Human Abilities: Emotional Intelligence

John D. Mayer,[1] Richard D. Roberts,[2] and Sigal G. Barsade[3]

[1]Department of Psychology, University of New Hampshire, Durham, New Hampshire 03824; email: jack.mayer@unh.edu

[2]Center for New Constructs, R&D, Educational Testing Service, Princeton, New Jersey 08541; email: RRoberts@ets.org

[3]Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania 19104; email: sigal.barsade@wharton.upenn.edu

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Abstract

Emotional intelligence (EI) involves the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought. We discuss the origins of the EI concept, define EI, and describe the scope of the field today. We review three approaches taken to date from both a theoretical and methodological perspective. We find that Specific-Ability and Integrative-Model approaches adequately conceptualize and measure EI. Pivotal in this review are those studies that address the relation between EI measures and meaningful criteria including social outcomes, performance, and psychological and physical well-being. The Discussion section is followed by a list of summary points and recommended issues for future research.

Contents

Emotion: an integrated feeling state involving physiological changes, motor-preparedness, cognitions about action, and inner experiences that emerges from an appraisal of the self or situation

EI: emotional intelligence

EMERGING RESEARCH IN EMOTIONAL INTELLIGENCE

In Ancient Greece, the development of logical thought—syllogisms, arguments, inquiry—was the burgeoning information technology of the day. The Stoics of Ancient Greece believed that logic was superior to feelings because people could agree as to rational arguments but often disagreed as to feelings. Although Stoic philosophy was influential, the idea that rationality was superior to emotionality was not accepted by all. For example, the sentimentalists of eighteenth-century Europe espoused a "follow your heart" credo, arguing that truth might be a property of one's feelings and intuition, and that such feelings were truer than reason (Reddy 2001). The recently introduced concept of emotional intelligence (EI) offers a new way of looking at the debate—that people can reason about emotions and use emotions to assist reasoning.

If EI were to exist, some argued, it could strengthen our current understanding of both emotions and intelligence (e.g., Sternberg 2001). It might enrich our sense of the functionality of human emotion and the breadth of human intelligence. EI also directs attention to the role of emotion at home, in schools, and at the workplace and how the effects of emotion may ripple through groups and

society (Barsade 2002, Barsade et al. 2003, Ciarrochi et al. 2006, Elias et al. 1997, Izard 2002, Matthews et al. 2007).

In this review, we describe research on EI covering a roughly 18-year span from 1990 to early 2007. During that time, work on the topic expanded from a few articles and book chapters to an active research area. Over the same period, research continued in emotion, intelligence, and their interaction, as reflected in *Annual Review of Psychology* coverage (a partial list includes Cacioppo & Gardner 1999, Eisenberg 2000, Lubinski 2000, Oatley & Jenkins 1992, Phelps 2006, Rosenbaum et al. 2001, Sternberg & Kaufman 1998, Voss & Wiley 1995). EI is related to both emotion and intelligence, but it also is distinct from them.

Our aim has been to collect what represents, to us, some of the best and most promising research in the EI field. A review of such research can help define EI, indicate its relation to other concepts, and illustrate its influence on practical outcomes. In the opening of our review, we provide a context for the present-day field, examine uses of the term "emotional intelligence," and describe the scope of research in the area. Our challenge in covering the field is considerable because the term "emotional intelligence" is used in many different ways. One of our goals is to identify the core elements of EI and its study.

THE SCOPE OF EMOTIONAL INTELLIGENCE

What Is Emotional Intelligence?

The term "emotional intelligence" has been employed on an occasional basis at least since the mid-twentieth century. Literary accounts of Jane Austen's *Pride and Prejudice* refer to various characters possessing this quality (Van Ghent 1953, p. 106–107). Scientific references date to the 1960s. For example, emotional intelligence had been mentioned in relation to psychotherapy treatments (Leuner

1966) and to promoting personal and social improvement more generally (Beasley 1987, Payne 1986).

During the 1980s, psychologists expressed a renewed openness to the idea of multiple intelligences (Gardner 1983, Sternberg 1985). Simultaneously, research on emotion and on how emotions and cognition interacted were on the ascendancy (for historical background, see Matthews et al. 2002, Mayer 2000, Mayer et al. 2000a, Oatley 2004). It was amid such lively inquiry that scientific articles on EI first began to appear (Mayer et al. 1990, Salovey & Mayer 1990).

Interest in studying EI grew dramatically throughout the late 1990s, propelled by a popularization of the topic (Goleman 1995). With the term's newly found cachet, and with the excitement surrounding the identification of a potential new intelligence, many used the term—but often in markedly different ways (Bar-On 1997, Elias et al. 1997, Goleman 1995, Mayer & Salovey 1993, Picard 1997). So, what does the term "emotional intelligence" really mean?

Can Emotional Intelligence Be Conceptualized Validly?

By 2007, the wide diversity of those interested in EI was matched by the wide diversity in the conceptions of EI they employed. Some researchers defined EI as an ability to reason about emotion; others equated the concept with a list of traits such as achievement motivation, flexibility, happiness, and self-regard. Still others found the addition of such traits, which seemed to be ad hoc, to be troubling, and wondered whether a theoretically sound conceptualization of EI could be identified (Locke 2005).

The conceptual network of psychological concepts. A scientific concept such as EI arises in the context of associated scientific terms and their meanings. Cronbach & Meehl (1955) referred to this context as a nomological network—a system of meanings

Intelligence: a mental ability (or set of mental abilities) that permit the recognition, learning, memory for, and capacity to reason about a particular form of information, such as verbal information

Nomological network: the interconnected terms and ideas that scientists use to understand their field of study. Scientists' ideas are characterized as connected with one another in logical fashion, and as tied to real-world phenomena, in an integrated, meaningful way

Mental ability: a person's capacity to perform a psychological task, such as solving a problem, so as to meet a specified criterion such as correctness, novelty, or speed

with which most scientists are familiar and that have been established because of their utility. For the term "emotional intelligence" to be valid, it must fit with such a network of concepts (or provide a rationale for why it does not). We begin by examining some concepts that are closely related to EI and then consider how EI might fit within this nomological network.

Our view and definition of human mental abilities and intelligence. Intelligence is a type of mental ability that concerns the handling of—and reasoning about—information of various sorts (Carroll 1993, Spearman 1927, Sternberg & Detterman 1986). The information involved can be very specific (relations among auditory frequencies) or very general (strategic planning). Often, these abilities are described as falling along a hierarchy from simple perceptual processes and information processing to higher and more general forms of problem solving (Carroll 1993).

We view intelligence as a general descriptive term referring to a hierarchy of mental abilities. At the lowest level of this hierarchy are basic, discrete, mental abilities. These include, for example, the ability to recognize words and their meanings in the verbal realm, or, as another instance, to see how puzzle pieces fit together in the perceptual realm, or to understand how objects are rotated in space. At a middle level of the hierarchy are broader, cohesive groups of abilities. These abilities include verbal-comprehension intelligence—a group of abilities focused on understanding and reasoning about verbal information, and, as a second example, perceptual-organizational intelligence—a group of abilities focused on recognizing, comparing, and understanding perceptual patterns. At the highest level of the hierarchy, general intelligence, or *g*, involves abstract reasoning across all such domains. Our working definition of intelligence appears in the margin.

Our view and definition of emotion. As an emotion emerges, it entails coordinated changes in physiology, motor readiness, behavior, cognition, and subjective experience (Izard 1993; Parrott 2002, p. 342; Simon 1982). For example, as a person becomes happy, she may experience lower blood pressure and greater motor readiness to approach others; she also may smile, think happy thoughts, and feel good inside. These emotional reactions emerge in response to perceived or actual alterations in the person's environment. Our working definition of emotion appears in the margin.

Our definitions of both intelligence and emotion are consistent with longstanding—we would say, consensual—approaches in their respective disciplines, but there are alternative views of both concepts (Averill & Nunley 1993, Kleinginna & Kleinginna 1981, Sternberg 1985, Sternberg & Detterman 1986). For example, some views of intelligences divide the concept into a crystallized, learned portion, including especially verbal aspects, and into a fluid portion that involves on-the-spot reasoning and emphasizes perceptual-organizational and spatial skill (e.g., Carroll 1993, Vernon 1971). Alternative views of emotion exist as well (Averill 1992, Averill & Nunley 1993). Acknowledging such complexities, we continue to examine how intelligence and emotion might connect with EI in a conceptual network.

The General Scope and Boundaries of Emotional Intelligence

Emotional intelligence is a term parallel to such others as verbal-comprehension intelligence, perceptual-organizational intelligence, or broad-visualization intelligence (Carroll 1993). In each such term, the descriptor—verbal-comprehension, perceptual-organizational, broad-visualization—modifies the noun: intelligence. For example, verbal comprehension concerns an individual's understanding and reasoning with verbal information.

Many forms of intelligence concern learning and reasoning about a particular type of material and then are enhanced further by the learning they have fostered. For example, verbal-comprehension intelligence describes the capacity to learn and reason about words and their meanings. The more words one understands, however, the more the verbal knowledge one already has gained promotes the intelligence. Thus, verbal intelligence is the ability to reason about words and the use of acquired verbal knowledge to promote such reasoning. Perceptual-organizational intelligence concerns the ability to reason about visual patterns and the use of acquired knowledge about patterns to enhance the intelligence. Following such precedents, an initial working description of EI is as follows:

> Emotional intelligence concerns the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought.

To study EI means to focus on the ability itself. Some have made the case that characteristics such as assertiveness and self-regard should be considered part of EI because both involve emotion and intelligence to some degree. Virtually all mental activities, however, from color perception to self-insight, potentially involve emotion and intelligence, simply because emotion and intelligence are active throughout most of one's mental processes; that is, mental functions are highly interconnected (Hilgard 1980, LeDoux 2000). EI is distinct from other mental processes in involving a primary focus on a specific area of problem solving.

As an analogy, consider again verbal-comprehension intelligence. The primary focus on the meaning conveyed by language is crucial. Someone could argue, for example, that assertiveness (or self-regard, etc.) is a part of verbal intelligence because asserting oneself often requires words. The argument fails, however, in regard to the criterion of the primary focus. Assertiveness is not part of the ability to reason verbally, although it may be influenced by such reasoning; equating characteristics such as assertiveness with the ability diverts attention from the intelligence itself. Returning to EI, its primary focus has to do with reasoning about emotions and the use of emotions to enhance thought.

APPROACHES TO EMOTIONAL INTELLIGENCE IN THE SCIENTIFIC LITERATURE

Theoretical Approaches to Emotional Intelligence

EI represents abilities that join intelligence and emotion to enhance thought. Some of the abilities that make up EI can be found in the top of **Figure 1**, in the box labeled "emotional intelligence." The box contains specific skills, such as the ability to accurately identify emotion, and indicates that these individual skills may also be viewed as forming an integrated, global EI. Theoretical approaches to EI, in fact, can be divided according to whether they focus on specific abilities or on more global integrations of those capacities.

The specific-ability approaches concern individual mental capacities important to EI. The integrative-model approaches regard EI as a cohesive, global ability. There exists a third approach to EI as well, called a mixed-model approach to the field (Matthews et al. 2004, Mayer et al. 2000b, McCrae 2000, Neubauer & Freudenthaler 2005). This approach mixes in a variety of non-EI qualities, and, consequently, appears to fall partway or largely outside the boundaries of the concept (**Figure 1**, *bottom*). These three approaches to EI are described in detail below.

Specific-Ability Approaches to Emotional Intelligence

Emotional perception and identification.
Specific-ability approaches to EI focus on a particular skill or skills that can be considered

fundamental to EI. In this section, we outline some of these abilities, beginning with accuracy in emotional perception. The study of perceptual accuracy grew out of an extensive body of research in nonverbal perception. Nonverbal perception includes deciphering social information, such as power and intimacy relationships, along with the accurate recognition of emotional expression. From the nonverbal research, specialized models of emotional accuracy emerged. For example, one model aimed to study a person's accuracy at perceiving emotion in child and adult faces, voices, and postures (Nowicki & Duke 1994). A number of reviews and key papers provide excellent descriptions of research in nonverbal sensitivity more generally (e.g., Buck 1984, Hall & Bernieri 2001, Rosenthal et al. 1979).

Two frequently used measures of perceptual accuracy in emotion are the Diagnostic Analysis of Nonverbal Accuracy Scales (DANVA and DANVA-2; Nowicki & Duke 1994) and the Japanese and Caucasian Brief Affect Recognition Test (JACBART; Matsumoto et al. 2000), though there are others (e.g., Elfenbein et al. 2006). Generally speaking, these scales present pictures of faces and of postures, gestures, or recordings of voice tones; the participant's task is to correctly identify the emotion expressed. For example, the DANVA-2 employs stimuli that express one of the four emotions of happiness, sadness, anger, and fear.

Use of emotional information in thinking. Some specific-ability models address the ways in which emotions facilitate thinking. For example, emotions may prioritize thinking (Mandler 1975) or allow people to be better decision makers (Lyubomirsky et al. 2005). A person who responds emotionally to important issues will attend to the more crucial aspects of his or her life. By contrast, if the person is constantly frustrated, say, by her subordinate's minor clerical errors, then broader concerns that are more important may not be addressed (Parrott 2002). In addition, certain specific emotions can foster given types

of thinking. For example, positive emotions promote greater creativity in some contexts (Amabile et al. 2005, Averill & Nunley 1992, Isen 2001, Lyubomirsky et al. 2005).

Part of emotional facilitation is to know how to include emotions in, and exclude emotions from, thought. On the Emotional Stroop test (Richards et al. 1992), people first see neutral words printed in varying colors and must say the colors without being distracted by the words. In a second condition, negative/anxiety emotion words are employed; in a third condition, positive emotion words might be employed. It is common for people to be distracted and read the emotion word rather than say the color. Those with higher EI might exhibit less interference from the emotion words (e.g., Masia et al. 1999, Richards et al. 1992).

Reasoning about emotions: emotional appraisal, labeling, and language. Another set of specific-ability models concerns emotional reasoning and understanding. For example, emotion-appraisal researchers have developed decision rules for matching a given emotion to the class of situation that has elicited it. If a person experiences fear, for example, it is likely that he is facing a situation that is threatening, raises thoughts of bad things happening, and elicits a need to escape (Roseman 1984, p. 210; Scherer et al. 2001). Related to such appraisals also are the accurate labeling and categorization of feelings (Clore et al. 1987, Innes-Ker & Niedenthal 2002). Theorists have argued that accurate appraisal may be a hallmark of emotionally intelligent responding (MacCann et al. 2004, p. 41; Parrott 2002, pp. 354–355). If a person's appraisal process is awry, then he or she may misunderstand an event or its consequences and react inappropriately.

As another example, emotional understanding may involve being able to describe one's own and others' feelings. For instance, the Levels of Emotional Awareness Scale (LEAS; Lane et al. 1990) presents 20 emotionally evocative situations involving the test

taker and a fictional person. Participants write both about how they and the other person would feel in the situation. Responses are scored according to whether the test taker appropriately includes emotional responses and the degree of sophistication (complexity) of those responses, including, for example, the individual's capacity to differentiate between his or her own and others' responses.

Emotion management. Another relevant ability area concerns emotional self-management. This area grew out of clinical findings that, for example, one's emotionality could become more positive by reframing perceptions of situations (Beck et al. 1979), as well as from the idea that when at work, individuals often exert considerable emotional self-control (Hochschild 1983). A sizeable amount of research on emotional self-management and regulation has emerged in parallel with that on EI (Gross 1998, Lazarus 1994), including in the child development domain (Eisenberg 2000). Denham and colleagues (2003), for instance, have used behavioral observations of children in order to assess their frustration tolerance, asking observers to rate the children's degree of distress, crying, and tantrums, among other indices.

Integrative-Model Approaches to Emotional Intelligence

Izard's Emotional Knowledge Approach. The key element in integrative models of EI is the joining of several specific abilities to obtain an overall sense of EI. For example, Izard's Emotional Knowledge Test (EKT; Izard et al. 2001) asks test takers to match an emotion such as sadness with a situation such as "your best friend moves away," as well as to identify emotions in faces. It provides an integrative measure of EI, focusing in particular on emotional perception and understanding. Izard's test also is important because it is designed for use with younger age groups (e.g., as early as 3–4 years old) relative to other measures of EI.

Izard (2001) sometimes prefer to speak of emotional knowledge as opposed to emotional intelligence. Psychologists often speak about an aptitude-knowledge continuum (e.g., Lichten & Wainer 2000). At one end of this continuum, aptitude refers to the capacity to reason and learn; at the other end, knowledge refers to what a person actually has learned. Both intelligence and knowledge tests operate according to similar principles and rely on assessing a person's knowledge. Generally speaking, intelligence tests emphasize general breadth and rate of learning as well as the ability to reason with unfamiliar problems. Knowledge tests, by contrast, measure attained knowledge. Both concepts fit within the scope of EI studies, as defined here.

The Four-Branch Model of Emotional Intelligence. The Four-Branch Model of EI is another integrative approach (Mayer & Salovey 1997, Salovey & Mayer 1990). The model views overall EI as joining abilities from four areas: (*a*) accurately perceiving emotion, (*b*) using emotions to facilitate thought, (*c*) understanding emotion, and (*d*) managing emotion (Mayer & Salovey 1997, Mayer et al. 2003). Each of these areas is viewed as developing from early childhood onward. For example, in perceiving emotion, a person's ability to recognize basic emotions in faces is likely to precede the ability to detect the faking of emotional expressions (Mayer & Salovey 1997, p. 10). As skills grow in one area (e.g., perceiving emotions), so will skills in other areas, such as understanding emotions and being able to regulate them.

The Four-Branch Model has been measured by a series of instruments, the most recent of which is the Mayer-Salovey-Caruso Emotional Intelligence Test, or MSCEIT (Mayer et al. 2002b). This test is composed of eight individual tasks similar to those described in individual areas above. Two tasks are used to measure each branch of the model. For example, emotional perception is measured by asking participants to identify

MEIS: Multifactor Emotional Intelligence Scale

Mixed Model: a theoretical approach that equates diverse psychological traits, abilities, styles, and other characteristics to EI

emotions in faces and landscapes. Emotional facilitation is assessed, in one subscale, by asking participants to identify which emotions promote which kinds of thoughts and activities. Emotional understanding is measured via understanding how emotions blend [e.g., "Which two emotions together are closest to contempt: (*a*) sadness and fear or (*b*) anger and disgust?"]. Emotional management of oneself and others is measured by presenting test takers with vignettes describing a social situation and asking them how emotions might be managed in the situation (Mayer et al. 2002a). The MSCEIT replaced the earlier, lengthier, Multifactor Emotional Intelligence Scale (MEIS; Mayer et al. 1999).

Mixed-Model Approaches to Emotional Intelligence

The third approach to EI is often referred to as a Mixed Model approach because of the mixed qualities that such models target. These approaches use very broad definitions of EI that include "noncognitive capability, competency, or skill" (Bar-On 1997) and/or "emotionally and socially intelligent behavior" (Bar-On 2004, p. 122), and "dispositions from the personality domain" (Petrides & Furnham 2003, pp. 278–280). Tett et al. (2005) drew on Salovey & Mayer's (1990) original EI model, which they interpreted in a broader, more mixed-model fashion than the authors had intended (see Mayer et al. 2000b, p. 401).

More concretely, most measures in this category assess one or more EI attributes, such as accurate emotional perception, but then to varying degrees mix in other scales of happiness, stress tolerance, and self-regard (Bar-On 1997); adaptability, (low) impulsiveness and social competence (Boyatzis & Sala 2004, Petrides & Furnham 2001); and creative thinking, flexibility, and intuition versus reason (Tett et al. 2005). Relative to the conceptual development we described above, these mixed-in attributes lack a primary focus on EI, as described in this review.

Relating Emotional Intelligence to Other Psychological Variables

Variables included in mixed models such as assertiveness and need for achievement surely are important to study—but are not part of EI, as that concept is developed here. A clearer approach is to consider EI a discrete variable and then study it in relation to such other characteristics. Several theorists have examined EI in the context of positive and negative affect and stress tolerance (Izard 2001; Parrott 2002, pp. 351–355; Zeidner et al. 2003); others have positioned EI, the need for achievement, and other diverse traits in the context of personality (Mayer 2005, 2006). These latter models connect EI to related variables in a way that is consistent with the great majority of psychologists' nomological networks.

MEASURES OF EMOTIONAL INTELLIGENCE

An Evaluation of Emotional Intelligence Measures

In this section, we examine more closely the measures proposed to assess emotionally intelligent skills and abilities. Our focus is on several of the scales introduced above, including scales of emotional perception (e.g., the DANVA and JACBART) and emotional understanding (e.g., the LEAS), as well as measures that integrate across such areas (e.g., the MSCEIT and EKT). We categorize and summarize these and other scales in **Table 1**.

The key purpose of this section is to ask, "Do these tests measure what they claim to?" In particular, do they measure EI? Standards of test validity have changed and developed over the past century, and still are developing. We have distilled from the current *Standards for Educational and Psychological Testing* (Joint Comm. Standards 1999) a group of desirable criteria that seem particularly relevant to EI research at this time. These criteria are grouped into three broad categories: (*a*) adequate test design relative to theories of EI, (*b*) the structure of EI measurement (which tells

Table 1 A guide to emotional intelligence measures frequently mentioned in the review

Key test name, related tests, and source(s)	Acronym(s)	Description of the test
Specific Ability measures		
Diagnostic Analysis of Nonverbal Accuracy 2 The test has three versions: 1. Adult Facial Expressions (Nowicki & Carton 1993) 2. Adult Paralanguage (e.g., auditory) (Baum & Nowicki 1998) 3. Posture Test (Pitterman & Nowicki 2004)	1. DANVA 2-AF 2. DANVA 2-AP 3. DANVA 2-POS	The Adult Facial version consists of 24 photographs of an equal number of happy, sad, angry, and fearful facial expressions of high and low intensities, balanced also by gender. For this and the related tests described below, the participants' task is to indicate which of the four emotions is present in the stimuli. A youth form is also available. The Paralanguage version includes two professional actors (one male, the other female) who say a neutral sentence, "I am going out of the room now but I'll be back later" in one of four emotional states. The Posture test includes 32 stimuli of two men and two women in standing and sitting postures representing high- and low-intensity happiness, sadness, anger, and fear.
Japanese and Caucasian Brief Affect Recognition Test (Matsumoto et al. 2000)	JACBART	Fifty-six Japanese and Caucasian faces are presented in a video format. Each target face portrays one of seven emotions: happiness, contempt, disgust, sadness, anger, surprise, and fear. Each such facial expression is presented for 0.2 seconds between identical initial and trailing neutral facial expressions posed by the same individual—that is, between backward and forward masks. The test-taker's task is to identify correctly the emotion present.
Levels of Emotional Awareness Scale (Lane et al. 1990)	LEAS	Twenty social scenes involving two characters, "you" and an additional individual, elicit four types of emotion: anger, fear, happiness, and sadness. After a test taker reads a scene, he or she is asked, "How would you feel?" and "How would the other person feel?" Participants are required to describe their anticipated feelings (and those of a second person) for each scene. Scoring is according to a continuum of low emotional awareness (no emotional response) to high emotional awareness (appropriate emotions for "you" and the character).
Integrative Model measures		
Emotion Knowledge Test (umbrella label for an evolving set of tests, including the Assessment of Children's Emotional Skills, Perceiving and Labeling Emotion, and Emotion Matching Test) (Izard et al. 2001, Mostow et al. 2002, Trentacosta & Izard 2007)	EKT (or ACES, PLE, or EMT)	The most recent ACES contains three subscales. Facial Expressions contains 26 faces; children are asked if they are happy, sad, mad, scared, or express no feeling. The Social Situations subscale includes 15 two- to three-sentence vignettes describing a social situation; the Social Behavior scale similarly contains 15 two- to three-sentence descriptions of behavior; children respond to each scale by estimating the emotion of the main character. An overall emotion-knowledge score is calculated.
Mayer-Salovey-Caruso Emotional Intelligence Scale (Mayer et al. 2002a, Mayer et al. 2003) Multibranch Emotional Intelligence Scale (Mayer et al. 1999)	MSCEIT; MEIS	Eight tasks (141 items) measure various aspects of EI including emotional perception in (*a*) faces and (*b*) landscapes, using emotions in (*c*) synesthesia and in (*d*) facilitating thought, understanding emotional (*e*) changes across time and (*f*) blends, and managing emotions in (*g*) oneself and (*h*) relationships. Responses are scored for correctness (e.g., against answers from an expert or consensus-based scoring). Each task uses a different item type; different response scales are used by different tasks. Scores for overall EI as well as Perceiving, Facilitating, Understanding, and Managing emotions, and other composites, can be calculated. The longer MEIS test (402 items) consists of 12 scales, also arranged into four branches; there is considerable conceptual overlap, but no item overlap, between the two tests.
Mixed Model measures		
Emotional Quotient Inventory (Bar-On 1997)	EQ-i	A 133-item self-judgment inventory. Items are divided over 15 subscales such as adaptability, assertiveness, and self-regard that also can be formed into five higher-order factors: intrapersonal, interpersonal, adaptation, stress management, and general mood.

(Continued)

Table 1 (*Continued*)

Key test name, related tests, and source(s)	Acronym(s)	Description of the test
Self-Report Emotional Intelligence Test (Schutte et al. 1998)	SREIT	A 33-item self-report inventory that has most often been used to assess an over all level of EI.
Multidimensional Emotional Intelligence Assessment (Tett et al. 2005, 2006)	MEIA	A 118-item self-report inventory employing 10 scales, many of which are based on the original Salovey & Mayer (1990) model of EI and some of which are added.

Measures are organized according to the categories presented in the main body of the text.

DANVA scores are usually reported in articles as "Coding Errors"—we have reversed this to "Coding Skill" in the main body of the text.

us whether EI is one thing or many things), and (*c*) test relationships with key benchmarks.

Adequate Test Design

We use the term "adequate test design" to refer to evidence of appropriate test content, evidence that test takers employ proper response processes to answer a question, and evidence of acceptable test reliability.

Content evidence of validity. Evidence for a test's validity includes the extent to which a test's content addresses what should be measured. For example, evidence that the DANVA-2 measures EI comes from the fact that the scale presents pictures of emotionally laden faces and body postures to participants who must then identify whether the content they see is mostly happy, angry, sad, or fearful. As another example, evidence that the MSCEIT measures EI stems from its content, which is divided into four areas corresponding to the Four-Branch model of EI: the capacities to (*a*) perceive emotions, (*b*) use emotions to facilitate thought, (*c*) understand emotions, and (*d*) manage emotions. For example, item content reflecting understanding emotion provides a participant with an emotion definition and then asks him or her to select the emotion that was defined (see **Figure 2**).

Response-process evidence of validity. The standard practice in measuring mental abilities is to ask people to solve problems and then compare their answers to a criterion of correctness. Such ability testing elicits a response process in which a person demonstrates an ability by actively solving the problem and then recording a correct answer. Significant reviews of intelligence—including those covering dozens of diverse abilities—rely exclusively on such ability testing (Carroll 1993). In other words, response-process evidence for the validity of an EI measure includes that the test poses questions of a test taker and then matches the individual's answers to a criterion of correctness.

The Specific Ability and Integrative Model scales discussed here meet such standards. For example, the JACBART asks participants to look at an emotional facial expression and then match the expression to an emotion. The correct answer is decided by reference to the Facial Affect Coding system, a well-regarded system for determining emotional facial expressions (Ekman & Friesen 1975). The MSCEIT has employed two scoring systems. The expert-consensus scoring method involves matching a participant's response to the correct answers nominated by emotion experts. The general-consensus scoring method matches participant answers to the preferred responses of the standardization sample. The rationale for the latter method is that, because human beings have evolved to understand emotional information, unselected groups of people can identify correct scores almost as well as can experts. A study of test scores, assessed across roughly 2000 individuals, indicated that these two scoring methods are

Response-process evidence: a form of validity evidence that concerns whether the questions posed by a test elicit the actual to-be-measured mental activities targeted for study

Specific ability approach: a theoretical approach to EI focused on a specific skill area within the domain (e.g., effective emotional management)

correlated, $r = 0.96$ to 0.98 (Mayer et al. 2003); that is, the two methods converge well on correct answers (for a discussion, see Mayer et al. 2001, Roberts et al. 2001).

Reliability of emotional intelligence measures. Reliability refers to the consistency with which a test measures; without consistency, measurement is compromised. One way to assess reliability is through a scale's internal consistency—that is, whether a participant's responses are consistent across items. The measures listed in **Table 1** generally possess moderate to high internal-consistency reliability. For example, the coefficient alpha (α) reliability of the LEAS ranges from 0.81 to 0.89 (Ciarrochi et al. 2003, Lane et al. 1990). Reported αs for the JACBART range from 0.73 to 0.92 (see Matsumoto et al. 2004, Roberts et al. 2006). Reports of the MSCEIT indicate total scale split halves of $r = 0.91$ and 0.93; split half estimates of reliability are employed because of the test's item heterogeneity (Mayer et al. 2003). However, the reliability of several other tests of emotion perception, especially those involving auditory modalities, are closer to $r = 0.45$ (MacCann 2006, Roberts et al. 2006). A second sort of reliability—test-retest reliability—concerns consistency across time. The MSCEIT's test-retest reliability is $r = 0.86$, with an $N = 60$ (Brackett & Mayer 2003). The test-retest reliability of the JACBART is $r = 0.78$ with an $N = 56$ (Matsumoto et al. 2000).

In sum, reliability ranges from $r = 0.80$ to 0.92 for most full-scales measures, which is adequate for research and, in the higher instances, for reliable assessment of an individual.

Validity Evidence from Factor Structure

Few topics concerning EI are as central as whether the abilities it consists of can be modeled as a unified intelligence. If so, then it is possible to speak of EI as a coherent area of information processing. Moreover, it would become possible to develop a taxonomic model that placed component abilities in relation to one another in a relatively invariant manner across subpopulations, time, and test administrators (e.g., Carroll 1993).

A number of studies suggest that measures of EI do form coherent, recognizable factors, despite the often low correlations among them (see below). Most centrally, a single, global EI factor can be used to describe both MEIS and MSCEIT test data (Ciarrochi et al. 2000; Mayer et al. 2003, 2005; Palmer et al. 2005; Roberts et al. 2001). The same studies also extract intercorrelated, more specific factors within the general factors. For example, two factors, Experiential and Strategic EI, are often obtained (Ciarrochi et al. 2000, Mayer et al. 2003, Roberts et al. 2006), as well as a three- or four-factor model emphasizing Emotional Perception, Understanding, and Management (Mayer et al. 1999, 2003; Palmer et al. 2005, Roberts et al. 2001). These findings are consistent with a hierarchical view of intelligence, in which a general EI divides into more specific factors and then into subfactors.

Test Relations to Key Benchmarks

Convergent validity evidence among emotional intelligence measures. We have identified a number of measures as related to EI. If they are all measures of EI, then they should correlate with one another—that is, converge toward a common criterion. Here, however, there is some concern. It has long been observed that correlations among various measures of the ability to perceive nonverbal expressions are low (Boone & Buck 2004, Buck 1984, Hall 2001). For example, most correlations among measures of perceiving interpersonal affect (and other nonverbal behavior) are in the range $r = -0.10$ to 0.20 s (Hall 2001, p. 135). One exception is a reported $r = 0.80$ between two newer scales, the DANVA-2 and the

JACBART (Nowicki 2007, p. 6). Comparisons between such scales and the perception scales of the MSCEIT seem consistent with the less strong, earlier findings: The JACBART and emotional perception scales of the MSCEIT correlated essentially zero, although the JACBART correlated $r = 0.20$ to 0.26 with other scales of the MSCEIT and MSCEIT Total EI (Roberts et al. 2006). Turning to other measures, the MSCEIT and the LEAS intercorrelate at about the $r = 0.15$ to 0.20 level (Ciarrochi et al. 2003). Yet, in principle, it seems possible to develop scales that intercorrelate more highly. For example, the four branches of the MSCEIT (which share no items in common and use different response scales) intercorrelate $r = 0.27$ to 0.51 (Mayer et al. 2003).

These measures appear, on a theoretical level, to be assessing abilities within the EI domain, yet reports to date indicate that the scales tap different sources of variance. Although the correlations within a test such as the MSCEIT are reassuring, the lack of correlation across tests is both perplexing and troubling. More studies relating these scales are needed, as is a better understanding of the basis of their divergence.

Relation to biopsychological processes.
Another key question concerns how EI relates to biopsychological processes. One argument for EI is that distinctly emotional regions of the brain might carry out information processing differently from more purely cognitive centers. A recent fMRI study indicated that the brain areas most activated when solving MSCEIT problems are the left frontal polar and left anterior temporal regions, which are closely linked with social cooperation (Reis et al. 2007). Similarly, people with higher LEAS scores exhibit greater responsiveness to stimuli in area 24 of the anterior cingulate cortex, which is involved in emotional processing (Lane et al. 1998). Intelligence researchers have long found that higher-IQ participants are able to solve problems with less brain activity (i.e., more efficiently) than those

with a lower IQ. Employing this paradigm, researchers have found that those higher in EI exert less brain activity to solve emotional problems, as indicated by brain wave activity (Jausovec & Jausovec 2005, Jausovec et al. 2001).

Relation to intelligences and related mental abilities. Based on the conceptualizations of EI as a form of intelligence, moderate relations should exist between EI and other measures of cognitive abilities. Studies with the MEIS, MSCEIT, LEAS, and various developmental measures do exhibit positive correlations with verbal, knowledge-based intelligence tests. The overall relationships between the MSCEIT and MEIS scales with verbal intelligence and verbal SAT are about $r = 0.36$; the correlations are lower ($r = 0.10$ to 0.20) for other cognitive intelligences such as perceptual-organizational intelligence. MSCEIT Emotional Understanding scores show the strongest individual relations with verbal/crystallized intelligence measures, with an average $r = 0.38$ across seven studies (Roberts et al. 2007).

The vast majority of EI measures of emotional perception are related $r = 0.20$ or less to tests of reasoning ability (often equated to fluid intelligence; Barchard 2003, Ciarrochi et al. 2000, Mayer et al. 1999, Roberts et al. 2001). One exception to this general finding is the JACBART, which, perhaps because of its speeded component, relates $r = 0.27$ to fluid intelligence (Roberts et al. 2006, Roberts & Stankov 1999).

Some aspects of EI also may intersect with social intelligence. In a factor analysis bearing both on the structure of EI and its relation to other intelligences, the MSCEIT subscales divided into two factors, the first related to Experiential EI (MSCEIT Perception and Facilitation) and the second, Strategic EI, related to socio-emotional reasoning that loaded MSCEIT Understanding as well as scales from the O'Sullivan-Guilford Social Intelligence measure (Barchard & Hakstian 2004).

Intelligence tests (including EI) assess the ability of participants to converge on a correct answer. This contrasts with creativity tests, which emphasize divergent forms of thinking—that is, the capacity to think in novel ways (Averill & Thompson-Knowles 1991). In fact, emotional creativity measured as an ability and MSCEIT Total EI appear entirely independent of one another (Ivcevic et al. 2007).

Overall, the evidence above suggests that ability-based EI measures index emotional knowledge, which is related to verbal-comprehension and/or crystallized intelligence. The magnitude of this correlation is typically $r = 0.30$ to 0.40, which indicates that EI is different from, say, verbal-comprehension intelligence. EI also may exhibit relations with social intelligence, but apparently not with creativity.

Relation to ongoing emotion and emotional empathy. EI theories, although specifying accurate reasoning about emotions, generally are agnostic as to the emotions a person might feel at a given time. Research evidence indicates that few relations exist: MEIS Total EI was unrelated to emotional state in a large sample (Mayer et al. 1999). Nevertheless, the definition of EI includes key aspects of empathy—especially that part of empathy having to do with recognizing others' feelings. Higher EI on the LEAS, MEIS, and MSCEIT does correlate, $r = 0.20$ to 0.43, with self-judgments of empathic feeling (Brackett et al. 2006; Caruso et al. 2002; Ciarrochi et al. 2000, 2003; Mayer et al. 1999; Mayer & Geher 1996).

Relation to benchmark personality traits. EI measures also have been examined in relation to benchmark personality traits such as the Big Five. The frequently studied Big Five traits are Extraversion-Introversion, Neuroticism-Emotional Stability, Openness-Closedness, Conscientiousness-Carelessness, and Agreeableness-Disagreeableness (Goldberg 1993). Mayer & Salovey (1993)

predicted EI would have a low but significant relation to the trait Openness (with which many intelligences correlate; Ackerman & Heggestad 1997). Two reviews of studies indicate that Total MEIS/MSCEIT EI does correlate with Openness, $r = 0.17$ to 0.18, but has its highest relation among the Big Five with Agreeableness, $r = 0.21$ to 0.28, a scale sometimes viewed as reflecting compassion and cooperation.

Measurement Issues Regarding Mixed-Model Scales

Conceptual issues. Mixed Model scales—those that mix in attributes from outside EI—have their own specific measurement characteristics and concerns. The theories behind these instruments mix many attributes with EI, and their measures reflect this (Bar-On 2000, Schutte et al. 1998, Tett et al. 2005). Mixed Model tests include items such as "I can express my needs much of the time" (e.g., assertiveness) or "I am a fairly easygoing person" (e.g., flexibility). Consequently, the instruments lack content evidence for their validity in assessing EI because they fail to focus either on intelligent reasoning about emotion or on using emotions and emotional knowledge to enhance intelligence.

As a matter of practice, Mixed Models all are operationalized with self-judgment scales rather than ability items (Bar-On 2000, Schutte et al. 1998, Tett et al. 2005). (Some scales also use observer reports as a secondary operationalization.) Self-judgment assessments ask questions that measure a person's self-estimated ability, such as "Do you usually clearly perceive the emotional state you are in?" Conceptually, such a response process is not valid for the direct assessment of a mental ability. Moreover, empirical evidence indicates that, generally, self-estimates of intelligence are related only minimally to measured ability (Paulhus et al. 1998); self-estimates of EI appear even less related to such abilities (Brackett et al. 2006). In the case of EI, appropriate feedback may be hard to come

The Big Five: a set of five personality traits: Extraversion, Neuroticism, Openness, Conscientiousness, and Agreeableness, each of which is a composite of more specific intercorrelated traits

EQ-i: Emotional Quotient Inventory

Integrative model approaches: theoretical approaches to EI focused on how multiple relevant abilities operate together to predict outcomes

by, and low ability can impede accurate self-understanding. Self-judgments, therefore, introduce a substantial proportion of variance unrelated to EI.

Indicative findings. The mixed-model scales' use of self-judgment questions, combined with their diverse content, leads to measures that are difficult to assess empirically, and often appear to assess a global pleasant versus unpleasant emotional style. Empirically, for example, many of the individual subscales or test totals of the Bar-On EQ-i, the Self-Report Emotional Intelligence Test, and the Multidimensional Emotional Intelligence Assessment correlate in the range of $r = 0.60$ to 0.70 with single scales of established personality dimensions such as (lower) Neuroticism from the Big Five (Brackett & Mayer 2003, Study 2; Dawda & Hart 2000; Petrides & Furnham 2001; Tett et al. 2005). Two studies indicate that the Big Five scales together predict EQ-i scores in a range of multiple r's $= 0.75$ to 0.79 (Brackett & Mayer 2003, Grubb & McDaniel 2007). Similarly, a scale of psychological well-being predicts the Schutte Self-Report Emotional Intelligence Scale at $r = 0.70$ (Brackett & Mayer 2003); EI ability scales have far lower relations in comparison (see Relation to Benchmark Personality Traits, above).

Empirical research confirms that self-reported EI does not predict ability assessments of EI well. Brackett and colleagues (2006) developed a self-judgment scale based on the Four-Branch Model, correlated it with the MSCEIT's measure of the same four branches, and found a correlation of only $r = 0.19$ between 275 participants' estimates and their actual abilities. More commonly used self-judgment scales of EI, such as the Bar-On EQ-i and Schutte scales, predict the MSCEIT at about the same level (Brackett & Mayer 2003, Zeidner et al. 2005).

Moreover, participants can readily portray more positive self-judgments under conditions of high-stakes selection. For example,

under "fake good" conditions, participants raised their average score on the (self-judgment) Bar-On EQ-i by 0.80 of a standard deviation—before any coaching or training (Grubb & McDaniel 2007).

Mixed Model scales do not define EI in a manner consistent with reasonable scientific terminology. They further employ measurement approaches that are invalid for assessing EI, as the concept is developed here. That said, some of the scales do possess specific merits, such as good standardization, reliability, or factorial validity, as measures of other constructs (e.g., Barchard & Christensen 2007, Grubb & McDaniel 2007).

A growing number of researchers have questioned whether there is a good rationale to label Mixed Models as measuring EI at all (Davies et al. 1998, Matthews et al. 2007, Mayer & Ciarrochi 2006, Murphy 2006). Our review leads us to the same question. The remainder of the review focuses on measures from the specific ability and integrative model approaches that we judge as possessing validity for assessing EI.

WHAT DOES EMOTIONAL INTELLIGENCE PREDICT (OR NOT) IN LIFE OUTCOMES?

A more complete understanding of EI requires an appreciation of how its measures relate to life outcomes. In this section, we attempt to create a condensed version of what one might take away from reading, one by one, a series of articles relevant to this literature. The summary conveys some of the major topics of study, some of the methods, and some of the many findings—both consistent and inconsistent. We present the material without much commentary, allowing readers to obtain a sense of the relationships on their own. In the Discussion section below, we offer some observations on the work, which are further developed in our Summary Points section. Our overview is divided into EI in social relationships, in school, at work, and in relation to well-being.

Social Relations in Childhood and Adolescence

EI consistently predicts positive social and academic outcomes in children (Eisenberg et al. 2000, Schultz et al. 2004). For example, Izard et al. (2001a) found that EKT Emotional Knowledge scores assessed among 5-year-old preschoolers positively predicted the students' third-grade social skills, such as assertion, cooperation, and self-control, as rated by teachers. The same assessment also negatively predicted a composite of problem behaviors such as internalizing and hyperactivity. These findings from economically disadvantaged families held after verbal ability, sex, and selected personality traits all were controlled. Similar findings have been reported by Fine et al. (2003).

Children's skill at emotional regulation appears to influence their social well-being as well (for reviews, see Cole et al. 2004, Eisenberg 2000). In a longitudinal study of children ages 3–4, Denham et al. (2003), collected multimethod ratings of children's emotional regulation and emotion knowledge. In a structural equation model, children's higher emotional regulation and emotional knowledge predicted social competence at ages 3–4 and later on in kindergarten (Denham et al. 2003).

In a study of adolescents, Mestre et al. (2006) found that 15-year-old Spanish students with higher MSCEIT Strategic (Understanding and Management) scores were more frequently nominated as friends by their peers. This finding still held for young women after controlling for IQ and the Big Five personality factors.

Social Relations in Adulthood

Diary studies and self-perceptions of social competence. Lopes and colleagues (2004) conducted a two-week daily diary study of German undergraduates' social interactions, for which participants reported every face-to-face social interaction they participated in lasting 10 minutes or longer. In these

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UNCOVERING NEW INTELLIGENCES

The 1980s and 1990s saw a resurgence in theoretical attention to specific intelligences (e.g., Gardner 1983, Sternberg 1985). For many years, some scientists argued that general intelligence (or *g*) could suffice empirically to represent an individual's many cognitive abilities in predicting occupational, educational, and life success generally (Jensen 1998). Although *g* is a plainly powerful and efficient index of mental ability, the idea that one construct might have such universal importance was hotly debated.

From the 1990s to present, researchers have explored the possibility that intelligences are a more diverse and looser confederation of abilities than once was thought. A particular focus among researchers has been the exploration of "hot intelligences"—intelligences that pertain to personally relevant information—such as practical, social, and emotional intelligence. Social intelligence for example, includes capacities to appraise and understand human relationships (Lee et al. 2000, Weis & Süß 2007). Practical intelligence involves the ability to understand often unstated rules (technically, tacit information) that surround us (Sternberg et al. 2006, Wagner 2000). A specific but often overlooked cognitive intelligence—spatial intelligence—is coming into its own as well (Lubinski 2000, Lubinski et al. 2001). Empirical investigations of many of these intelligences are advancing in a promising fashion. It appears likely that other intelligences beyond EI will add to the prediction of critical life outcomes such as academic and work performance, social relationships, and how well one attains psychological well-being.

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interactions, one or more of participants' scores on MSCEIT Perceiving, Facilitating, and Managing (but not Understanding) significantly predicted participants' perceptions of how enjoyable and/or interested, wanted, and respected they felt in the interactions.

Brackett and colleagues (2006, Study 2) found that higher EI among close friends led to higher self-perceived competence in reacting to their friends' life events. Among friendship pairs, higher EI participants reported making fewer critical remarks, $r = -0.33$, in response to others' successes (perhaps better managing their envy) as well as fewer passive-destructive responses such as "I

don't pay much attention" to the other's positive event. In the same study, higher EI also predicted fewer destructive responses to conflict in close relationships, $r = -0.22$ to -0.27, including fewer active responses, such as "I scream at him," and fewer passive responses, such as "I avoid her." This latter pattern held only for males in the sample.

Others' perceptions of the emotionally intelligent person. A number of findings indicate that having high EI leads others to perceive an individual more positively. For example, Brackett et al. (2006, Study 3) videotaped U.S. undergraduate students engaged in a "get to know you" conversation with a confederate. Four judges later rated the videotape of the target interaction for various attributes. For men, MSCEIT Total EI correlated in the $r = 0.50$ range with judges' ratings of the participants' overall social competence, including how much of a team player they were, how socially engaged they were, and their expressed level of interest in the confederate. There was, however, no significant relationship between EI and any of these variables for the women in the study.

Similar findings come from Lopes et al. (2005). In this study, undergraduates first completed self-report measures that asked about the general quality of their social interactions. The participants then nominated up to eight peers in their same college class who exhibited several aspects of EI. Similar to the findings above, MSCEIT Managing scores correlated $r = 0.28$ to 0.29 with the participants self-reports—and with peer nominations—for such attributes as "sensitive to the feelings and concerns of others" and "willing to help others." These relationships were significant above and beyond variance accounted for by other personality traits and verbal intelligence. In this same study, people high in EI, compared with those who scored lower, more often nominated as friends those people who also had nominated them. Additional support for this phenomenon was found by Lopes et al. (2004).

Conversely, MSCEIT Total EI correlated $r = -0.20$ with social deviance, as indexed by getting into fights or vandalizing property (Brackett & Mayer 2003). In a partial replication, the relationship was also found, but for men only, $r = -0.40$ (Brackett et al. 2004).

Emotional intelligence, family, and intimate relationships. EI also relates to one's family and other intimate relationships. In two studies of parental relations, MEIS EI skills in Perception, Understanding, and Management correlated $r = 0.15$ to 0.23 with self-judgments of perceived parental warmth (Ciarrochi et al. 2000, Mayer et al. 1999). However, perceived social support from parents (as opposed to warmth) shows a more mixed relationship: Only the MSCEIT Managing scale correlated with perceived support from parents, after controlling for the Big Five traits and verbal intelligence ($r = 0.22$; Lopes et al. 2003). No relationship was identified between MSCEIT EI and a report of interacting with one's mother and father (Brackett et al. 2004).

Although a few studies show weak or no influence of EI on intimate relationships (Brackett et al. 2005, Hampel 2003), several studies demonstrate significant correlations between the two. For example, higher DANVA-2 Face and Voice Perception accuracy scores correlated, $r = 0.57$ and 0.63, respectively, to relationship well-being (Carton et al. 1999). MEIS General EI also predicted relationship quality, $r = 0.22$, remaining significant after controlling for the Big Five personality traits and general intelligence (Ciarrochi et al. 2000). MSCEIT Managing Emotion also was positively correlated to the perceived quality of romantic partners (Lopes et al. 2004).

Brackett and colleagues (2005) examined the MSCEIT EI match between partners within a couple. If both members of the couple were low on EI, they experienced more conflict and poorer relationship quality overall, as predicted. Unexpectedly, couples in which one partner was higher in EI than the other

had equivalent (or often better) relationship quality than the high-high EI couples.

Scholastic Outcomes from Grade School to College

A number of studies have examined the impact of EI on academic performance. The previously discussed developmental study by Izard et al. (2001a) found that five-year-old preschoolers' emotional knowledge predicted third-grade teachers' ratings of academic competencies (e.g., arithmetic skills, reading skills, the motivation to succeed), $r = 0.43$. The correlation remained significant after controlling for verbal ability, sex, and socio-emotional traits.

Moving upward from elementary- through college-age students, Halberstadt & Hall (1980) reviewed 22 studies (5 of which included adult populations) of nonverbal sensitivity (including emotional perception) and found a small but significant positive relationship between the ability to identify nonverbal expressions, on the one hand, and cognitive ability assessed by standard tests and school performance, on the other.

Mestre et al. (2006) found that MSCEIT Strategic (Understanding and Managing) EI correlated, $r = 0.47$, with teacher ratings of academic achievement among 15-year-old Spanish boys—above and beyond IQ and the Big Five personality traits. A similar relation for teacher ratings for girls dropped below significance after controlling for IQ and personality. Scores on the MSCEIT Total EI also were higher for gifted compared to nongifted seventh- through tenth-grade Israeli students (Zeidner et al. 2005).

The MSCEIT Total, Strategic, and Understanding scales can predict school grades, between $r = 0.14$ and 0.23 (Brackett et al. 2004, O'Connor & Little 2003). This relationship (as well as others discussed above), however, may be accounted for in part by the overlap between these scales and cognitive intelligence. Predictions from the MSCEIT and LEAS regarding academic achievement often

decrease or become nonsignificant when controlling for cognitive intelligence and other personality measures (Amelang & Steinmayr 2006, Barchard 2003, Bastian et al. 2005, Brackett & Mayer 2003).

Emotional Intelligence at Work

Decision making and negotiation. People's work performance—and EI's relation to it—can be studied by simulating work environments in a laboratory setting. For example, Day & Carroll (2004) studied research participants in a group decision-making task. The participants' task was to determine the order in which employees should be laid off during an organizational downsizing. The ranking of which employees to layoff was first completed individually and then together in a meeting to achieve group consensus. Participants with high MSCEIT Total scores received higher organizational-citizenship ratings from other group members. MSCEIT Perception exhibited an $r = 0.17$ relation with individual (but not group) performance on the layoff task.

Managerial in-basket exercises allow researchers to study participants' performance at fact-finding, analyzing problems, and decision making more generally. In an organizational simulation with undergraduates, JACBART Emotional Perception correlated $r = 0.28$ with successful problem analyses, although not with related criteria (Matsumoto et al. 2004, Study 3).

In a negotiation study, Elfenbein et al. (2007) studied undergraduate buyers and sellers. Their Emotion Perception accuracy was measured on the Singapore Picture Scale, a test similar to the JACBART. Higher Emotion Perception on the part of sellers increased the amount of money gained overall by the negotiating pair and was marginally related to the proportion of money the seller individually received. Buyers' Emotional Perception showed no effect.

Mueller & Curhan (2007) examined a group of U.S. negotiators, all students in a Master of Business Administration program.

They found that high MSCEIT Understanding predicted that one's negotiation partner would feel more positively about his/her outcome, $r = 0.23$, even after controlling for the partner's positive affect and how much the negotiation partner received. The creation of positive affect by people with higher EI may be especially important because it can spread among groups via emotional contagion (Barsade 2002, Hatfield et al. 1994).

Field studies of emotional intelligence and performance. In a meta-analysis, Elfenbein et al. (2007) found that Emotion Recognition Accuracy predicted a modest but significant and consistent rise in workplace effectiveness in professionals as diverse as physicians, human service workers, school teachers and principals, and business managers. Also, Elfenbein & Ambady (2002) found that DANVA Facial (but not Vocal) Emotional Perception scores correlated $r = 0.25$ to 0.45 with employee performance, measured via senior staff members' ratings, in a yearlong U.S. not-for-profit public service program.

Lopes et al. (2006) examined the work performance of a sample of 44 analysts and clerical/administrative employees from the financial staff of a U.S.-based insurance company. After controlling for relevant personality and demographic variables, MSCEIT Total EI correlated $r = 0.28$ to 0.45 with company rank, higher merit increases, peer and supervisor rated sociability, and rated contribution to a positive work environment. A similar study by Rosete & Ciarrochi (2005) examined 41 executives from a large Australian public service organization. Executives' MSCEIT Total, Perception, and Understanding scores correlated in the $r =$ mid 0.30s range with rated "cultivates productive working relationships" and rated personal drive and integrity—but not with "achieves results." In this case, their EI scores, in other words, correlated with how they achieved rather than with what they achieved. Correlations remained significant after controlling for IQ and other personality traits.

A recent study builds on research that extraverts, relative to introverts, may be better able to employ emotional information since they are stimulated rather than overwhelmed by the emotion information. In a study of 177 managers in a U.S.-based global corporation, DANVA Facial Recognition correlated with transformational leadership styles as rated by 480 subordinates, and this relationship was strongest for managers higher in extraversion (Rubin et al. 2005). Turning to the moderating influence of cognitive intelligence, Côté & Miners (2006) found that MSCEIT EI predicted supervisor-assessed task performance and organizational citizenship (in some instances) in a sample of 175 full-time university employees, and it did so more strongly for people with lower cognitive intelligence. This suggests that higher EI may compensate for lower skill levels in other areas.

Psychological and Physical Well-Being

Psychological well-being. A person's inner well-being and external performance often mutually influence one another. Given that high EI appears to influence positive relationships and other outcomes, does it enhance a person's overall psychological well-being? The MSCEIT Total EI correlates $r = 0.16$ to 0.28 with psychological well-being (Brackett & Mayer 2003, Brackett et al. 2006), whereas MEIS Total EI relates to life satisfaction between $r = 0.11$ and 0.28 after controlling for other personality variables, including cognitive intelligence and socio-emotional variables (Ciarrochi et al. 2000, Mayer et al. 1999). The MEIS and MSCEIT Total EI, as well as the DANVA 2 Standing scales, correlate with self-esteem from $r = 0.19$ to 0.33 (Brackett et al. 2006, Ciarrochi et al. 2000, Pitterman & Nowicki 2004), though the relationship for the DANVA held for men only. Moving from well-being to distress, DANVA-2 Emotional Accuracy scores relate inversely overall with depression, $r = -0.42$ (Carton et al. 1999). MSCEIT EI relates $r = -0.24$ with anxiety (Bastian et al.

2005), and controlling for relevant personality variables, $r = -0.23$ and -0.16 with feeling worried and distressed before beginning a challenging task (Bastian et al. 2005, Matthews et al. 2006).

Physical health behaviors. EI also has been studied in relation to some health behaviors. For example, higher MEIS Total EI scores correlated $r = -0.16$ and -0.19, respectively, with lower tobacco and alcohol use among adolescents (Trinidad & Johnson 2002). The MSCEIT Total EI did not predict tobacco use among college students in two other studies; however, it again predicted alcohol use in one study (for men only, $r = -0.28$) (Brackett & Mayer 2003, Brackett et al.

2004). The MSCEIT Total EI either did not predict (Brackett & Mayer 2003) or moderately predicted illegal drug use, $r = -0.32$, for men only (Brackett et al. 2004). Finally, high emotional perception skills reduced the risk of (self-reported) Internet addiction, as measured among a sample of 41 undergraduates from the Stockholm School of Economics (Engelberg & Sjöberg 2000).

Overall Trends and Intriguing Findings

As we examined these and other findings, we identified trends that appeared to extend across several studies or more; these are summarized in **Table 2**. The trends include, for

Table 2 Summary of selected trends in emotional intelligence outcome studies

General effect	EI measures	Representative studies*
1. Better social relations for children. Among children and adolescents, EI positively correlates with good social relations and negatively correlates with social deviance, measured both in and out of school as reported by children themselves, their family members, and their teachers.	DANVA ER Q-Sort EKT ESK MSCEIT	• Denham et al. (2003) • Eisenberg et al. (2000) • Fine et al. (2003) • Izard et al. (2001)
2. Better social relations for adults. Among adults, higher EI leads to greater self-perception of social competence and less use of destructive interpersonal strategies.	EARS MEIS MSCEIT	• Brackett et al. (2006) • Lopes et al. (2004)
3. High-EI individuals are perceived more positively by others. Others perceive high-EI individuals as more pleasant to be around, more empathic, and more socially adroit than those low in EI.	MSCEIT	• Brackett et al. (2006) • Lopes et al. (2004) • Lopes et al. (2005)
4. Better family and intimate relationships. EI is correlated with some aspects of family and intimate relationships as reported by self and others.	DANVA-2 MEIS MSCEIT	• Brackett et al. (2005) • Carton et al. (1999)
5. Better academic achievement. EI is correlated with higher academic achievement as reported by teachers, but generally not with higher grades once IQ is taken into account.	LEAS MSCEIT	• Barchard (2003) • Izard et al. (2001) • O'Connor & Little (2003)
6. Better social relations during work performance and in negotiations. EI is correlated with more positive performance outcomes and negotiation outcomes in the laboratory and with more success at work, according to some preliminary research.	DANVA JACBART MEIS MSCEIT	• Côté & Miners (2006) • Elfenbein et al. (2007) • Rubin et al. 2005
7. Better psychological well-being. EI is correlated with greater life satisfaction and self-esteem and lower ratings of depression; EI also is correlated inversely with some negative physical health behaviors, but this has not yet been found as a strong set of relationships.	MSCEIT LEAS	• Bastian et al. (2005) • Gohm et al. (2005) • Matthews et al. (2006)

*More studies are indicated in the corresponding portion of the Outcomes section of the review.
Acronyms: DANVA, Diagnostic Analysis of Nonverbal Accuracy Scales; EARS, Emotional Accuracy Research Scale; EI, emotional intelligence; EKT, Emotional Knowledge Test; ER Q-Sort, emotional regulation Q-Sort; ESK, emotion situation knowledge; JACBART, Japanese and Caucasian Brief Affect Recognition Test MEIS, Multifactor Emotional Intelligence Scale; MSCEIT, Mayer-Salovey-Caruso Emotional Intelligence Test.

**Incremental
validity:** an attribute
of a test that refers to
its capacity to predict
a criterion over and
above other
empirically or
conceptually related
tests

example, that EI correlates with better social relationships for both children and adults, including in family relationships. Higher EI also predicts academic achievement (although this may be due to its overlap with cognitive intelligence), better social relationships at work, and better psychological well-being (see **Table 2**).

A few other individual findings caught our eye as well, including correlations between EI and (*a*) career interests (Caruso et al. 2002), (*b*) attitudes toward money (Engelberg & Sjöberg 2004), (*c*) money gained in a negotiation (Elfenbein et al. 2007), (*d*) emotional eavesdropping (Elfenbein & Ambady 2002), and (*e*) knowing how one would feel after an event—emotional forecasting (Dunn et al. 2007). Another set of studies concerned whether people who are more emotionally overwhelmed may be unable to use their EI (Gohm et al. 2005) and how EI related to adult attachment (Kafetsios 2004). Finally, we note the beginnings of research on EI training and its outcomes (e.g., Brackett & Katulak 2006, Izard et al. 2004).

DISCUSSION

The Scope and Measure of Emotional Intelligence

Over the past 18 years, research on EI has emerged and a remarkable amount has been learned. At the same time, EI is still a new field of research, and much remains to be done. In the preceding sections of this review, we examined mainstream conceptions of intelligence and emotion, defined EI, and described the scope of research in the field. We also described Specific-Ability, Integrative-Model, and Mixed-Model approaches to studying the field. We noted that there have been some real inroads into providing construct validity evidence for a range of EI measures since the field's inception. Specific Ability and Integrative Models, in particular, have generated promising measures of a unique psychological construct.

Outcomes of Emotional Intelligence

In the Outcomes section, we surveyed key findings regarding EI. Accumulating findings indicate that EI may predict important criteria in several areas, which are summarized in **Table 2**. Those findings include, for example, that EI correlates with better social relationships and with fewer problem social behaviors, and that this relationship begins in childhood continuing through adulthood.

As with much research of this sort, the overall consistencies in research findings that we have identified are accompanied by many inconsistencies as well. For example, measures of EI such as the MSCEIT sometimes predicted an outcome with one subscale, and in another study, predicted the same outcome but with a different subscale. Another inconsistency is that higher EI predicted some but not other specific indices of a general outcome such as good work performance.

Such issues reflect the realities of empirical research, in which research designs may be less than perfect, chance effects may lead to spurious significant or nonsignificant outcomes, samples may not be large enough, the range of target behavior may be restricted in a sample, and many other less-than-desirable factors may impinge. As research continues, these ambiguities likely will be clarified.

Concluding Comments

In the Summary Points below, we have distilled what we regard as the key ideas of this review. In the Future Issues section, we have highlighted some of the more important unresolved issues of today. Whatever the future holds for the science of EI, we believe that the concept has proven a valuable addition to contemporary science and practice. Consideration of EI theory and assessment has proven beneficial to the study of emotions and the study of intelligence, and raised awareness of the importance of emotional components in diverse domains of human abilities and their application in people's lives.

SUMMARY POINTS

1. Emotional intelligence (EI) is the ability to carry out accurate reasoning focused on emotions and the ability to use emotions and emotional knowledge to enhance thought.

2. Theoretical approaches to EI divide into two categories. Specific-Ability approaches examine relatively discrete mental abilities that process emotional information. Integrative-Model approaches describe overarching frameworks of mental abilities that combine skills from multiple EI areas.

3. Aside from the central Specific Ability and Integrative Model approaches to EI, some psychologists have suggested a third approach to the field: Mixed Model approaches. Such models mix diverse attributes, such as assertiveness, flexibility, and the need for achievement, that are not primarily focused on emotional reasoning or emotional knowledge. These models do not fall within the scope of EI as it is developed here.

4. EI measures based on Specific Ability and Integrative Models exhibit test validity as a group. This conclusion is based on an analysis of (*a*) the tests' design, including the tests' contents, response processes, and reliabilities, (*b*) the tests' structures, including their factorial validity, and (*c*) the tests' convergent and divergent validity, including their relations with criterion variables. One serious concern is that different scales of accurate emotional perception often do not correlate highly with each other. This lack of convergence among measures in the emotion perception domain is not yet understood.

5. Measures of EI based on Mixed Model approaches do not provide valid assessments in the area. This conclusion is based on an analysis that concludes such measures (*a*) employ response processes that assess self-concept rather than actual ability, (*b*) draw on attributes, such as flexibility and assertiveness, that are not part of the EI concept as understood here, and (*c*) empirically exhibit substantial overlap with other commonly studied personality traits.

6. EI is a predictor of significant outcomes across diverse samples in a number of real-world domains. It predicts social relations, workplace performance, and mental and physical well-being.

7. EI often shows incremental validity in predicting social outcomes over other measures of intelligence and socio-emotional traits.

8. The relation between EI and life outcomes suggests that EI may valuably inform practitioners' understandings of, and interventions in, human behavior.

FUTURE ISSUES

1. *Does EI fit into a comprehensive taxonomy of mental abilities?* Empirically supported taxonomies of cognitive mental abilities already exist (Carroll 1993). Could such taxonomies be enlarged to include emotional and social intelligences? Such taxonomies promote an understanding of mental abilities, define their interrelations, and ensure that the most important among those abilities are assessed. For example, recent

iterations of the Wechsler and Standford-Binet tests, drawing in part on such taxonomies, added scales to assess previously underemphasized abilities.

2. *What else does EI predict beyond the findings summarized here?* Researchers already have examined the relationships between EI and valued criteria. Are there more possibilities? For example, EI might predict a wider range of outcomes at school and work than studied thus far, such as attrition, attendance, and satisfaction. Research on EI in the home, as well as across different psychiatric groups, and patients' success in psychotherapy is of interest as well. Such research can help psychologists better understand the meaning and utility of the EI concept.

3. *What can meta-analyses clarify about EI?* Reviews of EI outcomes already exist. Future reviews could rely more on more formal techniques such as meta-analyses of effects in the area, focusing in particular on the correlates of measures based on Specific-Ability and Integrative-Model approaches. For example, a number of studies seem to indicate that EI's predictive effects may be stronger for men than women, but is this impression correct? Conducting such analyses will place such findings and claims concerning EI on a firmer footing.

4. *What is the effect of teaching emotional knowledge?* Studies of teaching emotional knowledge and reasoning in the home, school, and workforce already have begun. Are such applications effective and, if so, in what ways? Laboratory analogues, such as the experimental manipulation of emotional management, can help researchers understand EI's effect on outcomes. Field research also has the potential to indicate EI's impact if the effects of emotional teachings are clearly distinguished from other ameliorative practices. The results from experimental and applied research often are valuable guides to theory.

DISCLOSURES

John D. Mayer is an author of the Mayer-Salovey-Caruso Emotional Intelligence Test and receives royalties from that test. Richard D. Roberts works at the Center for New Constructs of Educational Testing Service and is developing for that organization, and also for other organizations through contract work, a range of assessments, some of which could be considered alternatives to or competitors with contemporary measures of EI.

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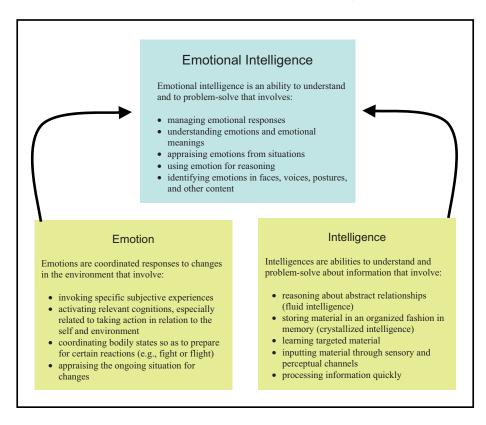
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Seminal article that introduces a theory of EI and argues for its study by the scientific community.

The Scope of Emotional Intelligence

Emotional Intelligence

Emotional intelligence is an ability to understand and to problem-solve that involves:

- managing emotional responses
- understanding emotions and emotional meanings
- appraising emotions from situations
- using emotion for reasoning
- identifying emotions in faces, voices, postures, and other content

Emotion

Emotions are coordinated responses to changes in the environment that involve:

- invoking specific subjective experiences
- activating relevant cognitions, especially related to taking action in relation to the self and environment
- coordinating bodily states so as to prepare for certain reactions (e.g., fight or flight)
- appraising the ongoing situation for changes

Intelligence

Intelligences are abilities to understand and problem-solve about information that involve:

- reasoning about abstract relationships (fluid intelligence)
- storing material in an organized fashion in memory (crystallized intelligence)
- learning targeted material
- inputting material through sensory and perceptual channels
- processing information quickly

Mixed Models of Emotional Intelligence

Mixed models of emotional intelligence begin with emotional intelligence-related qualities such as the ability to perceive emotions accurately, and mix in with them:

- motives such as *need for achievement*
- social styles such as *gregariousness* and *assertiveness*
- self-related qualities such as *self-esteem*
- control-related qualities such as *flexibility* and *impulse control*

Figure 1

Emotional Intelligence (EI; *upper box*) is closely related to two other scientific concepts: intelligence and emotion. Intelligence and emotion have consensual meanings for most psychologists. For example, intelligences (*box to right*) involve abilities to understand information; emotions (*box to left*) are coordinated responses to the environment. EI is the ability to reason about emotions as well as the capacity to use emotions and emotional information to assist reasoning. Specific-Ability approaches to EI (*upper box, bulleted items*) study such matters as how well a person identifies emotions in faces or how well a person understands emotional meanings. Integrative-Model approaches to EI (*upper box, overall*) concern the study of specific abilities together. Mixed-Model approaches (*bottom*) are less related to EI and to the other two approaches. Although they typically study some relevant emotion-specific abilities, they also add in motives, social styles, self-related qualities, and other traits that do not concern a primary focus on emotion or emotional reasoning.

Two Items of the Sort Found on
Emotional Intelligence Scales

1.

Emotion	Select one:
a. Happy	O
b. Angry	O
c. Fearful	O
d. Sad	O

2.
Tom felt worried when he thought about all the work he needed to do. He believed he could handle it – if only he had the time. When his supervisor brought him an additional project, he felt ____. (Select the best choice.)

Emotion	Select one:
a. Frustrated and anxious	O
b. Content and calm	O
c. Ashamed and accepting	O
d. Sad and guilty	O

Figure 2

The two test items, *1* and *2*, are typical of those that measure emotional intelligence. Item *1* measures emotional accuracy with a face of the sort found on the Diagnostic Analysis of Nonverbal Accuracy Scales-2. The participant's job is to identify the emotion expressed in the face (alternative *b*, angry, is the correct choice in this case). Item *2* represents an emotion understanding item of the sort that appears on the Mayer-Salovey-Caruso Emotional Intelligence Test. The participant's job is to identify the correct feeling that the individual might experience (alternative *a* is most likely, given the information supplied).

Contents

Errata

An online log of corrections to *Annual Review of Psychology* articles may be found at
http://psych.annualreviews.org/errata.shtml