Emotional intelligence: A meta-analytic investigation of predictive validity and nomological net

David L. Van Rooy* and Chockalingam Viswesvaran

Department of Psychology, Florida International University, Miami, FL 33199, USA

Received 3 December 2002
Available online 25 June 2003

Abstract

This study used meta-analytic techniques to examine the relationship between emotional intelligence (EI) and performance outcomes. A total of 69 independent studies were located that reported correlations between EI and performance or other variables such as general mental ability (GMA) and the Big Five factors of personality. Results indicated that, across criteria, EI had an operational validity of .23 ($k = 59$, $N = 9522$). Various moderating influences such as the EI measure used, dimensions of EI, scoring method and criterion were evaluated. EI correlated .22 with general mental ability ($k = 19$, $N = 4158$) and .23 (Agreeableness and Openness to Experience; $k = 14$, $N = 3306$) to .34 (Extraversion; $k = 19$, $N = 3718$) with the Big Five factors of personality. Results of various subgroup analyses are presented and implications and future directions are provided.

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Keywords: Emotion; Emotional; Intelligence; Meta-analysis; Personality; Validity; Mental ability; Predictive; Construct; Nomological net; Big Five

1. Introduction

Research on emotional intelligence is gaining momentum (cf. Davies, Stankov, & Roberts, 1998; Goleman, 1995; Mayer, Caruso, & Salovey, 1999) and becoming one
of the most topical areas in organizational research. To some extent, this recent emphasis on emotional intelligence arises from the renewed interest in personality research (cf. Barrick & Mount, 1991; Hough & Ones, 2001). This article discusses the current state of affairs in emotional intelligence research and then applies meta-analytic procedures to provide the first comprehensive understanding of the power of EI to predict performance outcomes. The article also explores the nomological net of EI with other individual difference variables that psychologists traditionally use to predict behavior: General Mental Ability (GMA) and the Big Five factors of personality.

It is difficult to provide an operational definition of EI that is accepted by all. This is not surprising as decades of research on stress, for example, still has not resulted in a universally accepted definition of what constitutes stress; the same can be said of the research on GMA as well as the definition of personality variables (cf. Goldstein, Zedeck, & Goldstein, 2002; Ones, 1993; Ones & Anderson, 2002). The EI concept is typically credited to Salovey and Mayer (1990) who coined the term emotional intelligence but Thorndike (1920) first proposed the idea of social intelligence that some consider akin to EI (but see Mayer & Salovey, 1997). In actuality, EI can best be thought of as a subset of social intelligence (Salovey & Mayer, 1990). However, since the construct of social intelligence is broader than EI, it has often been difficult to discriminate between it and GMA. As a more isolated construct, EI may be more distinct from GMA and personality. In addition, it is possible that measures of EI, especially ability based, are less susceptible to faking than other measures that are more transparent. Nonetheless, others (Kaufman & Kaufman, 2001) argue that the origins of EI can be traced to Binet’s early notions of intelligence. Gardner (1993) has postulated that social intelligence consists of a person’s inter- and intra personal intelligences. Still, EI was not truly popularized until the recent renaissance of the dispositional approach in the workplace (cf. Hough & Ones, 2001).

The differing names given to emotional intelligence are part of the reason that it has been difficult for researchers to agree on an all-encompassing definition. Emotional intelligence has also been referred to as emotional literacy, the emotional quotient, personal intelligence, social intelligence, and interpersonal intelligence (Dulewicz & Higgs, 2000). The definitions are so varied, and the field is growing so rapidly, that researchers are constantly amending even their own definitions of the construct. Nonetheless, although the definitions of EI vary, they tend to be complementary rather than contradictory (Ciarrochi, Chan, & Caputi, 2000). Based on the many definitions that have already been proffered, this article conceptualizes EI as the set of abilities (verbal and nonverbal) that enable a person to generate, recognize, express, understand, and evaluate their own, and others, emotions in order to guide thinking and action that successfully cope with environmental demands and pressures.

1.1. Dimensions of emotional intelligence

The emotional intelligence concept is generally divided into four dimensions (Salovey & Mayer, 1990), although other models such as a five-component model (Bar-On, 1997) are also widely accepted. George (2000) and others (e.g., Mayer,
Salovey, & Caruso, 1999) summarize the four dimensions of emotional intelligence postulated by Salovey and Mayer: the perception of emotion, the integration and assimilation of emotion, knowledge about emotions, and management of emotions. The four dimensions of emotional intelligence have been proposed as a sequential set of steps with the perception of emotion occurring at the first step and the other three then following in the order they are listed above (Mayer, Salovey, Caruso, & Sitarenios, 2001).

Briefly, the first dimension can be thought of as the ability to perceive emotion. This involves the accuracy with which a person can identify emotions in themselves and others. The next dimension consists of the ability to use or assimilate emotions to facilitate thought. This allows people to use emotions to guide their thinking, and new emotions can also be generated during this stage. The third dimension involves how people understand their emotions. Knowledge of emotions allows a person to understand how emotions change and the relationship between these states. The final dimension involves the management of not only one’s own mood and emotions, but also the emotions of others.

1.2. Emotional intelligence as a predictor

Emotional intelligence is appealing not only because of our general fascination with the way people feel but, more importantly, because the traditional cognitive predictors leave a considerable amount of variance unexplained. Indeed, cognitive ability accounts only for approximately 25% of the variance in job performance (Goldstein et al., 2002; Hunter & Hunter, 1984). The appeal of EI therefore lies in the possibility of tapping into and explaining another portion of the remaining variance. Although models (Arvey, Renz, & Watson, 1998) have specified the role of general emotionality in the workplace, as of yet, however, no theory specifically discusses the role of EI and its relationship to work outcomes (Wong & Law, 2002).

If EI and GMA were strongly correlated, the influence of EI would not be as important. Some studies have shown, however, that EI and GMA tend to be orthogonal constructs that denote different competencies (e.g., Ciarrochi et al., 2000; Davies et al., 1998; Fox & Spector, 2000). The inability of GMA to account for sufficient variance in success criteria in an organizational and educational context has therefore led to increased research seeking to remedy this deficiency (Dul- ewicz & Higgs, 2000). However, EI may add to the predictive power of GMA but it certainly does not trump it. Indeed, it may be that EI is not a strong predictor of performance in and of itself. Surgeons may still be successful, and many would argue more skilled since they will be detached, if they have a low level of EI. A person will most likely never even become a surgeon, though, if they have high EI that is not accompanied with high GMA. Accordingly, the most successful employee will most likely possess a high level of both emotional and general intelligence. In addition to the potential for incremental validity, the use of EI may result in reduced adverse impact for minority group members. It is a well-established fact that GMA results in adverse impact due to the large group differences as compared
to the smaller group differences found in personality-based variables (cf. Ones, 1993; Ones & Anderson, 2002).

When Goleman (1995) published his book on EI there was a relative dearth of empirical studies examining the link between organizational performance and EI. This led many researchers (e.g., Abraham, 1999) to simply put forth a hypothesis, or hypotheses, without actually testing it. Almost unanimously, these researchers proposed a positive relationship between EI and performance. It is still to be determined if EI influences performance consistently or if it differs according to type of job (e.g., academic vs. work) and other potential variables. Accordingly, the current study examined various subgroups that may affect the relationship between EI and performance. Some of the subgroup analyses studied here may be described as exploratory in nature but they provide valuable insights about many of the speculative hypotheses in the EI literature.

Although the distinctiveness of EI and GMA has been shown in many studies, the same cannot be said of EI and measures of personality. Indeed, Ciarrochi et al. (2000) found it difficult to distinguish between the two constructs. This is similar to the finding reported by Davies et al. (1998) who concluded that emotional intelligence is generally indistinguishable from established personality traits. The above researchers go on to say that it is thus not surprising that EI and GMA are not correlated as few self-report measures of personality are correlated with general intelligence (see also, Ackerman & Heggestad, 1997; Ones, 1993). Davies and colleagues concluded that little uniqueness is left in EI after accounting for personality. A conflicting, albeit promising, finding was demonstrated in a measurement validation study by Schutte et al. (1998) who constructed a measure that was not significantly related to four of the Big Five personality dimensions. The study by Schutte et al. suggests that EI is in fact a construct distinct from other personality constructs. The current study statistically analyzed the above inconsistencies in order to examine more thoroughly the relationship between EI and the Big Five personality dimensions.

1.3. Measurement of emotional intelligence

Many of the claims that have been put forth in relation to EI have not been substantiated by empirical research, especially on replication. Additionally, studies have not used the same, or even a few of the same, measures of EI. Of the existing measures of EI, the Bar-On Emotional Quotient Inventory (EQ-i) is one of the most widely used measures. The EQ-i is a 133-item questionnaire, rated on a five-point scale, which measures abilities and the potential for performance rather than performance itself (Bar-On, Brown, Kirkcaldy, & Thome, 2000). The EQ-i consists of five components: intrapersonal, interpersonal, adaptability, general mood and stress management. The EQ-i has previously been shown to demonstrate sufficient test-retest reliability (.85 after one month and .75 after 4 months; Bar-On, 1997).

However, the generally accepted view appears to suggest that it is difficult to measure EI and no truly robust measure currently exist (Dulewicz & Higgs, 2000). Appropriately, researchers (e.g., Sala, 2002; Wong & Law, 2002) are working to devise
better measures of EI and often prefer to construct their own measure of EI when conducting studies on the topic. This is reasonable as there is still a serious lack of research examining the predictive validity of existing measures of EI; even less is known about its predictive validity in work situations (Cherniss, 2000). As Mayer et al. (2001) recognize, it took decades to construct measures of GMA. Thus, the measurement of EI is still in its infancy and numerous measures can only benefit the advancement of the construct until more is known about EI.

Recent research has increasingly used a new measure, the Multifactor Emotional Intelligence Scale (MEIS; Mayer et al., 1999). The MEIS is notable, because unlike other measures of EI, it is a performance-based test. The scale, which has shown adequate psychometric properties, consists of 12 subset tasks that are divided into four dimensions of emotional intelligence, as mentioned above. Continued examination of this scale, however, is still needed to confirm the psychometric results that have thus far been evidenced. Accordingly, Mayer et al. (1999) have recently amended the MEIS into the MSCEIT, and subsequently into the MSCEIT V2.0 (Mayer, Salovey, Caruso, & Sitarenios, in press) which has also shown promising results, in order to provide a more psychometrically sound measure of EI. In yet another attempt, Wong and Law (2002) constructed and validated a short 16-item measure of EI. Although it was an exploratory study, results indicate that the measure shows discriminant validity with personality as measured by the Big Five. This measure, along with the above-mentioned measure by Schutte et al. (1998), and various other measures, could provide more reliable and shorter measures of EI.

A primary concern with existing measures of EI is the shortage of evidence for their psychometric measurement properties. The manuals for measures of EI have indicated sufficient reliability but other studies have not consistently produced the same result. This led Davies et al. (1998), for instance, to argue that measures of EI suffer in terms of reliability. Furthermore, the available information is scattered across manuals, theses, dissertations, and technical reports and the reporting of the reliability assessments vary. Gathering all this information in a standard comparative format will facilitate a better understanding of the construct as well guide future measurement efforts. Finally, by taking into account the reliability of EI assessments, the current meta-analysis allowed for a closer approximation of the true predictive validity of emotional intelligence as well as a better estimate of the nomological net of emotional intelligence with other traditional variables (cf. Ones, 1993).

1.4. Moderators of emotional intelligence

Like most predictors of performance, the influence of emotional intelligence may best be understood by examining the influence of potential moderators. Since the current meta-analysis did not test for moderation using multiple regression interaction techniques, the term subgroup will instead be used in this article to avoid confusion. The current study assessed the overall influence of EI on performance and it then examined the effects of five hypothesized subgroups that are briefly discussed below. Additionally, the analyses explored the relationship of EI with the Big Five factors of personality and GMA.
1.4.1. Performance criterion domain

Typically, studies examining EI and performance focus on either academic or work related outcomes. At the present time, enough studies have not yet been conducted that explored the EI link with training performance so the current analysis focused on academic, work related, and a group of other outcome variables (e.g., life success) that did not fall within the first two categories. Various outcome measures include performance in actual jobs, performance in laboratory tasks, success in school (typically measured by GPA), and sports such as hockey and baseball. This provided information on relationships between EI and other additional work-relevant factors as has been previously recommended (Janovics & Christiansen, 2001). An assessment of this subgroup will show us if EI is more or less effective depending on the criterion it is to be used with. For instance, it could be that measures of EI are more valuable for predicting work success, where it could be argued emotions are more prevalent or important, than academic success. Thus, it is possible that tests of EI may have different utility depending on the criterion. In addition to examining whether the mean predictive validity differs across domains, there is also need to investigate whether there is more variability in the workplace settings than in academic settings. The demands of the workplace settings are more varied compared to academic settings, which could result in greater variability of the predictive validity of EI in workplace settings.

1.4.2. Instrumentation

The studies in the current meta-analysis did not use a single measure of emotional intelligence. It was therefore appropriate to treat the measure of EI employed in each study as another subgroup variable since the tests vary in conceptual underpinnings and format. The two most common measures used were the Bar-On (1997) EQ-i and the 33-item Emotional Intelligence Scale (EIS; Schutte et al., 1998). The MEIS (Mayer & Salovey, 1997) was used in fewer studies than anticipated, considering the amount of attention that has been given to the four dimensions of EI proposed by its authors, but this was most likely a function of the short lived nature of the MEIS (i.e., it was revised into a new instrument). Other common measures include the Trait Meta Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), and the Emotional Competence Inventory (ECI; Sala, 2002). In all, five different measures of EI were explored in this subgroup analysis: the MEIS, TMMS, EIS, Bar-On EQ-I, and ECI. Additionally, a category of miscellaneous EI measures included all measures that were not used by multiple studies. The measures vary considerably on characteristics such as length and reliability as well as in their specific conceptualizations. Accordingly, this may be one of the most important moderators of EI since little is known about the differences between tests. To date, few studies have pitted the measures against each other thereby making the analysis of this subgroup more important.

1.4.3. Analysis of sub-dimensions

Studies that use emotional intelligence as a predictor typically report one of three types of possible correlations; (1) the correlation between a total EI score and
performance; (2) the correlation between EI subsets and performance; and, (3) the correlation between the total EI score and performance as well as the correlations of the EI subsets and performance. The current meta-analysis will use both the four-dimension classification of Salovey and Mayer (1990), the five-dimension classification of Bar-On (1997), and total score when examining the differing influence of the dimensions used. In instances where dimensions other than the above nine were used, a panel of five independent raters were used to classify each dimension employed in a focal study into one of the four dimensions postulated by Salovey and Mayer and also into one of Bar-On’s five dimensions. The analysis of EI subscales was important to determine if all of the subscales are actually necessary for an accurate prediction of EI and also to determine if the nomological net differs across dimensions.

1.4.4. Emotional intelligence measurement method

Studies also vary according to type of response format used to measure EI. Most of the measures (e.g., Bar-On EQ-i) use a subjective self-report format; other methods involve having someone else rate the person on EI. The current analysis will determine if other ratings of EI are more powerful than self-report measures. Kaufman and Kaufman (2001, p. 263) state that the future of EI assessment is surely based on the continued refinement of performance-based measures and not in self-report inventories. In this subgroup analysis we first separated self-reports from other ratings and then self-reports were further classified according to how the self-reports were scored. Self-reports can be scored by comparing self-ratings to consensus ratings or to expert ratings of the different options. These latter self-report methods are more objective. Indeed, Davies et al. (1998) stress the importance of objective measures of EI. Additionally, subjective measures of EI are likely to be more prone to faking than objective measures. All three methods of EI scoring were examined separately.

1.4.5. Criterion measurement method

Studies that assess emotional intelligence and performance may also have results that are influenced by the source of the criterion data. The criterion could be objective records of performance (e.g., units produced, GPA in school) or subjective ratings. Criterion ratings can be obtained from many people including supervisors, teachers, peers, and self. The source of the rating in the included studies varied according to the type of criterion that was used. This is another subgroup that needs to be examined further.

1.5. Summary and hypotheses

Enough studies have now been conducted, using many different measures, that it is now necessary to use meta-analytic techniques to combine the studies in order to paint a clearer picture of the general influence of EI on various performance outcomes. This will provide a platform for subsequent research that examines the construct and predictive validity of emotional intelligence. The following hypotheses are therefore proposed:
Hypothesis 1: A positive correlation exists between emotional intelligence and measures of performance.
Hypothesis 2: The predictive validity of EI varies according to the setting (i.e., academic, work, or other domain) in which performance is assessed.
Hypothesis 3: The validity of EI for predicting performance is influenced by the measure of EI used.
Hypothesis 4: The validity of EI for predicting various criteria differs according to the dimension of EI analyzed.
Hypothesis 5: The validity of EI differs according to the scoring method used (i.e., expert ratings vs. self reports, and consensus scored self-reports versus expert scored self-reports).
Hypothesis 6: The validity of EI is influenced by the criterion measurement method (i.e., ratings versus organizational records, and by the source of the ratings-supervisors, self, etc.).
Hypothesis 7: Emotional Intelligence is not correlated significantly with measures of GMA.
Hypothesis 8: Emotional intelligence is not correlated significantly with the Big Five personality dimensions.

2. Method

2.1. Search for primary data

Since there is still a nebulous distinction, at best, between EI and other related phenomena (e.g., social intelligence), the current meta-analysis only included studies that used a predictor that was specifically referred to as a measure of emotional intelligence. This precluded many constructs, such as social facilitation, interpersonal intelligence, etc., that have at times been used or described as quasi-measures of EI.

As Salovey and Mayer (1990) are generally credited with coining the term emotional intelligence, only studies subsequent to that date were included. Both computer and manual searches were used to look for articles on emotional intelligence. The initial search involved a computer search of the PsychInfo and PsycFirst databases. Relevant articles that examined the influence of EI on performance outcomes were then gathered and the reference sections were searched for other pertinent research. A computer database for dissertations was then searched for other EI research that has not been published in journals. Additionally, an Internet search and web posting resulted in five additional studies for inclusion. Finally, eight of the prominent EI researchers were contacted via email and this generated an additional four studies. As this is the first known study exploring this relationship, no datasets from previous meta-analyses were available for perusal.

The final database consisted of 57 usable studies, with a total sample size of 12,666, which were deemed appropriate for inclusion in the meta-analysis. Across these 57 studies were results from 69 independent samples with sample sizes from 13 to 1125 participants. All studies exploring the EI-performance link were included.
Although EI is still a new area of research with a limited number of relevant studies, the database of 69 independent samples is much larger than some of the databases that have been previously meta-analyzed. Even in other areas with more research it is generally difficult to find studies that report correlations among predictors (Hunter & Hunter, 1984). Interestingly, many of the 69 samples reported correlations with other predictors like GMA and personality. Perhaps this comprehensive reporting is more indicative of the source of publication—many of our studies were culled from technical reports, dissertations and thesis where complete correlation matrices are usually reported. Further, given that EI is a new construct, researchers have made a conscious effort in many of the studies to present correlations between EI and other variables. Thus, this database provides a rich source of information with the potential to add a valuable contribution to the existing EI literature. This value-added contribution is further underscored when we realize that many of these studies are theses and dissertations whose results are not easily available to readers in one source.

Due to the various measures of EI that were used in the selected studies, not all used the four- or five-dimension models of emotional intelligence. As a result, studies that used different dimensions (e.g., Fox & Spector, 2000) needed to be categorized into the four and five dimensional models. This was done by having three doctoral students in I/O Psychology, and the two authors, independently classify dimensions into the Salovey and Mayer as well as the Bar-On dimension that it most resembled. In order for a reclassification to have been included, at least four of the five independent raters had to be in agreement.

### 2.2. Meta-analytic procedure

In coding the studies we ensured that each sample contributed a single correlation for a meta-analysis. When correlations were reported across different criteria or different measures of a predictor, we averaged the corresponding correlations for the overall meta-analysis. We relied on averaged correlations since the intercorrelations needed to compute composites were not always available (Hunter & Schmidt, 1990, p. 456). However, when conducting subgroup analyses we entered the appropriate individual correlation, or average if more than one was reported, from that sample (still not violating the independence assumption).

The meta-analysis procedure by Hunter and Schmidt (1990) was used. The method provides a way to determine the degree of correlational differences across studies that may be attributable to statistical artifacts such as sampling error. Further, this approach (Hunter & Schmidt, 1990, Chap. 3) also corrects observed correlations for statistical artifacts. Such corrected correlations may be more theoretically meaningful when investigating the nomological net of a construct (Ones, 1993). Specifically, we corrected for sampling error and unreliability in the two measures being correlated. Note, however, that when we report the predictive validity of EI for different criteria we do not correct for predictor unreliability. Hunter and Schmidt (1990) refer to such correlations as the operational validity of the predictors. However, the observed variance is corrected for both predictor and criterion unreliability. In
contrast, when reporting the correlations between EI and GMA or personality variables we corrected for unreliability in both of the variables that were correlated.

The interactive artifact-distribution based meta-analysis program was used. The artifact distribution used was derived from our database and no recourse was made to any hypothetical distribution. The sample size weighted mean observed correlation was obtained, and the standard deviation of the estimated true score correlation (or when predictive validity of EI is discussed, the estimated true validity also referred to as operational validity) was used to test for subgroup effects.

3. Results

3.1. Meta-analysis of predictive validities

The overall predictive validity of emotional intelligence measures across different criteria was examined first. Across 59 independent samples, involving 9522 participants, the sample size weighted mean observed correlation was .20. This level of predictive validity is comparable to what is found for the Big Five factors of personality in a recent meta-analysis (Hurtz & Donovan, 2000). However, the sample size weighted observed standard deviation was .12, a substantial value suggesting the operation of moderator variables, and limiting the information yield from the observed mean of .20. Emotional intelligence measures do not appear to have significant (both statistical and practical) validity in some situations. In fact, only 37.7% of the observed variance was attributable to sampling error. When corrected for unreliability in the criterion measures, the mean operational validity increased to .23 and the associated standard deviation decreased to .1016, which resulted in a lower 90% credibility value of .10. This lower 90% credibility value, along with the standard deviation estimates, suggests that emotional intelligence measures have predictive validity in most situations (more than 90% of the situations) but the exact magnitude varies by situation. Thus, we can infer support for our first hypothesis.

The first subgroup we examined was the performance domain assessed in a study. Emotional intelligence measures have been used primarily in employment settings and in academic settings. In addition to these two performance domains (i.e., employment and academic), there were some validities that focused on life outcomes which were grouped into a third category. Three separate meta-analyses were conducted and the results are summarized in Table 1; the same table also provides the meta-analytic summary of the overall database that was summarized above for hypothesis one.

First, it is important to note that the number of samples across some of the subgroup analyses exceeded 69, the total number of independent samples. This is because some of the samples reported on more than one subgroup, which could be classified into different subgroups. However, within each subgroup all were independent samples. This point should also be kept in mind when reviewing the results of other subgroup analyses to be discussed below.
Emotional intelligence measures have an operational validity of .24, .10, and .24, for predicting performance in employment, academic, and life settings, respectively. The lower 90% credibility value is positive in all settings (.05 to .16) and we can infer that emotional intelligence measures predict performance in all three domains (employment, academic, and life). However, there is limited predictive ability in academic settings. Thus, there is partial support for our second hypothesis.

Our third hypothesis investigated the measure of emotional intelligence used to determine if there were differential results according to instrumentation. Six categories were created and the 69 independent samples were grouped into one of them. Note that some samples contributed to more than one category here (i.e., two measures of EI were used) but the independence of the samples in each category was maintained. The results are summarized in Table 2.

The operational validities varied from .19 for the MEIS to .32 for the Trait Meta Mood Scale (TMMS). The miscellaneous measures demonstrated an acceptable operational validity (.22) but are suspect unless their validity is replicated in different settings.

Table 1
Meta-analysis of the subgroup of type of performance

<table>
<thead>
<tr>
<th>Meta-analysis</th>
<th>K</th>
<th>N</th>
<th>R-bar</th>
<th>SDr</th>
<th>ρ</th>
<th>SDp</th>
<th>% var SE</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall EI</td>
<td>59</td>
<td>9522</td>
<td>.20</td>
<td>.1232</td>
<td>.23</td>
<td>.1016</td>
<td>37.7</td>
<td>.10 to .36</td>
</tr>
<tr>
<td>Employment</td>
<td>19</td>
<td>2652</td>
<td>.22</td>
<td>.1552</td>
<td>.24</td>
<td>.1441</td>
<td>27.2</td>
<td>.05 to .42</td>
</tr>
<tr>
<td>Academic</td>
<td>11</td>
<td>1370</td>
<td>.09</td>
<td>.0994</td>
<td>.10</td>
<td>.0410</td>
<td>80.6</td>
<td>.05 to .15</td>
</tr>
<tr>
<td>Other perform.</td>
<td>34</td>
<td>6327</td>
<td>.22</td>
<td>.1016</td>
<td>.24</td>
<td>.0686</td>
<td>47.6</td>
<td>.16 to .33</td>
</tr>
</tbody>
</table>

Note. K, number of samples; N, total sample size of all studies meta-analyzed; R-bar, sample size weighted mean observed correlation; SDr, observed sample size weighted mean standard deviation; ρ, true or operational validity, computed by correcting observed mean for criterion unreliability; SDp, standard deviation of true validity; % var SE, percentage of variance attributable to sampling error; 90% CI, 90% credibility interval computed as ρ + 1.28(SDp) and as ρ − 1.28(SDp).

Table 2
Meta-analysis of the subgroup of type of emotional intelligence measure used

<table>
<thead>
<tr>
<th>Meta-analysis</th>
<th>K</th>
<th>N</th>
<th>R-bar</th>
<th>SDr</th>
<th>ρ</th>
<th>SDp</th>
<th>% var SE</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall EI</td>
<td>59</td>
<td>9522</td>
<td>.20</td>
<td>.1232</td>
<td>.23</td>
<td>.1016</td>
<td>37.7</td>
<td>.10 to .36</td>
</tr>
<tr>
<td>MEIS</td>
<td>8</td>
<td>1368</td>
<td>.17</td>
<td>.0581</td>
<td>.19</td>
<td>0</td>
<td>164.7</td>
<td>.19 to .19</td>
</tr>
<tr>
<td>TMMS</td>
<td>7</td>
<td>880</td>
<td>.29</td>
<td>.1451</td>
<td>.32</td>
<td>.1304</td>
<td>32.0</td>
<td>.15 to .49</td>
</tr>
<tr>
<td>EIS</td>
<td>14</td>
<td>1279</td>
<td>.23</td>
<td>.1472</td>
<td>.25</td>
<td>.1161</td>
<td>45.8</td>
<td>.10 to .40</td>
</tr>
<tr>
<td>EQ-I</td>
<td>13</td>
<td>3046</td>
<td>.18</td>
<td>.1121</td>
<td>.20</td>
<td>.0977</td>
<td>31.9</td>
<td>.08 to .33</td>
</tr>
<tr>
<td>ECI</td>
<td>6</td>
<td>1292</td>
<td>.20</td>
<td>.1471</td>
<td>.23</td>
<td>.1420</td>
<td>19.8</td>
<td>.05 to .41</td>
</tr>
<tr>
<td>Misc. measure</td>
<td>17</td>
<td>2149</td>
<td>.20</td>
<td>.1232</td>
<td>.22</td>
<td>.0896</td>
<td>48.4</td>
<td>.11 to .34</td>
</tr>
</tbody>
</table>

Note. K, number of samples; N, total sample size of all studies meta-analyzed; R-bar, sample size weighted mean observed correlation; SDr, observed sample size weighted mean standard deviation; ρ, true or operational validity, computed by correcting observed mean for criterion unreliability; SDp, standard deviation of true validity; % var SE, percentage of variance attributable to sampling error; 90% CI, 90% credibility interval computed as ρ + 1.28(SDp) and as ρ − 1.28(SDp); MEIS, multi-factor emotional intelligence scale; TMMS, trait meta-mood scale; EIS, emotional intelligence scale; EQ-i, emotional quotient inventory; ECI, emotional competence inventory.
samples. The TMMS had an operational validity considerably higher than the next closest measure (the EIS (.25) by Schutte et al., 1998), but it also had a high standard deviation (.13) that could indicate the presence of moderators or that it is measuring multiple constructs. The 90% credibility value was positive across all categories suggesting that all measures demonstrated predictive validity.

The next subgroup analyzed investigated whether the sub-dimensions of EI had different predictive validities. We analyzed both the four dimensions hypothesized by Salovey and Mayer (1990), as well as the five-dimension classification of Bar-On (1997). The results of analyzing the four dimensions of Salovey and Mayer are summarized in Table 3 whereas the analyses of Bar-On’s five dimensions are presented in Table 4.

First, consider the four sub-dimensions of Salovey and Mayer. Three of the four dimensions had higher predictive validities than even the total score across the four dimensions (.19). Perception of emotions had the lowest predictive validity of .15 of

<table>
<thead>
<tr>
<th>Meta-analysis</th>
<th>K</th>
<th>N</th>
<th>R-bar</th>
<th>SDr</th>
<th>ρ</th>
<th>SDρ</th>
<th>% var SE</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall EI</td>
<td>59</td>
<td>9522</td>
<td>.20</td>
<td>.1232</td>
<td>.23</td>
<td>.1016</td>
<td>37.7</td>
<td>.10 to .36</td>
</tr>
<tr>
<td>MEIS total</td>
<td>8</td>
<td>1368</td>
<td>.17</td>
<td>.0581</td>
<td>.19</td>
<td>0</td>
<td>164.7</td>
<td>.19 to .19</td>
</tr>
<tr>
<td>(a) Perception</td>
<td>21</td>
<td>3484</td>
<td>.13</td>
<td>.0931</td>
<td>.15</td>
<td>.0574</td>
<td>67.4</td>
<td>.07 to .22</td>
</tr>
<tr>
<td>(b) Assimilation</td>
<td>7</td>
<td>770</td>
<td>.24</td>
<td>.1255</td>
<td>.27</td>
<td>.0940</td>
<td>51.8</td>
<td>.15 to .39</td>
</tr>
<tr>
<td>(c) Understand</td>
<td>10</td>
<td>1525</td>
<td>.23</td>
<td>.1811</td>
<td>.25</td>
<td>.1779</td>
<td>18.1</td>
<td>.03 to .48</td>
</tr>
<tr>
<td>(d) Management</td>
<td>18</td>
<td>2961</td>
<td>.19</td>
<td>.1639</td>
<td>.21</td>
<td>.1523</td>
<td>21.1</td>
<td>.01 to .40</td>
</tr>
</tbody>
</table>

*Note. K*, number of samples; *N*, total sample size of all studies meta-analyzed; *R-bar*, sample size weighted mean observed correlation; *SDr*, observed sample size weighted mean standard deviation; *ρ*, true or operational validity, computed by correcting observed mean for criterion unreliability; *SDρ*, standard deviation of true validity; % var *SE*, percentage of variance attributable to sampling error; 90% CI, 90% credibility interval computed as *ρ + 1.28(SDρ)* and as *ρ − 1.28(SDρ).*

<table>
<thead>
<tr>
<th>Meta-analysis</th>
<th>K</th>
<th>N</th>
<th>R-bar</th>
<th>SDr</th>
<th>ρ</th>
<th>SDρ</th>
<th>% var SE</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall EI</td>
<td>59</td>
<td>9522</td>
<td>.20</td>
<td>.1232</td>
<td>.23</td>
<td>.1016</td>
<td>37.7</td>
<td>.10 to .36</td>
</tr>
<tr>
<td>EQ-I total</td>
<td>13</td>
<td>3046</td>
<td>.18</td>
<td>.1121</td>
<td>.20</td>
<td>.0977</td>
<td>31.9</td>
<td>.08 to .33</td>
</tr>
<tr>
<td>(a) Intrapersonal</td>
<td>20</td>
<td>4548</td>
<td>.16</td>
<td>.1176</td>
<td>.17</td>
<td>.1077</td>
<td>30.4</td>
<td>.04 to .31</td>
</tr>
<tr>
<td>(b) Interpersonal</td>
<td>22</td>
<td>4684</td>
<td>.11</td>
<td>.0999</td>
<td>.12</td>
<td>.0803</td>
<td>46.3</td>
<td>.01 to .22</td>
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<tr>
<td>(c) Adaptability</td>
<td>20</td>
<td>4524</td>
<td>.17</td>
<td>.1086</td>
<td>.20</td>
<td>.0983</td>
<td>35.4</td>
<td>.07 to .32</td>
</tr>
<tr>
<td>(d) Stress Mgmt</td>
<td>9</td>
<td>2687</td>
<td>.13</td>
<td>.0930</td>
<td>.14</td>
<td>.0785</td>
<td>37.6</td>
<td>.04 to .24</td>
</tr>
<tr>
<td>(e) Gen. Mood</td>
<td>9</td>
<td>2687</td>
<td>.16</td>
<td>.0874</td>
<td>.17</td>
<td>.0685</td>
<td>41.9</td>
<td>.09 to .26</td>
</tr>
</tbody>
</table>

*Note. K*, number of samples; *N*, total sample size of all studies meta-analyzed; *R-bar*, sample size weighted mean observed correlation; *SDr*, observed sample size weighted mean standard deviation; *ρ*, true or operational validity, computed by correcting observed mean for criterion unreliability; *SDρ*, standard deviation of true validity; % var *SE*, percentage of variance attributable to sampling error; 90% CI, 90% credibility interval computed as *ρ + 1.28(SDρ)* and as *ρ − 1.28(SDρ).*
the four sub-dimensions and was the only dimension that had a validity lower than the total scale and undoubtedly lowered the overall validity. Management of emotions and understanding of emotions both had low credibility values (.01 and .03, respectively) so although all values are positive, caution should be exercised with these two dimensions.

The results for the five dimensions of EI postulated by Bar-On were more comparable. The lowest was for interpersonal and highest was for adaptability (.12 to .20). Again, all lower 90% credibility values were positive. Although it is understandable that adaptability had the highest predictive validity, it was surprising to find the interpersonal component with the lowest validity. Perhaps this unexpected finding was the result of confounding performance domains (academic and employment domains). It is possible that adaptability was predictive in all domains but interpersonal was highly valid in employment settings but had very low validity in academic domains. Even though this seems to be a possible confound, an examination of the standard deviation of the operational validities suggested that there was more variability in the meta-analysis of adaptability validities than in the interpersonal category. Overall, across Tables 3 and 4, we infer support for differential validity across the dimensions of EI.

Emotional intelligence can be assessed by either self-reports or with other ratings. Most of the validities included in our database were based on self-reports. Perhaps this reflects the fact that some aspects of EI are better known only to the individuals who are being assessed. However, we located three samples where someone else assessed the EI of the participants. Table 5 compares the validities between these two sources of EI scores and it indicates that other ratings had a mean operational validity slightly higher than that of self-reports (.24 vs .23, respectively). Moreover, there was more variability in self-reports but this observation should be balanced by the fact that self-reports were used in many more settings than other reports (58 vs 3, respectively) raising concerns about the generalizability of the results from the meta-analysis of other ratings.

Table 5 also presents the results for two methods of scoring self-reports. Self-reports can be scored by comparing the individual responses to the responses given...
by experts. Alternately, the self-responses can be compared to the consensus from that group. Results in Table 5 suggest that scoring self-reports based on expert ratings yielded a much higher validity than scoring based on consensus responses. However, this conclusion should be tempered by the realization that the majority of the self-reports did not clarify how the scoring was accomplished. We return to this point in our discussion.

Finally, we examined the criterion measurement method as another moderator of the predictive validities. We present in Table 6 the meta-analysis of the predictive validities of EI when the criterion is measured with: (1) organizational records, and (2) ratings. Of the studies that used ratings as the criterion measurement method, less than three used subordinate ratings. Therefore, in Table 6 we also present three additional meta-analyses: (1) supervisor or teacher ratings, (2) self-ratings and, (3) peer ratings.

The use of ratings criteria yielded a higher operational validity as compared to the use of organizational records (.26 and .14, respectively). These results are consistent with the validities found for several other predictors in an employment selection context (Guion, 1998). Supervisor and self-ratings had comparable validities (.25 and .27, respectively).

3.2. Construct validity

We located 19 independent samples that reported a correlation between EI scores and measures of GMA. The results of this meta-analysis are summarized in Table 7. Again, note that here we corrected for unreliability in both measures correlated. The estimated true score correlation was .22, but the standard deviation associated with this true score correlation was large (.1493).

Arguments have been made in the literature that the MEIS, an ability based test, is more related to intelligence than other measures. Whereas the model of Mayer and Salovey (1997) is referred to as a mental ability model, the other common models by
Bar-On (1997) and Goleman (1995) are best described as mixed models of EI. The difference in these models can be traced to the differing beliefs of what constitutes EI. The ability models of EI do not believe in the independence of EI and GMA. Instead, the ability models state that EI is best thought of as an intelligence in that it meets the three traditional criteria of an intelligence and the model focuses on emotions themselves and their interactions with thought (Mayer et al., 1999). In contrast, the mixed models of EI consider EI to be less related to GMA and also incorporates other constructs such as personality. To test this possibility we divided our 19 correlations into those that used the MEIS as compared to studies that use a different measure. The correlation between the MEIS scores and GMA was .33 whereas when EI was measured by a scale other than MEIS this correlation was .09. These results are also summarized in Table 7.

We next examined the incremental validity of EI over GMA. In order to assess this, we chose the validity value of .53 for GMA that has been provided by Schmidt and Hunter (1998). Although EI did demonstrate incremental validity over GMA, the increase is minimal at .02. However, when switched around, the incremental validity of GMA over EI is substantial at .31.

Finally, to assess the nomological net of EI we also investigated the correlation between EI scores and the Big Five factors of personality. To estimate the true score correlations reported in Table 8, unreliability in both the EI scores and personality

### Table 7

<table>
<thead>
<tr>
<th>Meta-analysis</th>
<th>K</th>
<th>N</th>
<th>R-bar</th>
<th>SD_r</th>
<th>q</th>
<th>SD_q</th>
<th>% var</th>
<th>SE</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Abil.</td>
<td>19</td>
<td>4158</td>
<td>.15</td>
<td>.1278</td>
<td>.22</td>
<td>.1493</td>
<td>26.8</td>
<td>.03</td>
<td>.01 to .41</td>
</tr>
<tr>
<td>MEIS &amp; GMA</td>
<td>9</td>
<td>2196</td>
<td>.23</td>
<td>.0954</td>
<td>.33</td>
<td>.0932</td>
<td>40.4</td>
<td>.21</td>
<td>.17 to .45</td>
</tr>
<tr>
<td>Others &amp; GMA</td>
<td>10</td>
<td>1962</td>
<td>.06</td>
<td>.1019</td>
<td>.09</td>
<td>.1039</td>
<td>49.0</td>
<td>.04</td>
<td>.01 to .22</td>
</tr>
</tbody>
</table>

*Note. K, number of samples; N, total sample size of all studies meta-analyzed; R-bar, sample size weighted mean observed correlation; SD_r, observed sample size weighted mean standard deviation; q, true score correlation, computed by correcting observed mean for predictor and criterion unreliability; SD_q, standard deviation of true score correlation; % var, percentage of variance attributable to sampling error; 90% CI, 90% credibility interval computed as q + 1.28(SD_q) and as q − 1.28(SD_q).*

### Table 8

<table>
<thead>
<tr>
<th>Meta-analysis</th>
<th>K</th>
<th>N</th>
<th>R-bar</th>
<th>SD_r</th>
<th>q</th>
<th>SD_q</th>
<th>% var</th>
<th>SE</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreeableness</td>
<td>14</td>
<td>3306</td>
<td>.19</td>
<td>.1297</td>
<td>.23</td>
<td>.1345</td>
<td>23.6</td>
<td>.06</td>
<td>.01 to .40</td>
</tr>
<tr>
<td>Conscientious</td>
<td>16</td>
<td>3414</td>
<td>.25</td>
<td>.1089</td>
<td>.31</td>
<td>.1056</td>
<td>35.1</td>
<td>.17</td>
<td>.14 to .45</td>
</tr>
<tr>
<td>Emot. stability</td>
<td>23</td>
<td>4213</td>
<td>.27</td>
<td>.1758</td>
<td>.33</td>
<td>.1943</td>
<td>15.2</td>
<td>.08</td>
<td>.05 to .58</td>
</tr>
<tr>
<td>Extraversion</td>
<td>19</td>
<td>3718</td>
<td>.28</td>
<td>.1466</td>
<td>.34</td>
<td>.1574</td>
<td>20.4</td>
<td>.14</td>
<td>.13 to .54</td>
</tr>
<tr>
<td>Openness</td>
<td>14</td>
<td>3306</td>
<td>.19</td>
<td>.1179</td>
<td>.23</td>
<td>.1188</td>
<td>28.6</td>
<td>.08</td>
<td>.05 to .38</td>
</tr>
</tbody>
</table>

*Note. K, number of samples; N, total sample size of all studies meta-analyzed; R-bar, sample size weighted mean observed correlation; SD_r, observed sample size weighted mean standard deviation; q, true score correlation, computed by correcting observed mean for predictor and criterion unreliability; SD_q, standard deviation of true score correlation; % var, percentage of variance attributable to sampling error; 90% CI, 90% credibility interval computed as q + 1.28(SD_q) and as q − 1.28(SD_q).*
scores were disattenuated. The highest correlate of EI was extraversion (.34) followed closely by emotional stability (.33) and conscientiousness (.31); both agreeableness and openness to experience also had significant correlations with EI scores.

Similar to our evaluation of the utility of EI over GMA, we also evaluated the incremental validity of EI over the Big Five using the values provided by Barrick and Mount (1991). Results suggest that EI adds substantial validity over the Big Five. The incremental validity values ranged from a low of .06 for conscientiousness to a high of .29 for openness to experience. The other incremental validities were .14, .17, and .18 for extraversion, emotional stability and agreeableness, respectively. When we investigated whether personality variables add incremental validity to EI measures, only two of the Big Five demonstrate incremental validity over EI. Further, it was a minor increase of .05 for conscientiousness and .02 for openness to experience.

4. Discussion

Results of the current meta-analysis demonstrate that emotional intelligence is a construct that is definitely worthy of future research and indicates that EI should indeed be considered a valuable predictor of performance. Although the correlation between EI and performance ($\rho = .23$) is not as high as many have claimed or would like, it is considerably higher than other selection methods (e.g., letters of reference) that are commonly used. The overall predictive validity of EI appears to hold fairly constant across all performance domains. The correlations ranged from a high of $\rho = .24$ for work performance and the group classified as other outcome variables to .10 for academic performance. The current findings should therefore generalize to many different outcomes. Additionally, since the meta-analysis drew from a representative sample consisting of many different countries and occupations, the results should also generalize across populations.

Our results also indicate that emotional intelligence and personality appear to be more highly correlated than many researchers would prefer. Indeed, three of the Big Five factors of personality had correlations with EI in excess of .31; the lowest correlation was .23 with agreeableness and openness to experience. This suggests that the distinctiveness of EI and personality may not be as clear-cut as it needs to be. Future measures will have to address this issue, and construct measures of EI that are not as highly correlated with personality. However, EI did show incremental validity over the Big Five; the Big Five did not demonstrate incremental validity over EI. Thus, it is possible that EI could be considered a better predictor of performance than the Big Five factors of personality. In light of this finding, more research now needs to address potential group differences in EI in order to ascertain that no adverse impact exists.

The relationship between EI and GMA is considerably stronger when looking at only the ability based MEIS in comparison to the other models that do not suggest a relationship between EI and GMA. Since the correlation (.33) of the ability based MEIS with GMA is so much higher than the other measures (.09), it is likely that
two different constructs are in fact actually being measured. Finally, unlike with personality, EI did not evidence incremental validity over GMA. However, GMA did significantly predict performance beyond that explained by EI. Thus, the claims that EI can be a more important predictor than cognitive ability (e.g., Goleman, 1995) are apparently more rhetoric than fact.

The issue of emotional intelligence is relatively new, but the concept of emotions at work has been around for sometime now. Unfortunately, emotions and work has been an understudied area. This is a mistake as emotions are common at work and it would be futile to continue to ignore the role of emotions in the workforce (Arvey et al., 1998). However, of all the work on emotions and work, the research on EI is possibly the one with the most dual interest to academics and practitioners alike and the number of studies, conferences, and publications on this topic is increasing at a rapid pace (Ashkanasy & Daus, 2002). Knowledge of emotions or EI can only help in providing us with a better understanding of workplace performance. Thus, our meta-analysis comes at a critical time and it provides information that will enable researchers to further develop the field of EI. More specifically, researchers need to more laboriously examine the influence of EI at work. This will involve more tests of its predictive validity, tests on how EI can be taught and learned, and how EI affects the worker at an individual, team, and organizational level.

Further, although our meta-analytic results suggest robust predictive validity for EI measures for assessing performance in employment settings, researchers have focused on a narrow set of criterion variables. Hypotheses have been postulated that effective emotional regulation will reduce the potential for burnout (cf. Grandey, 2000). If so, emotional intelligence should be a predictor of burnout, and perhaps may even function as moderator in that individuals high on EI may be better able to buffer the effects of burnout.

The role of emotions in the workplace was probably first underscored by Hochschild (1983) who studied the effects of emotional labor in service industries. The growth of the service industry in the recent decades enhances the role of emotional intelligence in the workplace (Rafaeli, 1989; Rafaeli & Sutton, 1987). Demonstrating that EI measures predict job performance is only the first step and should spur researchers to investigate how job characteristics moderate the display and deciphering of emotions. Also, the changing nature of the workplace (Howard, 1995) has a dual effect on the importance of emotional intelligence in the workplace. On one hand, telecommuting and other technological advances minimize human interaction and thereby reduce the importance of EI. Alternately, the same technological advances make the perception, understanding, assimilation and management of emotions in the self and others more critical for success; what is true of the workplace is true of the society at large.

In a time of frequent downsizing and continuous restructuring, emotions are a critical component of success. The emotionally intelligent worker is more likely to succeed in such a work environment. Additionally, with the increasingly diverse workplace demographics, EI can increasingly benefit a worker. Beyond helping the worker as an individual, EI should also help the work team as a whole. The emotionally intelligent person is more likely to empathize with others and find ways to
work together productively. This provides a number of other implications for individuals and organizations. First, if EI is truly a valuable predictor of performance, it would be wise for individuals to better understand their own, and others, emotions. Similarly, organizations could realize significant cost savings and profit improvements if EI could be improved. Accordingly, future research should address the extent to which EI can be improved over time through training and, possibly, introspection. This should be of interest to individuals such as career counselors who are constantly exploring new ways of raising individual performance. Career development has gained a prominent role in organizations given the rapid changes taking place in organizations and EI is likely to be an important construct in career development initiatives. However, considering our results, any potential development of EI may depend on which model of EI is used. In other words, the ability models, which are related to GMA, may indicate that more development can occur than the mixed models of EI. Expatriate workers are another group who may need to possess elevated levels of EI in order to be successful. The expatriate worker faces an entirely different set of circumstances and if the person is in touch with their own, and others, feelings they are going to have a better transition and be more successful.

It could be argued that the current meta-analysis drew extensively from studies that were not published in top tier journals. While this may be true, the quality of many of the studies, such as the dissertations, should not be understated (Ones, 1993). Additionally, the inclusion of unpublished studies may result in a more accurate measure of the true validity of a predictor. Published studies may tend to overly inflate the true correlation as only significant results are typically published thereby omitting relevant studies that should not be overlooked in a quality meta-analysis (i.e., the file drawer problem). Our results may then present a more accurate representation of the true validity of EI since less upward bias should exist given that all available studies on EI were included.

An additional concern could address the issue of correcting for reliability using reliability values that were listed in the original measure and not in the study of interest; this correction was only made if multiple studies were placed within one document (e.g., technical manual). However, a similar issue has already been raised and acknowledged previously. It was recommended that correcting for unreliability using estimates from a study other than the current one is better than the additional bias that would result from not using any estimates (Viswesvaran, 2002). Further, the subgroup hypotheses tested were in some instances omnibus in nature in that we did not specify the direction of the expected differences. However, our exploratory analyses are informative in summarizing the extant literature and, along with other directional hypotheses, guide our understanding of this new and important construct. Future research should explore our subgroups more thoroughly and investigate the effects of correlated moderators in a fully hierarchical moderator analysis once more studies have been completed (Hunter & Schmidt, 1990). Finally, whereas Q-statistics and confidence intervals can be used to test the statistical significance of different subgroups, we chose to be liberal in our estimation of subgroup effects in this paper. Thus, we discuss correlational differences even when they are not statistically significant because we believe that one meta-analysis (however great) is not
definitive enough to rule out areas of potential research. Interested readers can use the information provided in our Tables to draw stronger conclusions based on professional knowledge and risk-taking proclivities. Our objective was to summarize the scattered extant literature in one place and draw inferences that are justified in our professional judgment (not necessarily based on statistical significance). Finally, there may be some researchers who would question our use of the Big Five personality factors when assessing incremental validity. It could be argued that this takes too narrow a view of personality and that the values of Barrick and Mount (1991) are not the most accurate. However, Barrick and Mount are the most highly cited personality article in the last decade and so we considered their values to be a good starting point.

One weakness with the existing EI research can be traced to the classification, measurement, and validation of the sub-dimensions that are used. The current measures typically use either the 4- or 5-dimension model but continued research is needed to explore which dimensions are actually necessary. Because the two different models are derived from a different conceptual framework, we are not recommending that one model needs to be discarded at this point. Instead, it is recommended that the dimensions continue to undergo refinement. Additionally, since the four-dimension model is proposed as a hierarchy, longitudinal research is needed to address the issue. This may not be an easy task, but it is undoubtedly a necessary step that needs to be taken in the refinement effort. To the extent that the four dimensions of emotional intelligence can be causally (or at least temporally) ordered, one can expect differential relationships between the dimensions and performance (i.e., dimensions that are more temporally antecedent to performance are expected to have stronger relationship). However, to the extent progressive range restriction occurs the results would be opposite. Our subgroup analyses were designed to explore the competing possibilities. The results of this study, for instance, indicate a weak relationship between the perception of emotion dimension and performance. Longitudinal research will allow for a closer examination of this and it may indicate that certain dimensions could be eliminated or combined.

The results of the meta-analyses reported here also have implications for refining the construct of EI and for constructing new measures. For instance, no research to date has evaluated the extent that measures of EI assess typical or maximal performance. It still needs to be determined if measures of EI gauge what a person can do or what they will do. In other words, are these measures assessing how people perceive, interpret, and understand emotions during the course of everyday life or only when they are thinking deeply about their emotions (such as when they take the measure)? Future research should also address the possibility of faking these measures. More importantly, many of the measures of EI developed so far have not clearly articulated the theoretical framework guiding their item construction nor have the strategies used for item selection, for inclusion in the final measure, been clearly delineated. For example, emotions have been conceptualized as cognitive interpretations, physiological processes, and social constructions. It needs to be shown that the existing measures of EI are applicable for all the different conceptualizations of emotions. Further, researchers have debated the dimensionality of emotions as
comprised of either two or three dimensions—valence, arousal, and potency (Russell, 1991). This raises questions such as: (1) When we assess emotional intelligence what dimension is focused on? (2) Are the different measures of EI tapping into the same dimension of emotion?

Furthermore, when we talk of dimensions of EI such as perception, understanding, assimilation, management of emotions, are these dimensions of EI the same for all types of emotions (e.g., shame, guilt, etc.)? Psychologists have spent many decades studying each of these emotions separately, and it would be a noteworthy conclusion if the same intelligence processes underlie these different literatures. Although most of the literature is on negative emotions, recently there has been an emphasis on positive psychology (Seligman, 1990). The construction of new measures, and the refinement of existing ones, will be greatly facilitated by such an integrative framework. On a related note, one could also inquire as to whether the measures are domain-specific or more generalizable. Our subgroup analyses across academic, employment and life outcomes suggest that the assessment of emotional intelligence is indeed applicable in different domains.

One of the subgroups analyzed in this paper found that scoring self-reports with expert ratings resulted in higher predictive validities than scoring using group consensus ratings. Perhaps experts were able to decipher the content of the items more accurately than the group. However, the meaning and appropriate inferences of emotions have evolved over time (Mastenbroek, 2000). Thus, there is potential for cultural differences in perception and management of emotions. Unless expert ratings are based on a representative sample of experts from all different cultures assessed, the superiority of expert ratings over consensus ratings for scoring self-reports may not be generalizable to new settings.

The current meta-analysis is an important addition to the field of EI research for a number of reasons. First, as mentioned, in addition to using published research, the current meta-analysis also combined the results of many EI studies (e.g., theses, technical reports) that are often difficult to find and obtain. Second, the results of the meta-analyses presented here not only provides the relationship between EI and performance, it also tests many subgroups that could act as potential moderators. An examination of these coefficients and results will be beneficial, and can act as a guide, for future EI research and refinement efforts. Additionally, the current results indicate that approximately 4% of the variance in performance can be explained by EI; for work performance this figure is closer to 5%. This may not seem like a significant percentage, nor is it in line with claims of some EI researchers who have posited that EI may be more important than IQ, but it is large enough to generate significant savings and improvements for organizations that use measures of EI. Finally, we also summarized the correlation between measures of EI and other constructs such as GMA and the Big Five factors of personality. Oftentimes, it is difficult to estimate the intercorrelations across different variables, which hinder the development of a nomological net, and to address questions of incremental validity (Bobko, Roth, & Potosky, 1999; Cortina, Goldstein, Payne, Davison, & Gilliland, 2000; Schmitt, Rogers, Chan, Sheppard, & Jennings, 1997).
In summary, the current meta-analysis has provided a more accurate estimate of the predictive power of EI than was previously available. Additionally, construct validity in terms of correlations with GMA and the Big Five factors of personality was summarized. Future research should build on these findings to develop more refined measures of the construct as well as investigating the full potential of the EI concept.

References


*Indicates studies included in meta-analyses.