

## **Factorial Validity of the Survey of Emotional Intelligence**

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### **ABSTRACT**

Tett and his associates (Tett, Wang, Gribler, & Martinez, 1997) created a self-report measure of Emotional Intelligence, called the Survey of Emotional Intelligence (SEI), based upon Salovey and Mayer's (1990) model. Salovey and Mayer defined Emotional Intelligence as the ability to "understand and express [your] own emotions, recognize emotions in others, regulate affect, and use moods and emotions to motivate adaptive behaviors" (p. 200). Salovey and Mayer (1990) divided Emotional Intelligence into three major sections: appraisal and expression of emotion, regulation of emotion, and utilization of emotion. Within each, further divisions were made to make ten subsections in total. The SEI was carefully constructed to produce scales that have high internal consistency and discriminant validity, that are balanced for positively- and negatively-keyed items, and that are only minimally influenced by socially desirable responding. The purpose of the current research was to examine the factor structure of this measure and suggest revisions to the questionnaire.

This study included 416 psychology students. A confirmatory factor analysis was completed, with fit being assessed using the minimum fit chi-square statistic (Hu & Bentler, 1995) and the Comparative Fit Index (CFI) (Hu & Bentler, 1998). These fit indices indicated an unacceptable fit for the intended 10-factor model. Therefore, item-level data was subjected to an exploratory factor analysis with generalized least squares extraction. We extracted 10 factors, as suggested by both the Parallel Test (Horn, 1965; Cota, Longman, Holden, & Rekken, 1993) and the Minimum Average Partial Test (Velicer, 1976). Several oblique rotations were examined and the one that came closest to the ideal of simple structure was selected. Seven of the original 10 scales were recovered in the factor analysis, but three of the scales were not. One scale was divided between two different factors and two of the scales combined on a single factor. Thus, it appears that the SEI has poor factorial validity. Suggestions for modifications to the scale are given.

### **INTRODUCTION**

In 1990, Peter Salovey and John Mayer (1990) introduced the concept of Emotional Intelligence to the scientific community. They stated that emotionally intelligent people "understand and express their own emotions, recognize emotions in others, regulate affect, and use moods and emotions to motivate adaptive behaviors" (p. 200). Salovey and Mayer (1990) divided Emotional Intelligence into three major sections: appraisal and expression of emotion, regulation of emotion, and utilization of emotion. Within each, further divisions were made, for a total of ten subsections. See Table 1.

Robert Tett and his associates (Tett, Wang, & Fox, 2003) created a comprehensive self-report measure, the Survey of Emotional Intelligence (SEI), to assess all aspects of the Salovey and Mayer (1990) model. The care taken in designing this survey is truly impressive. The test designers followed the approach that Jackson (1968) used in designing the Personality Research Form (PRF) – what Jackson dubbed the "construct-approach." First, the test was based on a clearly defined construct: Mayer and Salovey's (1990) ten-area model. Second, the authors took steps to reduce the influence of socially desirable responding (SDR) on test scores, as recommended by Jackson (1970) and many other authors (e.g., Crowne & Marlowe, 1960; Edwards, 1957; Ones Viswesvaran, & Reiss, 1996). They followed Helmes' (2000) approach to reducing the influence of socially desirable responding, correlating SEI items with social desirability and removing items that were more strongly correlated with social desirability than the construct of interest (Tett et al., 2003). Third, Tett et al. used both positively- and negatively-keyed statements to reduce the influence of acquiescence response bias on test scores, as recommended by Jackson and Messick (1958) and others.

The authors of the SEI also evaluated the measure for reliability and validity in three separate studies, and throughout the scale development removed items that didn't meet stringent standards of internal consistency, test-retest reliability, convergent and discriminant validity. This resulted in a final measure which contains ten 12-item scales, most of which were balanced for positively- and negatively-keyed items. A 6-point Likert response scale is used, where 1 is "Strongly Disagree" and 6 is "Strongly Agree."

The high quality of the initial test construction efforts and the promising psychometric evidence argues for additional research to refine this scale. This paper will examine the factorial validity of the SEI and suggest revisions to improve construct validity.

### **METHOD**

#### ***Participants***

A total of 416 undergraduate students (133 male, 283 female) participated for course credit. The mean age was 20.51 (SD = 4.95).

#### ***Statistical Analysis***

Both confirmatory and exploratory factor analyses of the 146 SEI items were conducted. First, given that the SEI was designed to have ten scales that parallel the ten areas of the Salovey and Mayer (1990) model, a confirmatory factor analysis was conducted using EQS. Both the minimum fit chi-square statistic (Hu & Bentler, 1995) and the Comparative Fit Index (CFI; Hu & Bentler, 1998) were used to assess the fit of the 10-factor model.

Second, an exploratory factor analysis was used to examine the number and nature of the underlying constructs. To determine the number of factors, three criteria were used: the Scree plot (Cattell, 1966) indicated 11 factors; the Parallel test (Horn, 1965; Cota, Longman, Holden, & Rekken, 1993) suggested 10 factors, and the Minimum Average Partial test (Velicer, 1976) indicated 10 factors. Given that the scree plot sometimes overestimates the number of factors, while the Parallel test and MAP test are both relatively accurate (Zwick & Velicer, 1986), 10 factors were selected. We used generalized least squares extraction. Several oblique rotations were examined, and the pattern matrix with the lowest complexity, highest hyperplanar count, and most acceptable inter-factor correlations was selected. The items associated with each of the resulting factors were then examined, to determine their relation to the original scales of the SEI (and the original Salovey and Mayer model).

## RESULTS

### Confirmatory Factor Analysis

The confirmatory factor analysis indicated poor model fit. The chi-square test was statistically significant at the  $p < .01$  level. The CFI was .68, which is much lower than the .95 cutoff specified by Hu and Bentler (1998).

### Exploratory Factor Analysis

Given the lack of fit of the 10-factor model, and exploratory factor analysis was conducted to determine the number and nature of the underlying constructs. As expected because of the lack of fit of the 10-factor model, the SEI scales were not perfectly recovered in the exploratory analysis. See Table 2 for the primary factor pattern matrix and see Table 3 for the matrix of factor intercorrelations. Seven of the ten SEI scales were clearly visible in the pattern matrix. These scales were: Regulation of Emotion in the Self, Verbal; Empathy; Recognition of Emotion in the Self; Flexible Planning; Motivating Emotions; Mood Redirected Attention; and Non-Verbal Emotional Expression. Items from the Recognition of Emotion in Others and Regulation of Emotion in Others scales were associated with the same factor, which we labeled Social Skills. Finally, items from the Creativity scale fell on two different factors, which we labeled Conventionality and Creativity, based upon an examination of item content.

## DISCUSSION

The purpose of this study was to examine the factorial validity of the Self Report Questionnaire (SEI) as a measure of the ten areas of Emotional Intelligence given in the Salovey and Mayer (1990) model. A Confirmatory Factor Analysis of the 146 items failed to demonstrate the complete factorial validity of the SEI, and so an Exploratory Analysis was completed. Seven of the scales were recovered but three of the scales did not demonstrate factorial validity. Two of these scales (Recognition of Emotion in Others and Regulation of Emotion in Others) formed a single factor (Social Skills) and one of the SEI scales (Creativity) broke into two factors (Conventionality and Creativity). We conclude that the SEI has poor factorial validity and revisions are needed. We recommend that an item-level analysis be conducted of those scales that did not demonstrate factorial validity, to determine which items to remove. Then, new items can be written to improve the factorial validity of these scales. Given the quality of the initial scale development efforts, we are confident that the next revision of the SEI will further improve this promising measure.

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