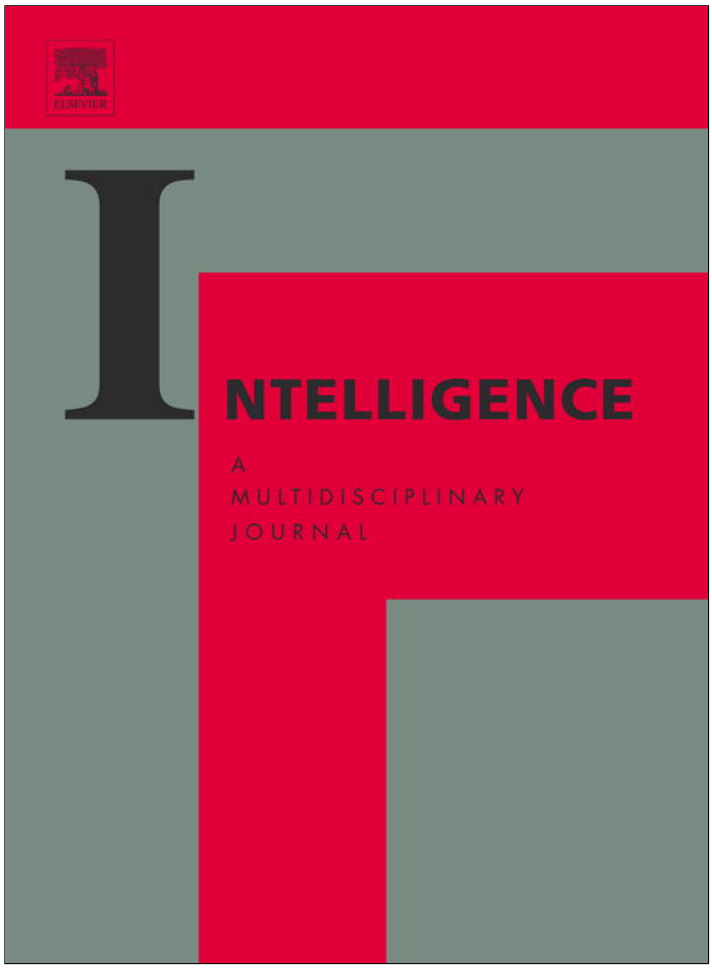

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Convergent and divergent validity of integrative versus mixed model measures of emotional intelligence

Christian A. Webb [a,*], Zachary J. Schwab [a], Mareen Weber [a], Sophie DelDonno [a], Maia Kipman [a], Melissa R. Weiner [b], William D.S. Killgore [a]

[a] Harvard Medical School, McLean Hospital, Department of Psychiatry, 115 Mill Street Belmont, MA 02478, United States
[b] Yale School of Public Health, 60 College St. New Haven, CT 06520, United States

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ABSTRACT

The construct of emotional intelligence (EI) has garnered increased attention in the popular media and scientific literature. Several competing measures of EI have been developed, including self-report and performance-based instruments. The current study replicates and expands on previous research by examining three competing EI measures (Mayer–Salovey–Caruso Emotional Intelligence Test, MSCEIT; Bar-On Emotion Quotient Inventory, EQ-i; and Self-Rated Emotional Intelligence Scale, SREIS) and their relationships with cognitive functioning (Wechsler Abbreviated Scale of Intelligence; WASI), Big Five personality traits (NEO-PI-R) and emotional well-being (Beck Depression Inventory, BDI and Positive and Negative Affect Schedule, PANAS). Results indicated that significant variability in the self-report EI measures was accounted for by personality and emotional well-being measures, whereas the MSCEIT was more strongly associated with IQ. Overall, nearly two-thirds (62%) of the variance in EQ-i scores was accounted for by Big Five personality traits, emotional well-being and full scale IQ; whereas only 14% of the variance in MSCEIT scores was accounted for by these same variables. The present findings raise questions regarding the divergent validity of self-report EI measures from existing personality and emotional well-being measures. The implication of these results and directions for future research are discussed.

1. Introduction

Since the late 1980s, there has been increased interest in the popular media and psychological literature in the concept of *emotional intelligence* (EI; Goleman, 1995; Salovey & Mayer, 1990). Conceptualizations of EI differ widely, as reflected by the broad array of available instruments that have been developed to assess the construct. Existing measures can be broadly categorized as either reflecting *specific ability*, *integrative model*, or *mixed model* conceptualizations of EI (Mayer, Roberts & Barsade, 2008). Specific ability models, as the term implies, highlight the role that a specific ability or set of abilities contribute to EI (e.g., accuracy of emotion perception and emotion regulation). According to integrative models, EI is best defined as an integration of several abilities. The most commonly used integrative measure is the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey & Caruso, 2002b). The developers of the MSCEIT define EI as the capacity to (1) accurately perceive emotion, (2) use emotions to facilitate thought, (3) understand emotion, and (4) regulate emotions. Accordingly, the test consists of four "branches" (each involving two tasks), which are designed to assess each of the four abovementioned abilities.

In contrast, mixed models adopt a relatively broader conceptualization of EI. For example, Bar-On (2004) defined EI as consisting of "*an array of noncognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures*" ([emphasis in original];

* Corresponding author. Tel.: +1 617 855 4429.
E-mail address: cwebb@mclean.harvard.edu (C.A. Webb).

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p. 14). The breadth of the EI definition in mixed models is reflected in the widely used Bar-On Emotional Quotient Inventory (EQ-i; Bar-On, 2002; see http://ei.mhs.com and Bar-On, 2012 for commentary on the recently released EQ-i 2.0), which includes a total of 15 subscales organized under 5 primary scales: 1) *Intrapersonal* (self-regard, emotional self-awareness, assertiveness, independence, and self-actualization), 2) *Interpersonal* (empathy, social responsibility, and interpersonal relationship), 3) *Adaptability* (reality testing, flexibility, and problem solving), 4) *Stress Management* (stress tolerance and impulse control) and 5) *General Mood* (happiness and optimism). Another example of a mixed model conceptualization of EI is reflected in the work of Goleman (1995), who helped popularize the term with his book *Emotional Intelligence*. Goleman's writings suggest that he views EI as a conglomeration of characteristics, including empathy, motivation, persistence, optimism and social skills (Mayer, 1999; Mayer et al., 2002b).

Proponents of integrative models of EI have argued that popular mixed model conceptualizations are overly broad and have become "unmoored" from the core constructs of emotion and intelligence (Mayer, Salovey & Caruso, 2008). For example, Mayer, Caruso, and Salovey (1999) stated that the EQ-i assesses a range of qualities including problem-solving and reality testing that "seem more closely related to ego strength or social competence than to emotional intelligence" (p. 268). Indeed, several studies have reported significant associations between the EQ-i, Big Five personality traits and measures of emotional well-being (e.g., Brackett & Mayer, 2003; Grubb & McDaniel, 2007; Newsome, Day, & Catano, 2000; O'Connor & Little, 2003). The divergent validity of the MSCEIT has also been questioned, with studies reporting significant associations between the latter measure, key personality dimensions, and general intelligence (e.g., Schulte, Ree, & Carretta, 2004; Fiori & Antonakis, 2011).

In summary, debate persists in the field regarding how best to conceptualize and measure EI. Although EI is often discussed in the popular media and psychological literature as if it were a single monolithic construct, dominant EI measures assess a variety of facets (e.g., as reflected by the 15 subscales of the EQ-i and 4 branches of the MSCEIT). The extent to which different EI measures overlap (i.e., convergent validity) and are discriminable (i.e., divergent validity) from theoretically related cognitive (e.g., intelligence quotient [IQ]), personality (e.g., neuroticism and extraversion), and emotional constructs (e.g., affect and mood) is not well understood and is critical for establishing the validity of the EI construct. To our knowledge, no study has concurrently examined the relationship between the most commonly used measures of EI, the Big Five personality traits, emotional well-being, and full scale IQ using one of the Wechsler Intelligence Scales. This is perhaps not surprising given the subject burden and time involved in administering such a large number of measures in one study.

With regard to the existing literature, the majority of previous EI studies have included only one measure of EI (e.g., either an integrative or mixed model measure), rather than comparing several EI measures representing different theoretical models. However, Brackett and Mayer (2003) did include several EI measures in their study (including the EQ-i and MSCEIT), and examined the correlation between EI, Big Five personality traits, and psychological well-being. Interestingly, results indicated that the EQ-i shared substantial variance with personality traits and psychological well-being; whereas the MSCEIT was discriminable from these variables. In addition, and relevant to the divergent validity of EI from traditional cognitive intelligence, Bracket and Mayer found that the MSCEIT, but not the EQ-i, was significantly positively correlated with verbal SAT scores. Although the authors did not assess full scale IQ, verbal SAT scores could be considered a proxy measure of verbal intelligence.

Similar to Brackett and Mayer (2003), previous studies that have examined the association between EI measures and IQ have not used "gold standard" measures of IQ (i.e., full scale Wechsler or Stanford–Binet intelligence scales) but rather have typically used proxy, and less time-consuming, measures of intellectual capacity or restricted their analyses to particular subtests within IQ measures (e.g., see Brackett & Mayer, 2003; Ciarrochi, Chan, & Caputi, 2000; Fiori & Antonakis, 2011; MacCann, Roberts, Matthews, & Zeidner, 2004; O'Connor & Little, 2003; Roberts, Zeidner, & Matthews, 2001; Schulte et al., 2004; Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005). Given the emphasis placed on establishing EI as a type of intelligence, complimenting conventional "cognitive" IQ (Mayer et al., 1999), it is surprising that no study, to our knowledge, has examined the extent to which competing measures of EI correlate with full scale IQ using gold standard measures. It should be noted, however, that Boyatzis, Good, and Massa (2012) recently reported that cognitive intelligence (assessed via the Ravens Advanced Progressive Matrices and Mill Hill Vocabulary test) was not significantly correlated with an informant, multisource assessment of emotional and social intelligence (i.e., the Emotional and Social Competency Inventory; Boyatzis & Goleman, 2007).

The goals of the current study were to examine the convergent validity (i.e., correlation between different EI measures) and divergent validity (i.e., correlation between EI, full scale IQ, Big Five personality traits and emotional well-being) of several commonly used measures of EI. We selected the MSCEIT and EQ-i as they are the most commonly used performance-based and self-report measures of EI, respectively. Differences emerging between the MSCEIT and EQ-i in patterns of associations may be due to differences in the *method of assessment* (performance-based test vs. self-report; i.e., *method variance*) or *content* (i.e., differences in the underlying EI constructs being assessed; i.e., *trait variance*). To control for differences in method of administration, an additional self-report EI measure was included (Self-Rated Emotional Intelligence Scale [SREIS]; Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006), which assesses the same content domains as the MSCEIT but is administered via self-report.

We tested three hypotheses:

1) The two self-report EI measures would be significantly correlated with one another, whereas the performance-based MSCEIT would not be significantly correlated with either self-report EI measure.
2) The EQ-i, but not the MSCEIT, would be significantly associated with personality and emotional well-being measures.
3) The MSCEIT, but not the EQ-i, would be significantly associated with full scale IQ.

2. Method

2.1. Participants

Sixty-five healthy participants (33 males; 32 females) were recruited from the Boston metropolitan area via flyers and internet advertisements. The age of the participants ranged from 18 to 45 with a mean age of 30 (SD = 8.01). The sample was 69.2% Caucasian, 15.4% African-American, 9.2% Asian, 3.1% Other, and 3.1% "more than 1 race." In addition, 4.6% classified themselves as Hispanic. The native language of all participants was English. Participants were screened for evidence of psychopathology and medical conditions by a trained Bachelor's level technician using a structured series of questions. Based on screening, all participants were determined to be free of any history of Axis I psychopathology, excessive substance use, drug or alcohol treatment, or severe medical or neurological conditions. Screening questions were adapted from the Structured Clinical Interview for DSM-IV-TR (SCID-I; First, Spitzer, Gibbon, & Williams, 2001).

2.2. Measures

2.2.1. Emotional intelligence performance-based test

The Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2002b) consists of 141 computer-administered items assessing the perception, use, understanding, and management of emotions. The MSCEIT yields a *Total EI* score and two Area scores, *Experiential EI* and *Strategic EI*. Experiential EI reflects the ability to perceive emotions in oneself, other persons, and different stimuli such as music and art, and to utilize emotional information to facilitate thought. Strategic EI reflects the ability to understand emotions and their evolution in oneself and others, and to manage them in an efficient and effective manner. Mayer, Salovey and Caruso (2002a) reported good reliability values for total MSCEIT scores, including internal consistency (split-half reliability = .91) and test–retest reliability (.86). For additional information on the psychometric properties of the MSCEIT, see Mayer et al. (2002a) and Mayer, Salovey, Caruso, and Sitarenios (2003). The MSCEIT was scored with the recommended "General" scoring option in which scores are based on a normative sample of 5000, rather than the Expert scoring option (i.e., relative to the responses of "emotion experts"; see Mayer et al., 2002a for detailed descriptions of scoring options).

2.2.2. Emotional intelligence self-report measures

Two self-report measures of EI were included in the present study. The Self-Rated Emotional Intelligence Scale (SREIS; Brackett et al., 2006) is a 19-item self-report measure that maps on to the emotional abilities assessed by the MSCEIT. Specifically, similar to the MSCEIT, the SREIS assesses the perception, use, understanding and management of emotions (in both oneself and others). Responses are made on a 5-point Likert scale ranging from 1 ("very inaccurate") to 5 ("very accurate"). In a series of studies, Brackett et al. (2006) reported the following Cronbach's alphas for the SREIS (.84, .77, and .66 for Studies 1, 2, and 3, respectively).

The Bar-On Emotional Quotient Inventory (EQ-i; Bar-On, 2002) is a commonly used 133-item self-report inventory of EI that yields a *Total Emotional Quotient* (EQ) and five composite scores (i.e., *Interpersonal*, *Intrapersonal*, *Adaptability*, *Stress Management*, and *General Mood*). The Interpersonal scale provides a measure of perceived empathy and interpersonal skills, whereas the Intrapersonal scale reflects self-perceived awareness of one's own emotions and self-regard. The Adaptability scale reflects the perceived ability to objectively analyze problematic situations, to solve them and to adapt to changing environments. Stress Management reflects tolerance of and perceived self-control during stressful or demanding situations. The General Mood scale reflects self-reported positive thinking and overall contentedness with personal life. Bar-On (2004) reported that the EQ-i demonstrated good reliability (internal consistency and test–retest reliability). For detailed information on the psychometric properties of the EQ-I, see Bar-On (2004). The EQ-i was scored using the "General Population" norm option (i.e., relative to a North American normative sample of 3831). Responses are made on a 5-point scale (1 = not true of me, 5 = true of me).

2.2.3. Cognitive functioning

The Wechsler Abbreviated Scale of Intelligence (WASI; Pearson Assessment, Inc., San Antonio, TX) was administered to assess cognitive ability. The measure provides scores for Full Scale IQ, Verbal IQ, and Performance IQ. The WASI is one of the most widely used intelligence scales and has reported reliability of .98 for Full Scale IQ, with high test–retest reliability, and correlates .92 with the more comprehensive Wechsler Adult Intelligence Scale-III (WAIS; Pearson Assessment, Inc., San Antonio, TX), the current gold standard in intelligence testing. A trained and experienced bachelor's level research assistant who was blind to the study hypotheses administered and scored the WASI under the supervision of a licensed doctoral level neuropsychologist.

2.2.4. Big Five personality traits

The Revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992) is a 240-item, self-report measure of the Five-Factor Model of personality (i.e., Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness). Responses are made on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. The NEO PI-R has demonstrated generally adequate reliability: internal consistency = .56–.81; test–retest reliability = .66–.92 (see Costa & McCrae, 1992).

2.2.5. Emotional well-being

Two commonly used measures of emotional well-being were administered to participants. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item self-report measure assessing current affective state. The measure consists of 10 items assessing positive affect (e.g., interested and enthusiastic) and 10 items assessing negative affect (e.g., upset and ashamed). Each item is rated on a 5-point scale ranging from 1 ("very slightly or not at all") to 5 ("extremely"). Ratings were averaged to obtain separate subscale scores for positive and negative affect. PANAS scores have demonstrated high test–retest reliability and acceptable convergent validity (Watson et al., 1988). The Beck Depression Inventory (BDI; Beck & Steer, 1987) is a 21-item self-report measure of depressive symptoms, with good psychometric properties (Beck, Steer, & Garbin, 1988).

2.3. Procedure

To minimize participant fatigue, given the relatively large number of performance-based tests and self-report measures administered, testing occurred over two consecutive days. During the first testing session, participants completed demographic forms, consent forms, the MSCEIT, EQ-i, SREIS and PANAS. On the second day of testing, participants completed the WASI, NEO-PI-R and BDI. All assessments were administered according to the standardized instructions provided in the manuals or other published materials. All measures were administered on paper with the exception of the EQ-i and MSCEIT, which were administered online, and the NEO, which was administered via computer. Only one participant was tested at a time. Average total duration of testing was approximately 5 h for Day 1 and 4 h for Day 2. Participants were compensated $200 following the completions of all assessments.

3. Results

3.1. Data analytic strategy

Pearson correlations were used to test the linear associations between EI (MSCEIT, EQ-i and SREIS), IQ (WASI), Big Five personality traits (NEO) and emotional well-being (BDI and PANAS) variables. Means, standard deviations, and correlations for investigated variables are listed in Table 1. Briefly, mean IQ was approximately two-thirds of a standard deviation above the population mean, which is perhaps not surprising given the education level of our sample recruited from the greater Boston area (mean years of schooling = 14.9). EI, personality traits and emotional well-being means were similar to population norms. Three participants did not complete the NEO, WASI or BDI, and one participant did not complete the PANAS. These participants were excluded from the analyses involving these measures.[1] To control for potential confounds associated with socioeconomic status, U.S. Census Bureau data were obtained on the median inflation-adjusted 12-month household income and the percentage of the participant's neighborhood below the poverty line (U.S. Census Bureau, 2010) based on census tract of home address. These census data and categorical data for racial background were used as covariates in a series of partial correlation analyses.[2] Finally, we also conducted a series of hierarchical multiple regression analyses to evaluate the proportion of variance in EI measures accounted for by linear combinations of the predictor variables. Correlations were corrected using the conservative Bonferroni method for multiple comparisons within each separate set of analyses.

3.2. Convergent validity

Using Bonferroni-adjusted alpha levels (.05/3 = .017), scores on the two self-report EI measures (EQ-i and SREIS) were significantly positively correlated with each other ($r = .50$; $p < .001$). Scores on the performance-based MSCEIT were significantly correlated with the SREIS ($r = .32$; $p = .011$) but not with the EQ-i ($r = .11$; $p = .379$).

3.3. Divergent validity with IQ

Using Bonferroni-adjusted p-values (.05/9 = .006), the MSCEIT was significantly correlated with Full Scale IQ ($r = .52$; $p < .001$), Verbal IQ ($r = .52$; $p < .001$), and Performance IQ ($r = 43$; $p < .001$). The SREIS was significantly correlated with Verbal IQ ($r = .37$; $p = .003$), but not with Performance IQ ($r = .17$; $p = .180$) or Full Scale IQ ($r = .30$; $p = .017$). As evident in Table 1, the EQ-i did not correlate with Full Scale IQ ($r = .22$; $p = .085$), Performance IQ ($r = .24$; $p = .060$), or Verbal IQ ($r = .17$; $p = .194$).

Of note, the MSCEIT remained significantly associated with all three IQ variables in partial correlation analyses controlling for socioeconomic and demographic variables including age, neighborhood median household income, percentage of the neighborhood below the poverty line, and ethnic status (all $rs > .45$ and $ps < .006$). However, the SREIS was no longer significantly associated with Verbal IQ ($r = .28$; $p = .049$).

3.4. Divergent validity with Big Five personality traits

Using Bonferroni-adjusted alpha levels (.05/15 = .003), the MSCEIT was not significantly correlated with any of the Big Five traits (Neuroticism $r = -.17$, $p = .198$; Extraversion $r = -.02$, $p = .890$; Agreeableness $r = .11$, $p = .404$; Conscientiousness $r = -.14$, $p = .265$; and Openness $r = .23$, $p = .068$).

In contrast, significant associations did emerge between the two self-report EI measures and the Big Five. Specifically, the SREIS was significantly correlated with Extraversion ($r = .41$; $p = .001$) and Openness ($r = .45$; $p < .001$). The SREIS, however, was not significantly correlated with either Neuroticism ($r = -.28$; $p = .030$), Agreeableness ($r = .20$; $p = .121$) or Conscientiousness ($r = .20$; $p = .113$). The EQ-i was significantly correlated with three of the Big Five factors (Neuroticism $r = -.60$, $p < .001$; Extraversion $r = .46$, $p < .001$; Conscientiousness $r = .49$, $p < .001$; but not with Openness $r = .32$, $p = .011$ or Agreeableness $r = .20$, $p = .121$).

3.5. Divergent validity with emotional well-being

Next, and while using Bonferroni-adjusted p-values (.05/9 = .006), we examined the association between EI, negative and positive affect (PANAS — NA/PA) and depressive symptoms (BDI). The MSCEIT was not significantly associated with scores on the BDI ($r = -.10$; $p = .433$), PANAS — NA ($r = -.17$; $p = .193$) or PANAS — PA ($r = -.19$; $p = .132$).

[1] Three outliers were identified and deleted. Specifically, one outlier for the BDI ($z = 4.91$) and two outliers for the PANAS — Negative Affect subscale ($z = 4.33$; $z = 3.40$) were identified. These datapoints were deleted.

[2] There were no significant gender differences in mean EI, IQ, Big Five personality traits, BDI or PANAS scores. In addition, given some evidence that IQ and EI increase with age (e.g., Bar-On, 2004; Mayer et al., 2002a), we tested the correlation between age and scores on the WASI, MSCEIT, EQ-i and SREIS. All correlations were non-significant with the exception of a significant *negative* correlation between age and SREIS scores ($r = -.39$; $p = .001$). Given that the SREIS is a self-report measure of EI, such a negative association may reflect the fact that younger participants are more likely to *perceive* themselves as having higher EI than older participants (whether or not their actual EI is higher than older participants). Of course, this one significant correlation must be interpreted in the context of non-significant correlations between age and the most commonly used self-report (EQ-i) and performance-based (MSCEIT) EI measures.

Table 1
Means, standard deviations and correlations for investigated variables.

Variable	M	SD	2	3	4	5	6	7	8	9	10	11	12	13	14
1. MSCEIT	103.06	12.09	.11	.32*	.52**	.52**	.43**	−.17	−.02	.23	−.14	.11	−.10	−.19	−.17
2.EQ-i	101.42	13.63	—	.50**	.22	.17	.24	−.60**	.46**	.32*	.49**	.20	−.46**	.32**	−.26*
3. SREIS	3.85	0.42		—	.30*	.37**	.17	−.28*	.41**	.45**	.20	.20	−.54**	.13	−.08
4.IQ-Full	111.10	16.08			—	.92**	.91**	−.27*	.12	.40**	−.11	.28*	−.35**	−.19	−.05
5.IQ-Verbal	110.40	15.76				—	.69**	−.21	.07	.37**	−.14	.23	−.38**	−.26**	.02
6.IQ-Perf.	108.85	15.43					—	−.30*	.15	.36**	−.06	.28*	−.25*	−.10	−.09
7. NEO-N	50.81	11.21						—	−.25	−.20	−.11	−.11	.48**	−.04	.19
8. NEO-E	54.55	11.70							—	.10	.04	.15	−.24	.25	.06
9. NEO-O	55.16	10.40								—	.13	.35**	−.32*	.00	.00
10. NEO-C	50.10	12.21									—	−.04	−.26*	.35**	−.22
11. NEO-A	47.53	11.02										—	−.21	.06	−.07
12. BDI	3.61	4.44											—	−.21	.24
13. PANAS − PA	29.03	7.46												—	−.17
14. PANAS − NA	11.65	2.33													—

Note: MSCEIT = Mayer−Salovey−Caruso Emotional Intelligence Test; EQ-i = Bar-On Emotional Quotient Inventory; SREIS = Self-Rated Emotional Intelligence Scale; IQ-Full/Verbal/Performance = Wechsler Abbreviated Scale of Intelligence — Full-Scale/Verbal IQ/Performance IQ; NEO-N/E/O/C/A = The Revised NEO Personality Inventory — Neuroticism, Extraversion, Openness, Conscientiousness, and Agreeableness; BDI = Beck Depression Inventory; PANAS = Positive and Negative Affect Schedule.
* $p<.05$.
** $p<.01$.

In contrast, a significant negative correlation emerged between the SREIS and BDI ($r=-.54$; $p<.001$). However, there was no significant association between the SREIS and either the PANAS − NA ($r=-.08$; $p=.533$) or PANAS − PA ($r=.13$; $p=.291$). Similarly, the EQ-i was significantly negatively correlated with the BDI ($r=-.46$; $p<.001$), but not with the PANAS − NA ($r=-.26$; $p=.044$) or PANAS − PA ($r=.32$; $p=.010$).

3.6. Multiple regressions including all predictors

Given the associations between IQ, Big Five traits, and emotional well-being measures (see Table 1), multiple regression analyses were conducted to test which of these variables would remain significantly associated with EI when competing variables are included as covariates (standardized betas [βs] and associated p values are reported below). In addition, such a comprehensive model allowed us to estimate the percentage of variance (adjusted R^2) associated with each EI measure that is accounted for by the combination of independent variables (IVs). See Fig. 1 for a graphical representation of multiple regression results.

First, a comprehensive model was tested in which full scale IQ, each of the Big Five traits, and the three emotional well-being variables were included as IVs, and the MSCEIT was the dependent variable (DV). A nonsignificant trend emerged for the overall model (F (9, 48) = 2.05, $p=.057$), with an adjusted $R^2=.14$. Only full scale IQ remained significantly associated with the MSCEIT when all other independent variables were controlled ($\beta=0.45$, $p=.006$; all other ps > .37).

The same comprehensive model, including all study IVs, was examined with the SREIS as the DV. In this case, the overall model was significant (F (9, 48) = 4.51, $p<.001$), with an

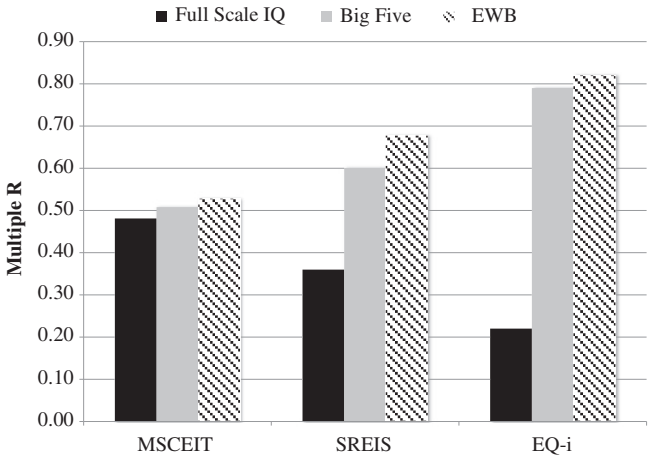

Fig. 1. Multiple *R*s for Full Scale IQ, Big Five traits and emotional well-being (EWB) scales regressed on total EI scores for the MSCEIT, EQ-i, and SREIS. Specifically, three hierarchical multiple regressions were conducted (one for each EI measure). For each regression, independent variables were entered in three blocks (Full Scale IQ in Block 1, Big Five traits in Block 2, and emotional well-being scales in Block 3). The sample size for each of these three regressions was 58. With regards to collinearity diagnostics, Tolerance values ranged between .62 and .83, and thus did not indicate any concerning multicollinearity (Field, 2009; Menard, 1995).

adjusted $R^2 = .36$. The Big Five traits of Extraversion ($\beta = 0.31$, $p = .012$) and Openness ($\beta = 0.30$, $p = .030$) were positively associated with SREIS scores. In addition, scores on the BDI were negatively associated with the SREIS ($\beta = -0.39$, $p = .006$). All other $ps > .38$.

Finally, the above comprehensive model was tested with the EQ-i as the DV. The overall model was significant (F (9, 48) = 11.25, $p < .001$), with an adjusted $R^2 = .62$. (The adjusted R^2 remained .62 even when full scale IQ was excluded from the model.) Three of the Big Five traits were significantly associated with EQ-i scores (Neuroticism $\beta = -0.32$, $p = .002$; Extraversion $\beta = 0.34$, $p < .001$; and Conscientiousness $\beta = 0.32$, $p < .001$). Openness was associated with the EQ-i at the level of a nonsignificant trend ($\beta = 0.21$, $p = .053$). In addition, scores on the PANAS — PA were positively associated with the EQ-i ($\beta = 0.22$, $p = .021$). All other $ps > .34$.

4. Discussion

Although there is general agreement that the ultimate relevance of emotional intelligence (EI) lies in its ability to predict important life outcomes (e.g., quality of interpersonal relationships, academic or occupational success), debate persists in how best to operationalize (e.g., integrative versus mixed models) and measure EI (e.g., self-report versus performance-based instruments). Different conceptualizations of EI are reflected in the broad array of available instruments that have been developed to assess the construct. The current study investigated the convergent and divergent validity of several competing measures of EI (MSCEIT, EQ-i, and SREIS). Consistent with our hypotheses, and paralleling the findings of Brackett and Mayer (2003), we found that the performance-based MSCEIT was discriminable from the personality and emotional well-being (EWB) variables we examined, whereas the two self-report measures of EI (EQ-i and SREIS) shared significant variance with these variables. This was particularly true for the EQ-i. Indeed, whereas the MSCEIT was not significantly associated with any of the personality or EWB variables examined, the EQ-i was significantly correlated with all but one of these variables at conventional statistical significance levels ($p < .05$; i.e., 4 of the Big Five personality traits and all 3 of the EWB variables; see Table 1). In addition to the findings of Bracket and Mayer, several previous studies have also reported significant associations between the EQ-i, Big Five personality traits, and measures of emotional/psychological well-being (e.g., Grubb & McDaniel, 2007; Newsome et al., 2000; O'Connor & Little, 2003). Overall, and as discussed in more detail below, the current findings raise concerns regarding the extent to which the EQ-i is discriminable from existing personality and EWB constructs.

As noted above, the EQ-i was designed to assess a broad "*array of noncognitive capabilities, competencies and skills*" ([emphasis in original]; Bar-On, 2004, p. 14), including items measuring constructs that seem to overlap substantially with EWB and Big Five personality traits (e.g., scales assessing optimism, happiness, stress tolerance, self-regard, self-actualization, and impulse control). Thus, given the items comprising the EQ-i, it is perhaps not surprising that the measure was found to be significantly associated with the EWB and personality measures included in the current study.

In addition to the overlap in semantic content between the EQ-i and emotion/personality measures, similarities in method of assessment may help account for the patterns of associations we observed. More specifically, given that the EQ-i, Big Five personality traits, and EWB variables were each assessed via self-report, significant correlations between these variables may have been due in part to *shared method variance* (Kazdin, 2003). It should be noted, however, that a third EI measure (SREIS) was included in the current study, which was also administered via self-report but was designed to assess the same content domains as the MSCEIT. The fact that the SREIS exhibited relatively weaker associations with EWB and personality variables than did the EQ-i suggests that the particularly strong associations between the latter measure and EWB/personality variables may be due at least in part to overlap in actual content (i.e., *trait variance*) rather than due entirely to shared method variance.

Furthermore, the difference in patterns of correlations between the performance-based MSCEIT and self-report measures may have been due in part to the influence of mood/affect on *perception* of EI. For example, those subjects with relatively higher levels of depressed mood may be more likely to *perceive* themselves as possessing low levels of EI, regardless of their "actual" EI (reflected in a significant negative association between BDI scores and both SREIS and EQ-i total scores). In contrast, given that the MSCEIT is a performance-based test rather than a self-report questionnaire, it may be less susceptible to perceptual biases associated with emotional state (as reflected in a lack of association between EWB variables and MSCEIT scores).

It is important to note that significant correlations with personality and EWB variables do not necessarily impugn the validity of the EQ-i. Indeed, as noted above, the scale was explicitly designed to contain subscales assessing a variety of facets, including domains overlapping with EWB and personality dimensions (Bar-On, 2002, 2004). In other words, the domains assessed in the EQ-i ultimately reflect the perspective of the test developer regarding what constitutes EI (Bar-On, 2006). On the other hand, the current findings indicate that nearly *two-thirds* (62%) of the variance in EQ-i scores was accounted for by Big Five personality traits and EWB; whereas only 14% of the variance in MSCEIT scores was accounted for when all variables were included in the model. These findings raise the important question: How much additional information does the EQ-i provide above and beyond existing personality and EWB measures? It will be important for future studies of EI to include Big Five personality traits and EWB measures as covariates in their analyses to reduce the risk of third variable confounds (e.g., a significant association between EI and important life outcomes may in fact be a spurious correlation accounted for by Big Five personality traits and/or EWB).

In contrast to the findings regarding personality and EWB, and consistent with our hypothesis, IQ was more strongly associated with the MSCEIT than either of the two self-report EI measures (although a significant correlation did emerge between the SREIS and verbal IQ). In addition to including several competing measures of EI, one of the strengths of the current study was the assessment of full scale IQ using a reliable and well-validated instrument (i.e., WASI). Previous studies have typically used proxy, and less time-consuming,

measures of IQ or restricted their analyses to particular subtests of IQ measures (e.g., Brackett & Mayer, 2003; Ciarrochi et al., 2000; MacCann et al., 2004; O'Connor & Little, 2003; Roberts et al., 2001; Schulte et al., 2004; Zeidner et al., 2005). In light of the current pattern of findings, it is interesting to note that the developers of the MSCEIT emphasized the importance of establishing EI as a type of intelligence, complementing traditional IQ (Mayer et al., 1999; Mayer & Salovey, 1993). In statistical terms, the authors argued that a valid measure of EI should correlate moderately with, but remain discriminable from, IQ. Correlations between the MSCEIT and IQ scales were in the "moderate" to "large" range in the current study (Cohen, 1992). Interestingly, the EI measure with the second strongest association with IQ was the SREIS (same content as MSCEIT but different assessment method), followed by the EQ-i (both different content and different method of assessment than the MSCEIT). These findings suggest that it will also be important to control for IQ in future EI studies, particularly when performance-based measures of EI are being employed. Moreover, given the distinction intelligence theorists have made between fluid (*Gf*) and crystallized intelligence (*Gc*), fruitful findings may also emerge from future research examining the relationship between EI and *Gf* versus *Gc*. Previous findings have suggested a relationship between the MSCEIT and both *Gf* (e.g., Di Fabio & Palazzeschi, 2009; Fiori & Antonakis, 2012) and *Gc* (Mayer, Roberts, et al., 2008). As well, within our own dataset, we found significant correlations between the MSCEIT and variables arguably tapping *Gf* (MSCEIT–WASI [Performance IQ] $r = .43$) and *Gc* (MSCEIT–WASI [vocabulary subtest] $r = .542$).

Finally, with regard to convergent validity, it is interesting to note that the two self-report measures of EI (i.e., EQ-i and SREIS) – which cover different content – were more highly correlated than the MSCEIT and SREIS which were designed to cover the same content, but used different methods of assessment (i.e., performance-based versus self-report, respectively). There are a number of different interpretations of these results, but the latter pattern of findings may reflect the effect of shared method variance on influencing the strengths of correlations between EI measures. Furthermore, to the extent that the MSCEIT does accurately assess EI, these findings may reflect the fact that, on average, an individual's report of their own EI abilities and actual EI performance do not correlate highly. Indeed, self-report measures are inherently limited by the fact that they rely on an individual's ability to accurately assess and report on the construct being assessed (in this case, EI). Similar criticisms have also been raised of the validity of self-report measures of IQ (Paulhus, Lysy, & Yik, 1998). Worthwhile findings may emerge from research utilizing other approaches to assessing EI, including multisource ("360°") assessments, videotapes of simulations or behavioral coding of taped interviews (Boyatzis, 2009; Boyatzis et al., 2012).

4.1. Limitations

Several limitations of the current study should be noted. First, our sample size was small, limiting statistical power. Nevertheless, we found a number of significant and intriguing relationships in line with our hypotheses, despite the fact that the especially conservative Bonferroni method was employed to adjust for multiple comparisons (Perneger, 1998; Rothman, 1990). Second, the current study was cross-sectional and not a prospective, longitudinal investigation, which prevented us from drawing inferences regarding the direction of associations (e.g., between emotional well-being and EI), and predicting longer-term life outcomes from EI scores (e.g., changes in interpersonal relationships, academic or occupational success). Third, we used the abbreviated WASI rather than the full WAIS to assess IQ. Finally, we should also reiterate that the SES data we obtained was from U.S. census tract statistics (U.S. Census Bureau, 2010) rather than a measure of each participant's individual SES status.

4.2. Future directions

More studies are needed which directly compare the psychometric characteristics of competing EI measures, including their convergent and divergent validity relative to existing measures of personality traits, emotion constructs and cognitive functioning. Ultimately, as noted above, it will be critical for studies to compare the incremental predictive validity of competing EI measures in predicting relevant life outcomes, after controlling for relevant personality variables and IQ. The results of such research may help inform the development of improved EI measures. In addition, the application of EI research to clinical populations may yield fruitful findings. For example, although effective psychosocial interventions have been developed and tested for clinical depression, the "active ingredients" of these treatments and precise mechanisms of symptom change remain unclear. Perhaps improvements in EI, or particular facets of EI (e.g., emotion management), in part mediate the therapeutic improvement experienced by clinically depressed patients in psychotherapy (e.g., in cognitive behavioral therapy which directly targets emotion regulation skills).

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