

# The Science of Emotional Intelligence

## Current Consensus and Controversies

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**Abstract.** Almost from its inception, the emotional intelligence (EI) construct has been an elusive one. After nearly 2 decades of research, there still appears to be little consensus over how EI should be conceptualized or assessed and the efficacy of practical applications in real life settings. This paper aims at providing a snapshot of the state-of-the-art in research involving this newly minted construct. Specifically, in separate sections of this article, we set out to distinguish what is known from what is unknown in relation to three paramount concerns of EI research, i.e., conceptualization, assessment, and applications. In each section, we start by discussing assertions that may be made with some degree of confidence, elucidating what are essentially sources of consensus concerning EI. We move then to discuss sources of controversy; those things for which there is less agreement among EI researchers. We hope that this “straight talk” about the current status of EI research will provide a platform for new research in both basic and applied domains.

**Keywords:** emotional intelligence, emotions, intelligence, emotional competencies, consensus and controversy

Over the past 17 years or so, emotional intelligence (EI) has emerged as one of the most visible and high-profile constructs in individual differences research (Matthews, Zeidner, & Roberts, 2002, 2007). Broadly defined, EI represents a set of competencies for identifying, processing, and managing emotion. Research into EI has prospered, in part, because of the increasing importance of intelligence for people in modern society. It has also been claimed that EI predicts clinical, educational, and occupational criteria above and beyond that predicted by general intelligence. However, despite a high level of public and scientific interest, the science of EI is in its early years, with many issues still being debated and cardinal questions remaining unanswered.

As the field matures, it has become increasingly commonplace for academic psychologists to reject early, overstated claims made in popular works about the importance of emotional intelligence. Goleman (1995), for example, claimed EI may be as important as IQ in determining life success (see also e.g., Cooper & Sawaf, 1997). Such claims have mainly been disconfirmed by the decade of rigorous empirical research that has followed. Decisively, Van Rooy and Viswesvaran's (2004) meta-analysis showed that, after correcting for statistical artifacts, the average correlation between EI and work performance was modest (i.e., around 0.24).

Notwithstanding, research on EI goes back to entirely respectable and sober research on social abilities and competencies pursued by a line of distinguished intelligence researchers (Landy, 2006). Contemporary researchers have also made a persuasive case that EI measures add something new to conventional understanding of human individual differences (e.g., Mayer, Salovey, & Caruso, 2000a,b).

There are now several hundred peer-reviewed journal articles that deal with key issues, including models of EI, assessment of EI, personality and cognitive ability correlates of EI, validation of tests of EI against measures of social functioning and adaptation, and applications in real life settings (especially work, education, and clinical practice). Although work on EI is open to various criticisms (e.g., Matthews et al., 2002), the field may still possess a sufficient groundswell of scientific support to constitute a legitimate branch of psychological science.

This paper aims at providing a snapshot of the state-of-the-art in this newly minted construct. Specifically, in separate sections of this article, we set out to distinguish what is known from what is unknown in relation to three paramount concerns of EI research, i.e., conceptualization, assessment, and applications. In each section, we start by discussing assertions that may be made with some degree of confidence, elucidating what are essentially sources of consensus concerning EI. We move then to discuss sources of controversy; those things for which there is less agreement among EI researchers. We hope that this “straight talk” about the current status of EI research will help the reader disentangle rhetoric from reality and fiction from fact in contemporary EI research.

## Conceptualization of Emotional Intelligence

Despite nearly 2 decades of research, there appears little consensus over how EI should be defined and conceptual-

Table 1. Multiple conceptualizations of emotional intelligence

Construct	Possible current measure	Equivalent in IQ research	Key processes	Adaptive significance	Developmental influences
Temperament	Scales for Big Five EQ-i (Bar-On, 1997)	None	Neural and cognitive processes controlling arousal, attention and reinforcement sensitivity	Mixed: most temperamental factors confer a mixture of costs and benefits	Genetics and early learning
Information processing	JACBART, Emotional Stroop, RAFL	Choice RT, inspection time, working memory	Specific processing modules	Uncertain: Is speed of processing necessarily adaptive?	Genetics and early learning
Emotional self-regulation	Selected scales from questionnaires for EI (e.g., SSRI, TEIQue)	Self-assessed intelligence	Monitoring and regulation of internal states; self-efficacy in such processes	Predominantly but not exclusively positive: presumed similar to self-esteem	Learning and socialization: e.g., mastery experiences, modeling, direct reinforcement (in emotive contexts)
Emotional knowledge and skills	MSCEIT	Gc and/or Gk	Multiple acquired procedural and declarative skills	Adaptive within context for learning: may be irrelevant or counter-productive in other contexts	Learning, socialization and training of specific skills and knowledge

ized (Matthews et al., 2002; Matthews, Roberts, & Zeidner, 2004; Roberts, Schulze, Zeidner, & Matthews, 2005). Thus, it is presently unclear whether EI is cognitive or non-cognitive; whether it refers to explicit or implicit knowledge of emotion; and whether it refers to a basic aptitude or to some adaptation to a specific social and cultural milieu (Zeidner, Matthews, & Roberts, 2001). Arguably, one of the primary initial tasks in any scientific endeavor is systematic mapping of the major components and facets in the universe of discourse under consideration (Kerlinger, 1973). However, it is difficult to obtain a satisfactory justification or definitional framework for the construct of EI. In fact, most researchers would likely agree that popular definitions are too over-inclusive to be useful. Defining EI as a "laundry list" of virtually every positive quality of character *except* for cognitive intelligence, also accomplishes little (cf. Goleman, 1995).

Although research definitions are not immune to over-inclusiveness, the majority of attempts to operationalize EI have tried to start from some conceptual analysis of the construct. The four-branch model of Mayer et al. (2000a) is the best-known and most influential conceptualization of this kind. It has inspired not just the ability tests for which Mayer et al. (2000b) are renowned, but questionnaire measures as well (see e.g., Schutte et al., 1998). Mayer et al. (2000b) divide ability models, which view EI as a standard intelligence, from mixed models that define EI more broadly as a package of personal qualities including both abilities and personality traits that facilitate expression of EI. A further conceptualization, "trait EI" (Petrides & Furnham, 2003), embeds EI exclusively within the personality domain, and, thus, separates EI rather sharply from abilities – as normally defined. It is certainly legitimate to study stable perceptions of emotional functioning as an aspect of

personality, but the label "trait EI" may be misleading, given its connotations of ability (O'Sullivan, 2007). Next, we discuss some sources of consensus, followed by sources of controversy, in conceptualizing the EI construct.

## Conceptualization: Sources of Consensus

*Emotional intelligence is a multifaceted construct that may best be studied from multiple perspectives.* A variety of different conceptions and definitions of EI have been proposed, each leading to different operational measures of the construct. The various psychometrically adequate scales for EI appear to be measuring several different constructs. This assertion is supported most clearly by the weakness of correlations between objective tests and questionnaires based on self-report (Brackett, Mayer, & Warner, 2004; Warwick & Nettelbeck, 2004), but other instances may be found. For example, Austin (2005) studied chronometric (i.e., time-based) measures that, by analogy with cognitive research, should correlate with scores on EI tests. Although a distinct emotional-information processing factor was identified, it failed to correlate significantly with overall EI scores from two leading assessments.

There is probably a consensus that "trait" EI may be studied separately from ability-based EI (e.g., Petrides & Furnham, 2003). However, it remains unclear if there is a single over-arching general "trait" EI dimension, or if the various questionnaires may be picking up multiple, largely independent traits. Some questionnaires do exhibit a strong general factor (e.g., Bar-On, 2004; Petrides & Furnham, 2003), whereas others do not. Tett, Fox, and Wang (2005) extracted three independent factors from their questionnaire, which they labeled as self-orientation, other-orienta-

tion, and emotional-sharing. As they point out, the first two factors correspond to Gardner's (1983) intra- and inter-personal intelligences, conceived as separate personal intelligences. By contrast, the Mayer et al. (2000a,b) model does not sharply separate emotion regulation in self and others. Thus, although it is agreed that EI may encompass multiple domains (e.g., Austin & Saklofske, 2005), it remains unclear how many separate domains should be discriminated, and whether general factors may be identified within each domain. Elsewhere (Matthews, Zeidner, & Roberts, 2006), we have tentatively distinguished at least four, largely separate domains, as shown in Table 1.

*Emotional intelligence overlaps with other psychological constructs.* A major issue is how EI should be aligned with other dimensions of ability and personality. The degree of overlap of EI with other constructs appears to be measure-dependent, with multiple EI constructs appearing to relate differently to other factors. For example, objective measures of EI such as the Multifactor Emotional Intelligence Scale (MEIS) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), in keeping with an "ability model," correlate between 0.30 and 0.40 with general intelligence, and rather less with personality traits (e.g., Roberts, Zeidner, & Matthews, 2001). Perhaps one might envisage including an EI ability factor inside the multistratum model for ability advanced by Carroll (1993).

By contrast, questionnaire measures for EI overlap with standard personality traits to a degree that is often excessive. The most egregious example is Bar-On's (2004) Emotional Quotient Inventory (EQ-i), which correlates around 0.80 with low trait anxiety and general psychopathology (e.g., Bar-On, 1997; Newsome, Day, & Catano, 2000). Most of its reliable variance may be attributed to the Five-Factor model (FFM) of personality (Dawda & Hart, 2000; Matthews et al., 2002). Similarly, Petrides and Furnham (2003) reported that their trait EI questionnaire correlated at  $-0.70$  with neuroticism and  $0.68$  with extraversion. Other questionnaires appear to possess more unique variance, but still show substantial intercorrelation with personality (see Matthews et al., 2002, 2004), raising the thus-far unanswered question of how personality and EI traits should be interrelated within a common structural model.

*Individual emotional intelligence constructs relate meaningfully to various external criteria.* There is a growing body of evidence showing that various scales for EI correlate robustly with a variety of outcomes that plausibly signal social-emotional success (Day, 2004). Both MSCEIT subscales and various questionnaires purportedly assessing EI correlate with measures of well-being and social engagement (e.g., Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006; Lopes, Salovey, & Straus, 2003; Saklofske, Austin, & Minski, 2003). Validity coefficients tend to be higher for questionnaires, but, in this case, they are amplified by confounding with personality traits linked to social

adjustment, such as extraversion. Given the overlap with personality and ability already noted, a critical issue is whether tests for EI show incremental predictive validity with key factors, including general intelligence and the Big Five personality factors, statistically controlled. Evidence for incremental validity is, however, clearly mixed. Several studies fail to show that scales for EI predict important criteria (e.g., academic success) with other traits controlled (Barchard, 2003), while still other studies demonstrate the obverse (e.g., Ciarrochi, Chan, & Caputi, 2000; Saklofske et al., 2003).

*Emotional intelligence relates to exceptionality in theoretically meaningful, and practically important, ways.* A common tactic for gathering validity evidence for ability and personality measures is to show that they discriminate groups that are exceptional in terms of, for example, their intellectual capabilities, pathology, or social maladjustment. Support for the validity of EI may be found from similar sources. Case studies of emotionally gifted individuals provide some informal but persuasive evidence (Oatley, 2004). Quantitative differences in EI scores have been shown for groups such as therapists, psychiatric patients, and prisoners (e.g., Bar-On, 2004; Schutte et al., 1988). These studies have typically, however, neglected the possible confounding influences of personality and ability. The association between EI and (lack of) alexithymia has been important in establishing the clinical relevance of the construct (Parker, Taylor, & Bagby, 2001). However, for each exceptional group, findings may vary with the measure of EI employed. For example, Zeidner, Shani-Zinovich, Matthews, and Roberts (2005) showed that intellectually gifted children obtained elevated scores on the MSCEIT, but were lower in self-reported EI, demonstrating a failure of convergence.

*Emotional intelligence follows a well-defined developmental trajectory.* There is an extensive literature on social-emotional development in children that predates work on EI (e.g., Denham, 1998). There appears to be a fairly well-defined sequence of markers of emotional development, beginning with the simple expressive and regulatory behaviors of the infant, and culminating in active, insightful self-regulation sensitive to the social and cultural environment (Saarni, 2000). We have proposed that emotional competencies may be attached to the following three aspects of the developmental sequence: (1) basic temperaments shaped by innate biological attributes; (2) social learning of rule-based adaptive behaviors (e.g., emotion display rules); and (3) development of self-reflective insight (Zeidner, Matthews, Roberts, & MacCann, 2003).

There are empirical literatures focusing on such key issues as the nature of temperament (Rothbart & Bates, 1998), the shaping of emotional competencies by parent-child interaction (Eisenberg, Fabes, & Loyosa, 1997), and the role of language in shaping emotional awareness in old-

er children (Shipman & Zeaman, 1999). The work of Izard (e.g., 2001) on emotional adaptiveness provides a clear and convincing link between the developmental literature and emotional intelligence.

## Conceptualization: Sources of Controversy

*Are researchers who investigate emotional intelligence on the right track or following blind alleys?* Various commentators have questioned the value of focusing on resolving the conceptual status of EI. Brody (2004), for example, challenges the psychometric status and predictive validity of ability tests of EI. By contrast, Landy (2005) claims that much of the applied work fails to meet elementary scientific standards, such as availability of data to other researchers. Even if it is accepted that empirical studies are rigorous, the suspicion may be that the phenomena observed (e.g., rating one's response to vignettes of doubtful personal relevance) lack ecological validity and are of little relevance to real-life emotional functioning.

*Is there evidence for multiple emotional "intelligences" and do they share any common element(s)?* We have already indicated that there seems to be little overlap between ability-based performance measures of EI and self-report measures. However, even if we transfer questionnaire measures to the personality domain, as trait EI, significant difficulties remain. As we have pointed out in previous critiques (e.g., Matthews et al., 2002, 2004; Roberts et al., 2005), there are a variety of distinct ways of conceptualizing EI as a construct open to objective measurement. These include as explicit emotional knowledge (as featured in the MSCEIT), as implicit emotional knowledge and procedural skills, as an "ecological" construct related to person-environment fit in specific social contexts, as components of information-processing measured chronometrically (Austin, 2005), and other perspectives (see Table 1). It is unknown whether constructs measured within each domain correlate positively with one another; certainly a future research topic that might profitably be explored. A possible basis for EI in implicit knowledge or processing has been especially neglected, despite recent interest in implicit features of personality and unconscious priming processes.

There are additional reasons from emotion theory to question whether an overarching EI construct is expected to generalize across different domains and measurement methods. One feature of many emotions theories (e.g., Oatley & Johnson-Laird, 1995) is that there are multiple basic emotions supported by distinct neurological and cognitive systems. For example, anxiety and anger, respectively, are supported by different fear and rage neurobiological subsystems (Panksepp, 1998). Thus, it is not self-evident that individual differences in the functioning of, say, the fear system, which is localized in structures including the amygdala, will relate to individual differences in other systems, such as anger, or disgust. It could reasonably be ar-

gued that EI relates not to individual emotions but to a super-ordinate emotion-regulation system located anatomically in the frontal lobes (cf., Rolls, 1999). However, in our view, EI researchers have done too little to separate emotion from meta-emotional regulation, which may be supported by different brain systems. Also surprising is the paucity of research evaluating whether individual differences in regulation generalize across the basic emotions. Clearly, these are important research questions that would advance the field if addressed with rigorously designed studies.

*What are the most appropriate criteria for evaluating the importance of emotional intelligence?* Another fundamental difficulty confronting researchers is deciding what independent criteria for social-emotional competence should be predicted by EI measures (Matthews et al., 2002). Exacerbating this problem, most research uses self-report scales to assess both the predictors and criteria, with criterion contamination, thus, coming into play. For example, questionnaires for EI include items that refer to positive mood, optimism, and confidence; the very same criteria that many researchers wish to predict. Indeed, too little research has used objective behavioral criteria, though in the few isolated instances where this information has been collected, evidence tends to be mixed. For example, the MSCEIT fails to predict attentional and working memory performance under stress (Matthews, Emo, Funke et al., 2006). EI questionnaires also fail to predict learning to use emotional information in a multi-cue discrimination task (Fellner, Perez, Emo, & Matthews, 2006). By contrast, studies have linked questionnaire measures to cortisol secretion (Salovey, Stroud, Woolery, & Epel, 2002) and speed of facial processing (Petrides & Furnham, 2003).

*What should the status of ethical and moral behavior be in emotional intelligence models?* Another issue is the extent to which ethical and moral behavior should be part and parcel of the EI construct. Equally important is whether it should be differentiated from character and ethical behavior, and from conformity to social norms. The selfish, Machiavellian individual may possess EI in the sense of perceiving other's emotional weaknesses and then proceeding to manipulate them. At the extreme, individuals with anti-social personality disorder may possess social skills that allow them to exploit others (Harpur, Hart, & Hare, 2002), despite deficiencies in other areas of emotional functioning. As recently noted by Waterhouse (2006, p. 253): "nothing in any EI construct precludes someone with high EI from being an immoral person."

There is also a tension between EI in the sense of fitting in with the social expectations of others and consensus norms and EI in the sense of making insightful autonomous decisions about the value of social norms. Some Germans opposed the Nazis and were executed as a consequence. Certainly, these people were ethical and even heroic; but were they emotionally intelligent?

*What are the dynamic processes underlying emotional intelligence?* It is perhaps ironic that much EI research revisits one of the less attractive aspects of intelligence research. This a tendency to present ability as a static set of constructs, while ignoring the processes that support intelligent interaction with the external environment (cf. Corno et al., 2002). Describing EI as a list of desirable qualities, unrelated to any independent psychological theory, is the most obvious example of this problem. More subtly, research on EI frequently ignores the person-situation interaction that has become fundamental to personality research (Magnusson, 1976). The basic point is that the expression of EI may vary – perhaps radically – depending on the surrounding environment. Individual differences in EI may be more apparent in some contexts than in others, and EI may be adaptive in some settings but harmful in others (Ciarrochi, Dean, & Anderson, 2002; Petrides & Furnham, 2003).

Borrowing from Caspi and Bem's (1990) account of person-situation interaction, we can identify at least three forms of interaction, related to the above, that remain almost entirely unexplored. How do high EI persons filter and interpret the social world around them (reactive interaction)? What kinds of behaviors does the high EI person provoke in others (evocative interaction)? Perhaps (consciously or unconsciously), the high EI person elicits more cooperation and support from other people, whereas the low EI person rubs them the wrong way. How does EI relate to choosing and shaping social environments (proactive interaction)? For example, low EI may be associated not just with a liking for harmful drugs (Trinidad, Unger, Chou, Azen, & Johnson, 2004), but also for picking friends that are a bad influence.

*Is emotional intelligence related to adaptation?* Calling EI an ability signals that it refers to individual differences in adaptation. Within this perspective, the high EI person is, in some sense, better adapted to social-emotional functioning than the person of lower EI. This assumption needs empirical support, especially as self-reports of competence are sometimes viewed as circumspect (see Dunning, Heath, & Suls, 2004). The vision of the pioneers of tests for EI appears to have been that high EI is unequivocally adaptive (e.g., Mayer, Caruso, & Salovey, 1999). To enjoy high EI is to enjoy a variety of benefits, including life satisfaction, emotional connections with others, and occupational success. As we have previously shown, researchers differ sharply in their assessments of whether these predictions have been confirmed (e.g., Brody, 2004; Day, 2004; Mayer, Salovey, & Caruso, 2004). Furthermore, there appears to be a "dark side" of EI (or some of its specific operationalizations), including over-confidence, narcissism, Machiavellian social manipulation, and inflated self-esteem (Zeidner, Roberts, & Matthews, in press).

## Assessment of Emotional Intelligence

The case that reliable and valid assessment of EI is central to building a science of EI is straightforward to make (Matthews et al., 2002), and is generally accepted by researchers (cf. however, Oatley, 2004). As noted above, approaches to measurement of the EI construct have generally been understood within Mayer et al.'s (2000b) distinction between ability and mixed models of the construct. Indeed, reviews of the various measures of EI (e.g., McCann, Matthews, Zeidner, & Roberts, 2003) have generally been structured around this distinction. The ability model suggests that EI may be assessed by objective tests, whereas mixed models have inspired self-report approaches. Mayer et al. (2000b) introduce the possibility of measuring abilities by self-report, but we are not aware of any questionnaires for EI that demonstrably measures abilities rather than personality-like traits.

Several developments suggest that it may be time to move on from the dichotomy between mixed and ability models of EI (Mayer et al., 2000b) at least in some respects. First, some questionnaire researchers (e.g., Petrides & Furnham, 2003) claim that self-report inventories belong to the domain of personality (trait EI) and do not measure abilities, even of the "mixed" kind. Second, questions remain about whether Mayer et al.'s (e.g., 2000a,b) tests measure abilities akin to those assessed by conventional intelligence tests (Brody, 2004; Matthews et al., 2002). Some fresh thinking on how to measure social-emotional abilities or competencies may be required. Third, conceptual analyses of the kind discussed in the previous section imply that the current range of tests for EI may not adequately sample the full range of constructs that may be labeled as "EI"; again, new assessment methods may be needed. Thus, a review of assessment methods needs not only to evaluate extant tests against standard psychometric criteria, but to examine the fundamental principles being used to sample the domain of emotional competence as a basis for test development. Next, we take up these issues in more depth by reviewing sources of consensus and controversy in the assessment of emotional intelligence.

## Assessment: Sources of Consensus

The discipline of psychometrics provides relatively uncontroversial principles for determining what constitutes sound assessment practices. Indeed, almost all major organizations concerned with educational and psychological testing have endorsed a set of standards for determining the efficacy of a given measure (AERA/APA/NCME Test Standards, 1999). These standards lay out a framework for interpreting reliability and validity; in essence, how the corpus of research should confirm the status of the instrument. Issues of consequential validity (i.e., demonstrating that the construct assessed by the test has meaningful soci-

etal consequences), fairness (i.e., showing that items are not biased against a particular subpopulation for inappropriate reasons), and how to appropriately document test development are also critical components of developing an EI measure (Matthews, Emo, Roberts, & Zeidner, 2006). All of these various processes are ongoing and should feed back to guide theoretical refinements, test development, and future cycles of research. It is equally important to establish each piece of evidence.

*Emotional intelligence assessments need to demonstrate adequate reliability.* The vast majority of research on self-reports has concentrated in particular on establishing internal consistency reliability (e.g., Bar-On, 1995; Schutte et al., 1998; Tett et al., 2005). Those subscribing to performance-based measures most generally calculate split-half reliability (e.g., Palmer, Gignac, Manocha, & Stough, 2005). Mayer et al. (2004) provide a rationale for the latter approach when using performance-based assessments administered in the fashion that they describe. Of note, we are unaware of studies that report the standard error of the measurement of any EI test, although this could have been readily calculated from the summary statistics and test reliability coefficient.

It is not incidental that many of the subscales have marginal (i.e., less than 0.60) reliabilities both for self-report and performance-based measures, though superordinate constructs such as Experiential EI, general EI, and the like have high reliability coefficients (i.e., in excess of 0.90). Strategies for improving the reliability of subscales, such as increasing the number of test items, have curiously been neglected. By way of illustration, the MSCEIT actually has fewer items than its predecessor the MEIS for several common subscales; and their reliabilities were marginal. There are also relatively few studies of the test-retest reliability of any measure. Moreover, although those that have been conducted are suggestive, they generally come from studies with fairly small sample sizes (e.g., Tett et al., 2005). The jury is still out on whether many existing tests have high enough reliability coefficients for use in applied settings.

*Emotional intelligence assessments require various forms of validity evidence.* The AERA/APA/NCME Test Standards (1999) acknowledge construct validity as an all-encompassing, unifying concept overarching all types of validity evidence. Regrettably, not all forms of validity evidence have been the subject of extant empirical research on EI. In the quest for construct validity evidence, research has tended, instead, to focus on factorial validity, convergent and discriminant validity evidence, and test-criterion relationships (Matthews, Zeidner, & Roberts, 2007). Next, we briefly discuss some of the validity evidence for EI measures.

*Factorial validity.* Overall, the data attesting to the factorial validity of virtually every single extant measure of EI are equivocal. For example, Schutte et al. (1998) postulated a

single, general factor for the self-report inventory that they developed. However, Petrides and Furnham (2000b) provide evidence instead for a four-factor solution, while still other commentators (e.g., Saklofske et al., 2003) have not been entirely successful in replicating this, or other, factor solutions for this measure (see e.g., Gignac, Palmer, Manocha, & Stough, 2005; who lamentably consider their study the first to address this issue). Similarly, Matthews et al. (2002) reanalyzed data from Bar-On's (1995) EQ-i technical manual to reveal a number of inconsistencies in the hypothetical structure purportedly underlying this instrument (see also Livingstone & Day, 2005; Palmer, Manocha, Gignac, & Stough, 2003). Given the high degree of overlap between questionnaire assessments of EI and standard personality traits, the onus is on researchers working with a mixed-model or trait EI to develop factor models that specify the relationship between EI and standard personality traits as latent constructs. However, little progress has been made in this direction. Petrides and Furnham (2001) claim that trait EI is a lower-order construct within the FFM, but their factor analytic data actually show that different facets of trait EI load on different factors. Some facets attach to the standard Big Five, whereas others define a separate factor. Researchers have yet to explore the multistratum factor models that have helped to clarify psychometric confusions in the standard intelligence field (Carroll, 1993).

Performance-based measures fare no better when it comes to showing robust, theoretically-defensible factor structure. For example, although there are several studies that allege the MSCEIT has four recoverable branches (Mayer, Salovey, Caruso, & Sitarenios, 2001), virtually no published study has been able to find evidence for an independent Emotional Facilitation (i.e., using emotions to facilitate thought) construct (see e.g., Palmer et al., 2005; Roberts et al., 2006). Problems in factor structure also hold true for the MSCEIT's predecessor, the MEIS (Roberts et al., 2001; Zeidner et al., 2001). Furthermore, research is sorely needed to test for factorial invariance of current measures of EI across different sociocultural groups.

*Convergent and discriminant validity evidence.* Performance-based tests show convergent validity against ability measures, correlating positively with verbal, knowledge-based tests (i.e., crystallized intelligence), particularly for Understanding Emotion (Branch 3), while at the same time being relatively weakly related to tests of reasoning ability (fluid intelligence; see Ciarrochi et al., 2000; Mayer et al., 2000b). Generally, the evidence suggests that ability-based EI-measures index emotional knowledge, which is related to crystallized intelligence. By contrast, self-report measures of EI have shown poor convergent validity. For example, thus far, they show low (near zero) correlations with traditional forms of intelligence (see e.g., Davies, Stankov, & Roberts, 1998; Derksen, Kramer, & Katzko, 2002; Sala, 2002; Zeidner et al., 2005).

There is a growing body of evidence that self-report assessments of EI assess dispositional traits rather than a form

of intelligence. Unfortunately, the magnitude of correlation between the vast majority of self-report assessments of EI and (a lack of) Neuroticism (particularly, anxiety) is strong, with moderate to high correlations also evident between the self-report assessments and Agreeableness, Conscientiousness, and Extraversion, for a good deal of the available scales (see MacCann et al., 2003; Matthews et al., 2002). Given correlations with several personality variables it seems possible that once the variance associated with personality is partialled out, EI-related variance would be minimal. Collectively, these findings suggest that self-report measures of EI, whether based on mixed or trait models, have questionable discriminant validity.

A final piece of convergent validity evidence is the relations between different EI assessments. EI measures do not fare well in this respect. The correlation between performance-based and self-report assessments is surprisingly low, ranging somewhere between 0.20 and 0.30 across many studies. More problematic, we have shown that opposite conclusions can be reached on the basis of these two different assessment approaches when one also looks at external variables like intelligence or at group differences (Zeidner et al., 2005).

*Test-criterion relations.* The test-criterion relation refers to what was formally known as predictive validity. For both self-report and ability scales, this is often mixed. For example, Brackett and Mayer (2003) tested both kinds of measure as predictors of various criteria for emotional competence, controlling for the FFM and cognitive ability. In each case, EI predicted only one out of six criteria, with small effect sizes. By contrast, other studies have demonstrated modest test-criterion relations. In the ability field, several studies (see Lopes et al., 2004; Rivers, Brackett, Salovey, & Mayer, 2007) have shown that the Managing Emotions branch of the MSCEIT predicts social functioning with personality and ability controlled. Likewise, studies have shown that self-report scales for EI can add modestly to prediction of well-being criteria, with the Big Five controlled (e.g., Saklofske et al., 2003). Although uncorrected validity coefficients for questionnaire assessments of EI tend to be higher than for the MSCEIT, most of their predictive validity derives from overlap with personality. (Some self-report scales, as we have previously argued, are also vulnerable to criterion contamination, in that they include items referring to well-being or social success). It is striking that, with personality and ability controlled, both types of measure provide only modest incremental validity at best, typically adding 5% or so to the variance explained.

*Assessments of emotional intelligence need to be premised on justifiable scoring rubrics.* There is little doubt that simply by virtue of the methods, and the widespread use of this technique across psychology, investigating self-reported EI can be justified as a research tactic. However, by contrast, compared to more traditional intelligence tests (e.g., vocab-

ulary, matrices), the scoring of performance-based EI tests is difficult, as there is no algorithm for determining the correct answer (MacCann, Roberts, Matthews, & Zeidner, 2004; Roberts et al., 2001; Zeidner et al., 2001). Objectivity, or “the problem of the correct answer” (Mayer et al., 2000b), has proven hugely problematic in investigations of social intelligence, and has, thus far, proven an equally difficult issue to traverse in emotional intelligence research. The MSCEIT (and the earlier MEIS) deal with this problem in one of three ways: (1) assuming emotion experts know the answer (expert scoring), (2) assuming that the stimulus creators know the answer (target scoring), or (3) assuming that the correct answer is what people generally agree is correct (consensus scoring). Each of these scoring techniques has problems (see Matthews et al., 2007).

## Assessment: Sources of Controversy

*Is the proposed dichotomy between ability and mixed models useful?* The current trend toward relating self-reports of EI to the personality domain (Petrides & Furnham, 2003) leaves the earlier mixed models of EI (e.g., Bar-On, 2000) in limbo. Should we abandon Bar-On’s idea that questionnaires may be used to assess abilities, or does the notion still have credence? Again, it may be useful to explore differentiation of constructs within the self-report domain. Thus, although the split between performance and questionnaire tests looms large in the present context, other uncertainties over the optimal choice of assessment methods are appearing as the field develops.

For example, assessing one’s geographic knowledge by asking a series of question along the lines of “what is the capital city of Greenland” seems more cost-effective and valid than asking a person to “rate how good you are in geography on a seven-point scale from awful to brilliant” (the answer to which might suddenly change if you were offered a decent sum of money). Given the choice to assess intelligence with a question that is factually verifiable or a subjective rating, even the staunchest advocate of the later approach is forced to concede this is a no-brainer. Besides having a good deal more face and ecological validity, veridical items are less impervious to faking, coaching, or self-deception biases. Notwithstanding, self-estimates of intelligence (or related constructs, stressing in particular cognitive engagement) have been used in research settings to generate a variety of theoretically meaningful findings (e.g., Ackerman & Goff, 1994; Furnham & Rawles, 1999; Rammstedt & Rammseyer, 2000). Thus, it is important not to dismiss self-report approaches to EI out of hand.

*Are the stakes at which assessment is targeted defensible?* Basic research aside, psychological testing is generally conducted for some practical purpose, with varying implications. In general, practitioners and policy makers talk of the tests falling into one of three categories, corresponding to the “fidelity” of the instrument in question for decision-

making purposes. These are (1) high-stakes (e.g., determining whether an individual can enter the college of their choice after taking an assessment); (2) medium-stakes (e.g., ascertaining whether an individual may move into a higher position on the corporate ladder on the basis of a test score); or (3) low-stakes (e.g., a test designed to give the individual a certain level of self-insight). Currently, there is considerable push to bring EI measures into the high stakes testing arena. Clearly, however, in the absence of more carefully documented validity evidence, such usage is questionable.

#### *Is it not time for more advanced psychometric analyses?*

As alluded to at several points, thus far a good deal of EI research has been conducted without particularly advanced psychometrics. We are aware, for example, of no published study using item response theory (Emberson & Reeise, 2000; van der Linden, 1996), differential item functioning (Holland & Wainer, 1993), or equating (Kolen & Brennan, 2004), to name but a few of the statistical procedures commonly employed in cognitive assessment today. These procedures are especially important for high-stakes assessment, and feed in to a previous concern that we had that contemporary EI assessments should be used at a justifiable level.

## Applications of Emotional Intelligence

As alluded to in the introduction, a major driving force fueling the growing public and scientific interest in EI, and cognate emotional and social competencies, is their potential for improving personal and societal well-being. Thus, EI has been claimed to play a pivotal role in such diverse domains as job performance, interpersonal relationships, educational achievements, and clinical disorders. This final section will address applications of EI to these various domains of human endeavor.

As already demonstrated, empirical research has not always supported many of the validity claims surrounding this concept. Nevertheless, there is sufficient evidence for incremental validity of the better EI measures to suggest that a focus on EI may be relevant to enhancing personal, social, and organizational functioning and adaptation (Mayer et al., 2000a,b). There are also well-validated intervention programs that are designed to improve emotional functioning, especially in education (Zins, Weissberg, Wang, & Walberg, 2004). Such programs lend weight to the idea that elevating EI may be a valuable practical strategy in many real-life settings.

EI has been claimed to be predictive of individual task performance at the workplace, especially in settings requiring leadership, teamwork, or effective communication, as well as contextual or tacit performance (e.g., Abraham, 2005; Daus & Ashkanasy, 2005). EI may also relate to cit-

izenship behavior, integrity, and effective personal relationships in organizational settings.

In education, EI skills and competencies that are cultivated and trained in social and emotional learning programs are commonly believed to be able to help motivate students to reach higher levels of achievement, become more socially and emotionally competent, and to become more responsible and productive members of society. It is thought that elevating EI will impact both overt academic goals, such as better grades, and the student's broader personal development (Zins et al., 2004). Reviews of the evidence on programs for social-emotional learning, including those using meta-analysis to demonstrate change in outcome criteria, support their efficacy in improving mental health, academic performance, and remediation of various behavior problems (Greenberg, Weissberg, O'Brien, & Zins, 2003).

EI may also have considerable potential for clinical applications. Assuming EI is related to disordered affect and dysfunctional affect regulation (which, in turn, is related to psychopathology) it might play an important role in clinical diagnosis and treatment (Parker, 2005). Research on alexithymia highlights how difficulties in understanding and communicating emotion may be important in affective disorders (Taylor & Bagby, 2004). However, while many mental disorders are related to emotional dysfunctions and expressions of negative affect, the diversity of these disorders may mitigate against an unambiguous relationship with low EI (Matthews et al., 2002).

We now point to a number of areas in which there appears to be a general consensus about applications, before again touching on what appear as major sources of controversy.

## Applications: Sources of Consensus

*There has been irrational enthusiasm surrounding the practical utility of emotional intelligence.* Many scholars now working in the area agree that there has been an initial, irrational exuberance regarding the practical value of EI in applied settings (see e.g., Landy, 2006). Barrett, Gross, Christensen, and Benvenuto's (2001) review suggests that much of the existing evidence bearing on the role of EI in occupational success is anecdotal, impressionistic, or collected by consulting companies and not published in the peer-reviewed literature. Further, Zeidner, Roberts, and Matthews (2002) have pointed out that despite popular claims, most of the programs touted as effective EI programs lack clear conceptual frameworks, implementation analyses and checks, and sound evaluation designs. At present, there are few EI training programs that have been systematically constructed, implemented, and assessed. For example, some (though certainly not all) EI programs are being implemented in school settings without sufficient theoretical grounding, intervention hypotheses, or rigorous evaluation studies. Nevertheless, the failings of current ap-



plied work and training programs do not negate the possibility that more modest practical gains may be attainable.

*EI appears related (albeit weakly) to performance outcomes in a variety of applied settings.* Overall, research suggests that EI modestly predicts outcomes in a variety of real-life settings, with evidence available mainly for occupational (Daus & Ashkanasy, 2005) and educational contexts (Zins et al., 2004). In occupational settings, the additional contribution of EI to prediction over and above personality and ability is typically limited (Day, 2004). The majority of studies have used criteria that are based on self-report; objective behavioral criteria are regrettably neglected. A concern with the occupational studies reviewed by Van Rooy and Viswesvaran (2004) is that many use supervisor ratings that may be influenced by the likability of the employee, rather than their job competence. At the same time, there seems to be growing confidence among organizational psychologists that tests for EI predict job performance to an extent that is practically useful (Daus & Ashkanasy, 2005). Our view is that the scope and importance of the validity coefficients for EI remains open for debate, but the proponents of EI have made progress in demonstrating that the scales have sufficient criterion validity to be taken seriously.

EI has been claimed to be directly predictive of work performance and job satisfaction, organizational citizenship, truancy at work, and prosocial behavior. A review by Daus and Ashkanasy (2005) suggests that for jobs that would appear logically to require a high level of EI (e.g., police officers) relationships between EI and job performance and satisfaction may be higher than those where emotional demands are less obvious. There are, however, specific problems for the use of EI in occupational settings (Zeidner, Matthews, & Roberts, 2004). These include: (1) failure to provide an adequate theoretical rationale for their use in a particular occupational setting, (2) lack of occupational-specificity, (3) absence of normative data for different occupational groups, and (4) failure to provide evidence for predictive and discriminate validity (both within and among occupational clusters). Thus, the applied psychologist must fall back on clinical or professional judgment to gauge the role of EI in many contexts, lacking a proper science-based analysis.

In education, EI appears a rather weak predictor of academic success per se. Thus, based on a limited number of studies, the best estimate of the true validity coefficient for the relationship between EI and academic success (i.e., grades) is small (around 0.10). In fact, of all the performance domains, academic success may be the one where EI has the least potential. Furthermore, the EI-performance relationship appears to be both measure dependent (higher for self-report than ability measures), as well as criteria dependent (Van Rooy, Dilchert, Viswesvaran, & Ones, 2006). A more compelling argument, though, may be that EI indirectly mediates success by protecting students from barriers to learning such as mental distress, substance abuse, delinquency, teen pregnancy, and violence (Hawkins,

Smith, & Catalano, 2004). Equally, the criterion space for studying academic success has so far been narrow; there is more to academic success than grades. Thus, retention, citizenship, and psychological well-being all appear important outcome variables to consider in the educational sector, each of which have so far received short shrift (Roberts et al., 2005).

It has also been claimed that EI has merit and practical utility in predicting a broad set of outcomes in the social domain, such as quality of social relationships, marital success, prosocial behaviors, and delinquent behaviors. Compared to academic performance and occupational criteria, these outcomes have often been difficult to measure and operationalize (Van Rooy et al., 2006). Clearly, as we suggested earlier, the theoretical rationale for why EI should be predictive of criteria in the social realm needs to be more fully delineated. Thus, a broadside approach should not be adopted whenever EI is used to try to predict any possible outcome without specifying how and why these outcomes are important.

*Systematic approaches are required to match emotional intelligence (sub)constructs to applications.* In the special contexts of organization and industry, there is currently no empirically validated taxonomy of job types corresponding to separate components of EI. Thus, we cannot ascertain what facets of EI are requisite for any given job cluster. Generally, the level of EI apparently critical for occupational success should be a function of how central EI may be to work activities. Thus, EI may be more important in service organizations than others. Furthermore, EI may be more important for those occupying lower positions in the hierarchy relative to those much higher up in the organizational chain (Daus, 2006). Thus, a more systematic approach to matching emotional competencies to career components is needed. For example, a fine-grained analysis of the emotional demands imposed on police officers might support development of a measure of emotional regulation that could be used to assess and select police officers. This measure, in turn, could be validated against job-specific behavioral criteria, such as frequency of angry verbal behaviors during encounters with the public. Just as traditional job analysis is increasingly being supplemented by cognitive task analysis, so too there appears a need for "emotional task analysis" to ascertain the affective requirements of different occupations. At present, practitioners may need to rely on a relatively superficial dissection of emotional requirements. However, as theories of emotional competence become more fully articulated, more theory-driven analysis of emotional tasks at work may become possible.

## Applications: Sources of Controversy

*Are current research designs adequate?* Studies assessing the predictive validity of EI have failed to employ measures of EI that predict career success or other important educa-

tional and social criteria. The most basic task for validation research is to show that EI measures reliably differentiate between low- and high-performing groups on particular criteria. In the occupational domain, such studies should focus on predicting success both across jobs and within jobs, identifying the occupations for which EI is more and less important (e.g., social workers vs. financial analysts).

The use of EI component sub-tests also needs to be validated using large-scale, trait-performance validation designs. It is highly plausible that effective performance in different occupations involves different patterns of emotional (or social) characteristics. The criteria against which EI predictors in occupational selection and placement are validated should likewise be valid, reliable, and uncontaminated. The same holds for educational, clinical, and social outcomes (Zeidner, Matthews, & Roberts, 2004).

The impetus of proponents of EI in applied settings should be on testing the validity of EI in predicting a wide array of meaningful criteria. As a first step, it would seem important to look for the variance explained by EI with regard to conventional criteria (e.g., in the workplace: supervisor's ratings of performance, objective criteria such as absenteeism) and whether EI remains predictive with general intelligence and personality factors statistically controlled.

*To what extent is the predictive validity of emotional intelligence moderated by the nature of the applied setting?* Before employing EI measures in a particular setting, it is essential to precisely identify the specific contexts, needs, and purposes for which the EI test is being used. Without sounding trite, different jobs call for varying levels of social and emotional involvement and activity. Disparate occupations also require different types of interpersonal interaction. In some jobs (e.g., social work), one interacts emotionally with others during most of the time on the job. In such professions, there is a real need to have frequent interchanges with clients at an emotional level. Incumbents in some jobs not only need to talk with others face-to-face and exhibit positive, prosocial behavior (e.g., receptionist), but also assess the reactions of others, and attempt to influence others' emotions and motives (e.g., insurance agent). Some jobs require matching one's own behavior to the needs of others (e.g., psychotherapist), creatively influencing others by engaging their emotions, and transforming one's own emotions and also those of others. In other jobs (e.g., statistician), one interacts with people a smaller percentage of time, such that the need to be able to recognize and manipulate others' feelings is relatively unimportant, but one may need to manage personal frustrations. By the same token, EI may be effective in predicting educational outcomes in some domains (e.g., social sciences) yet not be predictive of outcomes in others (e.g., math and physical sciences).

*How are emotional intelligence measures best used in practical situations?* Should EI measures be used together with other variables in the predictor stock in a multiple re-

gression prediction equation of relevant job or educational performance criteria, or used in a noncompensatory "multiple-hurdle" framework? In this case, a sequential model is adopted for integration of multiple measures used in any test battery that assesses, in turn, job or educational-relevant abilities, performance-relevant issues, and appropriate measures of EI. While time consuming, this process will most likely result in more accurate assessment.

*To what degree can we develop and train emotional intelligence?* Programs for helping managers and would-be leaders, as well as students, to become more emotionally intelligent have mushroomed in recent years. Although many of these programs are promising, few have been modeled upon EI theory or designed in a way that is likely to lead to long-term change. Furthermore, intervention programs that seek to raise EI sometimes lack a clear theoretical and methodological rationale, and employ a miscellany of techniques, whose psychological bases are not always clear (Zeidner et al., 2002). EI, and the competencies linked to it, are based on temperament, learning experiences, and reflective goal-oriented experiences. One-day seminars or workshops can be valuable in educating people and raising awareness, but they may not by themselves lead to the kind of reprogramming that is required for significant improvement (Cherniss & Adler, 2000).

*Which components of emotional intelligence are the most malleable or susceptible to intervention(s)?* At present, it remains uncertain which of the components of EI are most malleable and responsive to training; what the threshold level of EI is for training; or what age level EI components are most responsive to instruction and training. Equally, little is known of the following key facets of training: specific goals, specific EI components most responsive to training, most effective interventions to use for low vs. average EI clients, and the minimal level of EI that a client needs to benefit from therapy. There is also a need for developing standards for program implementation as well as employing cost-benefit analysis for assessing the return for costs associated with delivering EI programs.

## Discussion

Our review suggests that there are several difficulties in trying to evaluate the overall scientific contribution of EI research (Matthews et al., 2002). These are summarized, using the three key domains covered in the main body of this review – concepts, assessments, and applications – in the passages that follow. Because we believe some of these represent tractable research issues, these passages also contain suggestions for future research directions.

## Conceptualization

Currently, there is no agreed upon definition of the EI construct. Thus, it is presently unclear whether EI is cognitive or noncognitive; whether it refers to explicit or implicit knowledge of emotion; and whether it refers to a basic aptitude or to some adaptation to a specific social and cultural milieu (Zeidner et al., 2001). Arguably, one of the primary initial tasks in any scientific endeavor is the systematic mapping out of the major components and facets in the universe of discourse under consideration (Kerlinger, 1973). However, it is difficult to obtain a satisfactory justification or definitional framework for the construct of EI (Zeidner et al., 2001).

A precondition for any large-scale applications of EI in applied settings is the development of well-defined theoretical frameworks and assessment tools. We believe that resolving uncertainties over the conceptualization and theory of EI requires better structural models than are presently available or being employed in EI research. The analysis represented in Table 1 suggests that there may be quite different "EI" constructs to be found in different research domains. Various accounts of the key components of EI exist, but these models are in need of systematic comparison and integration. We also see a need for weeding out those constructs that are not well-supported by research or lack a sound theoretical base. Building better conceptual models of EI also requires better psychometric models that specify both the overlaps and the uniqueness of EI constructs in relation to personality and ability.

## Assessments

Presently, it is uncertain how EI may best be measured or assessed. Various tests of the construct fail to converge and these diverse measures may, in fact, be assessing different constructs. There is less consensus regarding appropriate vehicles and methods for assessing EI than there appears to be for even the rather under-developed conceptual models that saturate the field. Arguably, this is an unsatisfactory state of affairs, one that may be conceived as inhibitory to the development of a systematic framework for conducting EI research. Certain points of consensus are virtually dictated by the scientific community, most especially with respect to standards set for psychological and educational measurement.

The two different approaches taken by researchers to the assessment of EI has led to two separate scientific literatures emerging on the topic. Often the findings coming out of these two emerging research traditions do not converge. Thus, it is perhaps an important undertaking of future research to provide a synthesis of these approaches, should this be possible. Conversely synthesis may not really be possible; perhaps it is best to adopt one approach over another according to a cogent set of arguments. Oatley (2004)

has suggested over-emphasis on measurement issues has led to neglect of the psychology of EI. The initial question, of course, calls for a Kuhnian answer, namely, only time will tell whether the evidence is sufficient to persuade the research community that a paradigm-shift is required.

Regardless, the sheer number of self-report measures so far developed in this field, without attendant concerns for the procurement of compelling validity evidence, suggests that it is time to call for a moratorium on the development of still further instruments of this type. By contrast, the number of performance measures is surprisingly small (though clearly some of those used by emotions researchers could be reconceptualized as measures of specific EI constructs). Developing further objective measures of EI would appear to be an important future research endeavor.

## Applications

Clearly, the practical utility of tests of EI is limited by the conceptual and psychometric deficiencies described above. Thus, available tests generally have questionable validity evidence for the tests to be used with confidence in making real-world decisions (Zeidner, Matthews, & Roberts, 2004). Moreover, intervention programs targeted to enhance EI in educational (Zeidner et al., 2002) and occupational settings (Zeidner, Matthews & Roberts, 2004) appear sometimes to lack clearly articulated theoretical and methodological rationales.

Arguably, in order for EI to be useful in applied settings, the theoretical foundations of EI need to be secured first; otherwise it will remain a fuzzy and slippery construct, with little practical value. It is critical that definition issues are settled before proceeding to operationalize and apply the construct in real-life settings. Of note, research has yet to demonstrate the added value of using EI measures in applied settings relative to narrower measures of individual differences.

There is a danger that EI may be no more than a fad of the type common in business and education (Murphy & Sideman, 2006). The explosive growth of EI matches the three defining characteristics of such fads identified by these authors: (1) a fast growth trajectory, (2) promise of a great deal more than can be delivered, and (3) provocation of intense reactions, both positive and negative. Such fads, Murphy and Sideman (2006) go on to argue, generally follow a natural life-cycle. Interest tends to plateau, followed by a precipitous decline, although the fad may re-emerge years or decades later. While the optimist may believe EI is here to stay, the pessimist may believe that EI will burn out before too long.

## Concluding Comments

Finally, research surrounding EI is still new, and the optimist may take the diversity of concepts and measures as a sign of the vitality of the field. As research addresses the controver-

sies we have highlighted here, we can expect to see a shake-out of misconceptions, the maturing of the science, and greater consensus between advocates for EI and skeptics. Progress depends on greater rigor in conceptualization and measurement, and in validation of scales against objective criteria for social-emotional functioning. In applied fields, the focus should be on evidence-based studies that show that interventions specifically directed toward EI improve over other, well-attested techniques for improving social functioning. The spirit of “letting a hundred flowers bloom” should not be used as an excuse for poor science or for practical interventions that promise more than they deliver. Will EI stay or will it go? Only time will tell.

### Authors' Note

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