limitation. The lack of evidence establishing convergence between the two tests has also been noted. This study seeks to (a) examine the convergence between these two tests of emotional intelligence (EI), and (b) reexamine the factor structure of EI using an appropriate number of indicators per factor. A high degree of convergence between the two tests was found, but, consistent with some previous studies, only partial support was found for the proposed factor structure of both tests. These findings are discussed in the context of the larger validity argument surrounding these tests and the emotional intelligence construct.

1. Introduction

The young construct of *emotional intelligence* (EI; e.g., Mayer & Salovey, 1997) has generated a significant body of research, especially since the introduction of performance tests designed to measure it as an ability construct. These tests – the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT V.2; Mayer, Salovey, & Caruso, 2002) and the Multifactor Emotional Intelligence Scale (MEIS; Mayer, Caruso, & Salovey, 1999) – have served as the primary sources of evidence concerning the nature and structure of the Mayer–Salovey ability model of EI (henceforth, just "EI") and its relations to other constructs and variables. However, serious concerns remain about many aspects of the validity of these tests as measures of EI.

One issue that has caught particular attention is the factor structures of the tests and whether they conform to expectations given by the theoretical model of EI upon which the tests were built. Results have been heterogeneous and equivocal, which could in part be due to the low number (as few as two) of indicators that have been used to measure each proposed factor. A second source of concern is the lack of evidence establishing convergence between the two measures of EI. The present study seeks to address these concerns.

1.1. The measurement of emotional intelligence through the MEIS and the MSCEIT

Mayer and Salovey (1997) have defined emotional intelligence as comprising the abilities to *perceive*, *use*, *understand*, and *manage* emotions. The MEIS has 394 items divided into twelve "tasks", two to four of which are designed to measure each of the four proposed branches of emotional intelligence. The MSCEIT is similar to the MEIS in its general format and its scoring procedures, though it is shorter (141 items) and the individual items and many task formats are completely new. The MSCEIT contains two tasks intended to measure each of the four branches of the EI construct. In addition, the first two (Perceiving and Using) and second two (Understanding and Managing) branches are conceptually grouped together as the "experiential" and "strategic" areas of EI, respectively.

1.2. A discussion of empirical investigations of the MEIS and MSCEIT

Three points regarding prior empirical investigations of EI tests are of particular importance to this study: the number indicators used per factor, the factor structure itself, and the relationship between the MEIS and the MSCEIT.

1.2.1. Number of indicators per factor

Although a number of studies have used exploratory and confirmatory factor analysis to examine the structure of the MEIS (Ciarrochi, Chan, & Caputi, 2000; Mayer et al., 1999; Roberts,

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Zeidner, & Matthews, 2001) and the MSCEIT (e.g., Day & Carroll, 2004; Mayer, Salovey, Caruso, & Sitarenios, 2003; Palmer, Gignac, Manocha, & Stough, 2005; Roberts et al., 2006; Rode et al., 2008; Rossen, Kranzler, & Algina, 2008), these studies have shared an important analytic limitation related to the low number of indicators (averaged task scores) per factor. The MSCEIT has only two indicators for each of the four factors, while the MEIS has two indicators for two factors and four indicators for the other two. This is a serious analytic limitation, as has been identified and discussed by Palmer et al. (2005) and Wilhelm (2005); such situations are especially prone to convergence problems and often return unstable or inadmissible solutions, and are often difficult to interpret in practice (Bentler & Jamshidian, 1994; Gorsuch, 1997; Wothke, 1993). Discussing the MSCEIT, Wilhelm (2005) noted, "... the status of the four branches... cannot be tested adequately" (p. 148).

Thus, it is unclear whether the equivocation and inconsistency in results from factor-analytic studies (as described below) results from fundamental instability in the EI construct, or from this key analytic limitation.

1.2.2. Factor structure

Support for the structure of the EI model initially hypothesized by Mayer and Salovey (1997) is equivocal at best. The Using Emotions in particular has been found to be closely related to or indistinguishable from each of the other branches in turn: Understanding (Mayer et al., 1999), Perceiving (Mayer et al., 2003; Rode et al., 2008), and Managing (Palmer et al., 2005). Still other studies (Ciarrochi et al., 2000; Roberts et al., 2001; Roberts et al., 2006) had difficultly finding a relationship between Using Emotions and any aspect of the remainder of the tests.

More broadly, there seem to be discrepancies in the literature regarding the overall level of support for a recognizable dimensional structure of EI. While some studies (Day & Carroll, 2004; Mayer et al., 2003) have been generally positive about the proposed factor structure of EI, the others cited above have, to various extents, found the evidence to be more equivocal.

1.2.3. Conceptual and empirical relationship between the MEIS and MSCEIT

No study has yet empirically investigated the relationship between the MEIS and the MSCEIT. Various authors (e.g., Conte, 2005; Matthews, Zeidner, & Roberts, 2004; Neubauer & Freudenthaler, 2005; Zeidner, Matthews, & Roberts 2001) have cited this as potentially a significant oversight: "it is up to Mayer and colleagues to show that [the MSCEIT] has ... overlap ... with its predecessor, the MEIS, as has been done with most other well-established psychological tests", write Neubauer and Freudenthaler (2005, p. 40). "Without such data", write Matthews et al. (2004, p. 201), "it is possible that what is being assessed each time is something entirely dissimilar, rendering it impossible to compile a corpus of knowledge around which a concept like EI might coalesce".

2. Introduction to the present study

The study described next was designed to address the issues outlined above. In particular, the primary goals of the present study are (1) to explore the degree of association between the MEIS and the MSCEIT, at the overall and factor level; and (2) to reexamine the factor structure of emotional intelligence with a sufficient number of indicators per factor, by using tasks from both the MEIS and MSCEIT simultaneously as indicators of the hypothesized components of emotional intelligence.

3. Method

3.1. Participants

The sample consisted of 241 participants (149 female, 73 male, 19 unreported), ranging in age from 18 to 71 years with a mean age of 29.6 (SD = 11.9). The participants were drawn from the student population of the University of California at Berkeley through flyers and website advertisements, and from the general community in Berkeley through website recruiting.

Of the 223 subjects who reported their ethnicity, 44% were Caucasian American, 34% were Asian American, 11% were African American, 7% were Latin American, and 5% were other or mixed. 20% reported a primary language other than English. In terms of education, 5% reported a high school diploma or less, 41% had completed high school but not (yet) received a 4-year degree, 38% had received a 4-year degree, and 17% had a graduate degree.

3.2. Materials

Participants completed the MSCEIT Research Version 2.0 and the MEIS. The order in which subjects completed the two tests was alternated between administrations. Following the two EI tests, subjects also completed a demographic questionnaire.

3.3. Procedure

Between 15 and 25 subjects completed the tests at each administration, conducted in classrooms on the University of California campus. The guidelines for remote administration provided in the MSCEIT technical manual (Mayer et al., 2002), were applied to both the MSCEIT and the MEIS. Subjects took between 90 and 120 min to complete both EI tests.

3.4. Scoring of the MEIS and MSCEIT

Multi-Health Systems (MHS) owns and keeps proprietary the consensus and expert scoring keys for the MSCEIT. The test authors contend that local norming is appropriate for research purposes, and this is the approach generally used in the studies cited above.

In order to create a consensus scoring guide for the MSCEIT, response patterns from the current study were combined with data from two other sources: from 404 subjects tested by Roberts and colleagues (personal communication, 2006), and from 113 subjects tested by Zeidner and colleagues (personal communication, 2006). After discarding 18 cases due to input error or large (>10%) amounts of missing data, 736 subjects remained for the purposes of creating a scoring guide.

The response patterns of these subjects were examined item-by-item and translated into a scoring key, with the weighted score for each possible response reflecting the proportion of subjects choosing that response, following the established MSCEIT consensus scoring procedure (Mayer et al., 2002, 2003). Task, branch, area, and total scores were determined by averaging the weighted responses to all relevant items. A similar procedure was followed for the MEIS: data from the current study were combined with data ($N = 503$) provided by the authors of the MEIS (John Mayer and David Caruso, personal communication, 2006) in order to create the key.

A random subset of the MSCEIT data ($N = 42$) was sent to MHS to be scored using the standardized consensus scoring key. Scores returned by MHS for these subjects correlated very highly with scores obtained using local norms at the total test ($r = .98$, $p < .01$), area, and branch levels (coefficients ranging from $r = .94$ to .97).