

**Measuring the Ability to Identify One's Own Emotions:  
The Development and Initial Psychometric Evaluation of a Maximum-Performance Test**

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**Abstract**

Emotional Intelligence includes the ability to perceive, understand, and manage your own emotions and those of other people. Both self-report and maximum-performance measures of most of these aspects of Emotional Intelligence exist. However, there are no maximum-performance measures of the ability to identify one's own emotions. Creating such a measure poses unique measurement problems. After all, if a person claimed that they felt guilty or happy or angry, what criteria can the outside observer reliably use to determine if the person is correct? Because of this, it may not be possible to create a maximum-performance measure that directly taps the ability to identify one's own emotions. However, it may be possible to create a maximum-performance test of a closely allied skill, knowledge of the relationships between emotions and physical sensations.

The purpose of this study was to create a relatively short test of knowledge of the relationships between emotions and physical sensations and to provide preliminary evidence of its reliability and validity. An initial item pool of 224 emotion-sensation pairs were administered to a sample of 219 undergraduate students and each item was correlated with an established measure of Emotional Intelligence. Based upon these correlations, five emotions and 11 sensations were selected for inclusion on Version 2 of the Sensations Test, with 19 of these emotion-sensations pairs being scored.

Initial reliability and validity evidence for the Sensations Test Version 2 was then examined. There was evidence of moderate internal consistency and of convergent validity with other maximum-performance measures of Emotional Intelligence. The Sensations Test did not correlate with self-report measures of Emotional Intelligence, however, even when these self-report scales were designed to measure precisely the ability to identify one's own emotions. This lack of significant positive correlations highlights the importance of creating a maximum-performance measure of this skill.

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**Introduction**

Emotional Intelligence is a new and exciting concept for both theoretical and applied researchers. Emotional Intelligence can be broadly defined as the cognitive ability to perceive, understand, and manage your own emotions and those of other people. Various approaches to measuring different aspects of Emotional Intelligence have been attempted, and both self-report (Bar-On, 1997; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995; Schutte et al., 1998; Tett, Wang & Fox, 2003) and maximum-performance measures (Mayer, Caruso, & Salovey, 2000a, 2000b) of many aspects of Emotional Intelligence now exist. However, creating maximum-performance tests has been quite difficult, because the experience of emotions is subjective. This makes it difficult to design Emotional Intelligence items where there is clearly one and only one correct answer. Measuring the ability to identify one's own emotions has been particularly difficult. After all, if we ask someone how they feel, and they say they feel sad, how would we know if they are right? Because of this, it may be impossible to create a direct measure of the ability to identify one's own emotions. At present, only self-report measures of this skill exist (Bagby, Parker, & Taylor, 1994; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). However, it may be possible to develop a maximum-performance test that assesses knowledge that is closely allied to this skill: knowledge of the relationships between emotions and physical sensations. That was the purpose of this study.

The purpose of this study was to create a relatively short maximum-performance test of knowledge of the relationships between emotions and physical sensations, based upon the rationale that this skill is closely related to the ability to identify one's own emotions. This test was called the Sensations Test. The first version of this test contained 224 emotion-sensation pairs. The purpose of this study was to twofold: first, to identify those emotion-sensation pairs that validly assess Emotional Intelligence, by comparing scores on each item with scores on a well-

validated measure of Emotional Intelligence, the MSCEIT (Mayer, Caruso, & Salovey, 2000a, 2000b); and second, to assess the reliability and validity of the Sensations Test Version 2.

There are, in fact, no universal relations between emotions and autonomic nervous system responses (Cacioppo, Berntson, Larsen, Poehlmann, & Ito, 2000) or the physical sensations that accompany them. Because of this, it is not possible *a priori* to specify the “right” answers to each emotion-sensation pair. Emotion researchers in general agree that the experience of emotion is idiosyncratic and that the physical sensations associated with particular emotions vary from one person to another and from one situation to another within the same person. Therefore, the results of these analyses will be used to determine both which items validly measure Emotional Intelligence, as already mentioned, and also how to score each item. As well, because there are in fact no clear and unambiguous relationships between particular emotions and physical sensations, the Sensations Test should only be seen as a very rough measure of emotion-sensation knowledge.

## Method

### Participants

A total of 219 undergraduate students (150 female, 69 male) participated in this study in return for course credit. Participants ranged in age from 18 to 49 (mean 22.6, SD 6.2). A majority of participants identified themselves as White (59%), although a relatively large number of Asians (15%), Blacks (10%) and Hispanics (9%) also participated. All participants either spoke English as their first language (90%) or had been speaking English for at least 10 years and felt very comfortable reading and writing in English.

### Measures

#### Maximum-Performance Measures

*Sensations Test* (Barchard, 2003). The Sensations Test Version 1 consists of 7 emotions (scared, angry, jealous, sad, happy, guilty, and disgusted) and 32 physical sensations. These emotions were selected to cover a wide range of emotions and to include emotions that are commonly included in theories of basic emotions (e.g., Ekman & Friesen, 1975; Oatley & Johnson-Laird, 1987). Sensations were generated by brain-storming possible physical sensations associated with each of the seven emotions listed, removing duplicates, and checking that each sensation was agreed to be physical rather than emotional.

For each emotion-sensation pair, respondents are asked to indicate the frequency with which the emotion is associated with the sensation. A 6-point frequency scale was used, with 1 indicating the sensation is never associated with that emotion, and a 6 indicating it is always associated with that emotion.

*Mayer-Salovey-Caruso Emotional Intelligence Test* (MSCEIT; Mayer, Caruso, & Salovey, 2000a, 2000b). The MSCEIT is a maximum-performance test of Emotional Intelligence. It contains eight subscales that are grouped into four branches: Perception, Facilitation, Understanding, and Management. The total score on the MSCEIT is calculated by combining all four subscales.

The MSCEIT does not contain any subscales designed to assess the ability to perceive one’s own emotions. However, it does contain two subscales designed to measure understanding of emotions, and it may be that these scales have the highest correlations with the Sensations Test.

*General Intelligence*. Participants were categorized into high and low intelligence groups based upon four indicators of General Intelligence: their Verbal and Math SAT scores, their ACT scores, and their overall GPA. First, we calculated the average SAT score. Second, we calculated the z-scores for average SAT scores, for ACT scores, and for GPA. Third, we calculated the average of these three z-scores for each participant. Finally, participants were categorized into the two groups based upon a median split: The high intelligence group had General Intelligence scores that were above the median while the low intelligence group had scores that were below the median. It should be noted, however, that the low intelligence group is likely still above average in intelligence compared to the general population: They were classified as low only because they were below the median for the group of university students included in this study.

#### Self-Report Measures

*Style in the Perception of Affect Scale* (SIPOAS; Bernet, 1996). The SIPOAS is a 93-item ipsative measure of personal preferences for each of three styles of emotion perception. The first subscale, Based on Body, “reflects an effortless, integrated awareness of the fine nuances of body feelings that precede or accompany the awareness of emotion” (Bernet, 1986, p. 4) and Bernet argues that it is closely related to Emotional Intelligence. Emphasis on Evaluation “reflects a style in which great effort is made to understand what is happening to oneself, often from the viewpoint of an outside observer, or in terms of imagined ideals or expectations” (Bernet, 1986, p. 4). Looking to Logic “interposes logic between feelings and response, to control or avoid potential discomfort or ambiguity of emotions” (Bernet, 1986, p. 4). Conceptually, the Based on Body scale is closely associated with the ability to identify one’s own emotions. People who report a preference for using physical sensations to understand their own

emotions should know the relationships between physical sensations and emotions better than people who use external standards or logic to make conclusions about the emotions they are feeling.

*Toronto Alexithymia Scale – 20* (TAS-20; Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994). The TAS-20 is a 20-item self-report measure of alexithymia. Alexithymia is a clinical condition associated with an inability to describe emotional experiences, and is often conceptualized as the opposite of Emotional Intelligence. The TAS-20 has three subscales: Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally-Oriented Thinking. Each item is answered using a five-point Likert-type scale. For each subscale, high scores indicate a low level of Emotional Intelligence. The Difficulty Identifying Feelings scale in particular should have a strong negative relationship with the Sensations Test, because it is intended to measure an inability to identify one's own emotions.

*Trait Meta-Mood Scale* (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). The TMMS assesses “people’s tendency to attend to their moods and emotions, [to] discriminate clearly among them, and [to] regulate them” (Salovey et al., 1995, p. 128.) It contains 30 five-point Likert-type items falling on three scales: Attention, Clarity, and Repair. The Clarity subscale in particular should measure the same construct as the Sensations Test, the ability to correctly identify one’s own emotions.

### **Statistical Analysis**

#### *Selecting Items for Sensations Test Version 2*

A variety of statistical criteria were used to select items for inclusion on the second version of the Sensations Test. First, we calculated the correlations between scores on the 224 items on the Sensations Test with two criterion measures: scores on the MSCEIT Understanding subscale and total scores on the MSCEIT. Items with significant correlations with one or both of these scales were tentatively identified as measuring Emotional Intelligence. These analyses were then repeated for the high and low General Intelligence groups, to ensure that the items that were selected worked well with a wide range of intelligence levels. One-way ANOVA’s and scatterplots were also examined, to explore possible non-linear relationships or correlations that might be unduly influenced by one or two outliers. The Sensations Test Version 2 was then compiled using the emotion-sensation pairs that appeared from these five analyses to have the most compelling evidence that they measured Emotional Intelligence.

#### *Creating the Scoring Key for Sensations Test Version 2*

The scoring key for the Sensations Test Version 2 was created by examining the direction of the correlations between the items and total scores on the MSCEIT. If the correlation was positive, the item was positively-keyed. If the correlation was negative, the item was negatively-keyed. If there was no relationship, the item was not scored.

#### *Validating Sensations Test Version 2*

To assess the reliability and validity of the Sensations Test Version 2, two statistical analyses were conducted. First, the internal consistency of Version 2 was examined and an item analysis was conducted to determine if any items were detracting from internal consistency. Second, we calculated the correlations between total scores on the Sensations Test Version 2 and 5 maximum-performance and 9 self-report measures of Emotional Intelligence. The 5 maximum-performance measures were the four scale scores of the MSCEIT and the total scores from the MSCEIT. The 9 self-report measures were the subscales of the SIPOAS, TMMS, and TAS-20 scales.

### **Procedures**

Participants completed the above-mentioned measures in two one-hour group testing sessions scheduled one week apart. All measures were administered on the computer, under the supervision of a trained research assistant.

## **Results**

### *Development of Version 2*

To determine which items to include on the Sensations Test Version 2, each of the 224 emotion-sensation pairs were examined based on the analyses described above. For 20 of these pairs, there was strong evidence that scores on the emotion-sensation pair were associated with Emotional Intelligence, as measured by the MSCEIT Understanding subscale and MSCEIT Total Scores (see Table 1). However, the emotion “disgusted” had no compelling relationships with any of the sensations, and “guilty” only had a single compelling relationship. Therefore, these two emotions were omitted from Version 2 of the Sensations Test. The remaining five emotions were each paired with the 11 identified sensations to create a 55-item test, where 19 of the items would be scored. See the Appendix for Version 2 of the Sensations Test.

### *Internal Consistency Item Analysis of Version 2*

The internal consistency of the 19-item Sensations Test Version 2 was calculated as .66. This level of internal consistency is lower than would be ideally desired, but adequate for research purposes. Corrected Item-Total Correlations and Alpha-if-Item-Deleted were then examined to determine which items were contributing to this low internal consistency. The following emotion-sensation pairs decreased internal consistency by a small amount: Scared – Tense Muscles, Angry – Weak, and Happy – Lighthearted.

*Convergent Validity of Version 2*

The convergent validity of the 19-item Sensations Test Version 2 was assessed by calculating the correlations of total scores on the Sensations Test with 5 maximum-performance and 9 self-report measures of Emotional Intelligence (see Table 3). The Sensations Test Version 2 has moderate positive correlations with each of the five MSCEIT measures. These correlations should be considered over-estimates of the true correlations between Version 2 and the MSCEIT, because the MSCEIT was used during the selection of items for the scale. On the other hand, it is encouraging that all of the branch scores have moderate positive correlations with Version 2, even though only the MSCEIT Understanding and MSCEIT Total scores were used during item selection.

Most of the self-report measures of Emotional Intelligence did not have significant correlations with the Sensations Test. When we designed this study, we hoped that the Sensations Test would be positively correlated with self-report measures of Emotional Intelligence, particularly those subscales that were designed to measure the ability to identify one's own emotions. However, in retrospect, the lack of correlation is not very surprising given that previous research (Barchard & Hakstian, 2003) has shown that self-report and maximum-performance measures of Emotional Intelligence have very little relationship with each other. These results could therefore be interpreted as testimony to the importance of creating a maximum-performance measure of this skill, rather than as evidence that the Sensations Test lacks convergent validity.

However, the Sensations Test did have statistically significant correlations with two self-report measures of Emotional Intelligence, both subscales of the SIPOAS. The SIPOAS Based on Body scale was designed to measure a cognitive style that is the core of Emotional Intelligence, and Emphasis on Evaluation and Looking to Logic were set up as alternative cognitive styles. These alternative styles should not be associated with high Emotional Intelligence. Instead, a non-significant or negative correlation with these two subscales would have been expected. The SIPOAS Looking to Logic subscale did indeed have a small negative correlation with the Sensations Test ( $r = -.172, p < .01$ ). However, the Based on Body subscale did not have the significant positive correlation expected, and the correlation with the Emphasis on Evaluation subscale was positive ( $r = .183, p < .01$ ) instead of negative, which was very surprising. Not only did the Sensations Test fail to correlate with the Sensations Test in the manner expected, but it also did not correlate in the same way that other self-report measures did: Other self-report measures of Emotional Intelligence did not have significant correlations with the Sensations Test at all. We therefore conclude that the unexpected correlation between the Sensations Test and the SIPOAS Emphasis on Evaluation subscale may point to a weakness in the SIPOAS rather than the Sensations Test.

**Conclusions**

The purpose of this research was to create a measure of Emotional Intelligence by selecting emotion-sensation pairs that validly assess knowledge of the relation between emotions and physical sensations. Of the 224 emotion-sensation pairs that were examined, the vast majority showed no particular relationship with Emotional Intelligence: It was not the case that Emotionally Intelligent people knew that these emotions were associated with these physical sensations or that they were not associated. Instead, for many emotions, everyone seemed to agree that there was or was not a relationship between a particular emotion and a particular physical sensation. Most of these items were, therefore, too easy for the population used in this study, college students, even when focusing on those college students in our sample who had lower levels of General Intelligence.

However, we were able to identify some emotion-sensation pairs that appear to measure Emotional Intelligence. First, we identified emotion-sensation pairs that had moderate relationships with Emotional Intelligence. Next, we eliminated items that appeared to have non-linear relationships with Emotional Intelligence, and those where the relationships appeared dependent upon a small number of outliers. When these problematic items were eliminated, we were left with a handful of emotion-sensation pairs that provide compelling evidence that they measure Emotional Intelligence. The Sensations Test Version 2 was created using 5 emotions and 11 physical sensations, for a total of 55 items of which 19 are scored. It has acceptable internal consistency and some evidence of convergent validity.

The ability to identify one's own emotions is arguably the most central skill in the area of Emotional Intelligence. The Sensations Test represents a novel approach to assessing this skill. However, additional research is needed on this new measure before its use in applied settings can be justified. The relationships of Version 2 with the MSCEIT need to be cross-validated in a new dataset, and the relationships with additional measures of Emotional Intelligence, related concepts, and relevant criterion-measures need to be examined.

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Table 1  
*Positively Associated and Negatively Associated Emotion-Sensation Pairs*

	Scared	Disgusted	Guilty	Sad	Angry	Jealous	Happy
Tense muscles	p						
Refreshed	n		n	n	n	n	
Heart beats faster	p						
Jumpy	p						n
Sexually aroused	n			n	n	n	
Weak					n		
Cold					n		
Lighthearted					n		p
Gagging						n	
Strong						n	
Energetic						n	

*Note.* p indicates a compelling positive relationship between this emotion-sensation pair and Emotional Intelligence, while n indicates a compelling negative relationship.

Table 2  
*Item Analysis of the Sensations Test Version 2*

Emotion-Sensation Pair	Corrected Item Total Correlation	Alpha if Item Deleted
Scared Tense Muscles	.13	.67
Scared Heart Beats Faster	.27	.65
Scared Jumpy	.16	.66
Scared Sexually Aroused	.48	.63
Scared Refreshed	.39	.63
Sad Refreshed	.27	.66
Sad Sexually Aroused	.38	.65
Angry Weak	.09	.67
Angry Cold	.14	.66
Angry Lighthearted	.33	.64
Angry Refreshed	.42	.64
Angry Sexually Aroused	.40	.64
Jealous Sexually Aroused	.41	.63
Jealous Energetic	.40	.63
Jealous Gagging	.14	.66
Jealous Strong	.28	.65
Jealous Refreshed	.37	.65
Happy Jumpy	.27	.65
Happy Lighthearted	-.01	.70

Table 3  
*Correlations of Sensations Test Version 2 with Maximum-Performance and Self-Report Measures of Emotional Intelligence*

	Correlations
<b>Maximum-Performance Measures</b>	
MSCEIT Perception	.411**
MSCEIT Facilitation	.450**
MSCEIT Understanding	.437**
MSCEIT Managing	.404**
Total MSCEIT	.529**
<b>Self-Report Measures</b>	
SIPOAS Looking to Logic	-.172*
SIPOAS Based on Body	-.099
SIPOAS Emphasis on Evaluation	.183**
TAS20 Difficulty Identifying Feelings	-.062
TAS20 Difficulty Describing Feelings	.024
TAS20 Externally Oriented Thinking	-.045
TMMS Repair	-.021
TMMS Attention	.033
TMMS Clarity	-.030

\*  $p < .05$ . \*\*  $p < .01$ .

## Appendix

### Sensations Test Version 2

Strong emotions are associated with distinctive physical sensations. This is a test of your knowledge of the relation of physical sensations to emotions.

This test focuses on four emotions – feeling scared, angry, jealous, or happy – and 11 different physical sensations. For each combination, please indicate how often these physical sensations are associated with each of the following emotions.

Be sure to answer every question. If you leave a question blank, it is automatically wrong.

Use the following scale:

<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Usually</b>	<b>Always</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

	<b>Scared</b>	<b>Angry</b>	<b>Jealous</b>	<b>Sad</b>	<b>Happy</b>
Tense muscles					
Refreshed					
Heart beats faster					
Jumpy					
Sexually aroused					
Weak					
Cold					
Lighthearted					
Gagging					
Strong					
Energetic					