Citation:

Schulze, R., Roberts, R. D., Zeidner, M., & Matthews, G. (2005). Theory, measurement, and applications of emotional intelligence: Frames of reference. In R. Schulze & R. D. Roberts (Eds.), *Emotional intelligence: An international handbook* (pp. 3–29). Hogrefe & Huber.

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Theory, Measurement, and Applications of Emotional Intelligence: Frames of Reference

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Summary

This chapter provides an introduction to theory, measurement, and applications of psychological constructs, with special reference to that set of concepts standing at the interface of emotional intelligence (EI) research. In particular, we provide the reader with a brief overview of the fields of intelligence, emotions, and personality research. We also discuss the importance of measurement in individual differences psychology and a subset of the methods that are often utilized by researchers working in this sub-discipline. Finally, we suggest the potential importance of EI in applied fields. Throughout these passages, we aim to establish the frames of reference for subsequent chapters in order to facilitate the reader's understanding of the many issues raised by contributors to this edited volume.

1.1 INTRODUCTION

Traditional approaches to cognitive assessment generally require the solution to an abstract problem (e.g., rotating an object in three-dimensional space) or some factual item that is important to the dominant culture (e.g., knowing the meaning of words), for which responses are scored as either right or wrong. Thus assessed, cognitive ability provides the single best psychological predictor of many real-life criteria. For example, meta-analyses have suggested that cognitive measures predict job and academic performance better than any other measured concept of psychological, sociological, or demographic significance (see, e.g., Schmidt & Hunter, 1998). However, while noteworthy, these relationships are actually constrained by rather modest limits. For example, even when cognitive tests are combined with other, well-established, psychological measures (e.g., personality, biographical data) and statistical corrections are made for a range of artifacts, validity coefficients for the prediction of real-life criteria seldom exceed .60 (e.g., Jensen, 1998; Matthews, Zeidner, & Roberts, 2002; Neisser et al., 1996). Moreover, cognitive constructs have often been criticized for being culturally and/or ethnically insensitive, ecologically questionable, and largely contrived. Findings from meta-analyses, along with attendant criticisms of cognitive tests, have spurned researchers to explore new psychological domains that might collectively raise the level of prediction while simultaneously addressing critical concerns.

In the current book, a range of specialists will argue that emotional intelligence (EI), along with two closely related constructs (i.e., social and practical intelligence) represent important psychological phenomena that have so far been given limited consideration by scientists working within this tradition. Broadly conceived, EI, which is discussed more often in the book than the other two constructs, represents a form of ability that processes and benefits from the emotional system (Matthews et al., 2002; Matthews, Roberts, & Zeidner, 2004; Mayer, Salovey, & Caruso, 2000). Of note, it may comprise an entire family of constructs that may be juxtaposed to concepts that derive from traditional approaches to the measurement of academic intelligence. In turn, each EI construct may add incremental validity (over and above cognitive abilities, as typically measured) to the prediction of real-life outcome variables, including physical health, academic performance, perceived quality of life, and psychological well-being.

In this opening chapter, we provide an overview of intelligence models, emotions theories, and a construct that has come to be closely related to EI because of the proliferation of self-report measures used to assess it: personality. We also explore various methods and techniques frequently used by scientists working in these fields. In the penultimate section we touch briefly on applied issues, before closing with some comments on how this chapter is to be viewed in the context of the entire volume.

1.2 HUMAN INTELLECTUAL ABILITIES

Scientific understanding of human abilities has gained much from the research of Carroll (1993), who summarized and integrated over 400 studies conducted within the factor analytic tradition (Roberts, Markham, Zeidner, & Matthews, 2005). Carroll's reanalysis of each data set led him to a model having three levels (or strata). On Stratum I lay primary mental abilities. On Stratum II are a variety of broad cognitive abilities also identified by Cattell, Horn, and associates in their theory of fluid and crystallized intelligence (e.g., Horn & Noll, 1994). Finally, on the third-stratum is a general intelligence factor. The importance of Carroll's concepts extends to educational interventions, public policy on testing, and sociological issues (see, e.g., Spearitt, 1996). It is also likely to guide theory and research in individual differences for some time (Roberts et al., 2005).

The uniqueness of Carroll's (1993) model is that virtually all models of cognitive abilities may be subsumed under its broad umbrella. In the passages that follow, we introduce each of these models, which contributors to this volume will variously refer to. Before leaving Carroll, it is perhaps appropriate to note that he did make suggestive comments of direct relevance to issues raised by contributors to this book (i.e., emotional, social, and practical intelligence). In particular, Carroll (1993) notes that there is evidence for a domain of behavioral knowledge, which is relatively independent from Stratum II constructs, certainly in some data sets. He also suggests that this domain requires more careful and systematic exploration than had been accomplished up to the time of his writing.

1.2.1 Structural Models of Intelligence

In the following subsections, we present a selection of prominent structural models of intelligence. They are all very closely related to a statistical technique called *factor analysis* that will not be explained in this chapter. For a deeper understanding of structural models of intelligence—and factor analysis, which many theories of EI draw upon—the reader is referred to Schulze (2005).

Psychometric g. Perhaps the most famous theory of intelligence is that offered by Spearman (e.g., 1923) who proposed that there are two factors underlying mental test performance: a general factor (g) and specific factors (s). Specific factors are unique to performance on any cognitive test, whereas the general factor permeates performance on all intellectual tasks. As a consequence, Spearman postulated that g alone is of psychological significance. Individual differences in g are the result of differences in the magnitude of mental energy invested in any given task. It is worth noting that a strict g account of human intelligence would render the concept of EI quite problematic; by definition, EI requires the presence of at least one other intelligence (e.g., something we might call rational intelligence) for the qualifier (i.e., emotional) to have cur-

rency (Matthews et al., 2002). This notion is clearly inconsistent with a single-factor intelligence model.

Primary mental abilities. In a significant departure from Spearman, Thurstone (e.g., 1938) proposed, and later provided supportive evidence for, primary mental abilities (PMAs), which collectively comprise intelligence. While originally finding thirteen such factors, Thurstone eventually settled on nine that he was both able to consistently validate and assign psychological labels. The PMAs so derived include: verbal comprehension, verbal fluency, number facility, spatial visualization, memory, inductive reasoning, deductive reasoning, practical problem reasoning, and perceptual speed. These factors are not ordered in any particular way and are thus of equal importance in detailing the structure of intelligent behavior (for this reason, Thurstone's model is sometimes called an *oligarchic theory*).

Structure-of-intellect model. While the number of factors in Thurstone's theory is large, Guilford (e.g., 1967, 1988) took a more extreme view in positing that some 180 factors comprise intelligence. Accordingly, for Guilford, every mental task involves three aspects (also called *facets*): operation, content, and product. There are six kinds of operations in this model, five types of content, and six varieties of products. The *structure of intellect* has been symbolized as a rectangular prism composed of 180 ($6 \times 5 \times 6$) smaller prisms. Each dimension of this prism corresponds to one of the three ingredients (i.e., operation, content, and product) with each of the 180 possible combinations of these three categories forming even smaller rectangular prisms. An early appeal of this model was its ability to incorporate both creativity and social intelligence (what Guilford calls behavioral cognition [see, e.g., O'Sullivan & Guilford, 1975]) into its structure—psychological dimensions that few models of intelligence include. For this reason, the reader may note that several of the chapter authors refer to the structure-of-intellect model in their commentaries.

Gf-Gc theory. Various critics bring into question each of the preceding theories highlighted above; for example, the number of PMAs has shown to exceed nine, though equally the data attest that there are considerably less than 180. Moreover, PMAs tend to cluster together, suggesting a hierarchical arrangement of factors. For this reason, contemporary focus has been given to hierarchical models of intelligence. In the most prominent of these—the theory of fluid (Gf) and crystallized (Gc) ability—there is considered to be enough structure among established PMAs to define several distinct types of intelligence. Empirical evidence, from several lines of inquiry, supports the distinctions between factors of this theory (e.g., Cattell, 1971; Horn & Noll, 1994; Roberts et al., 2005). Data have shown that these broad factors: (1) involve different underlying cognitive processes; (2) share different predictive validities; (3) are differentially sensitive to intervention; and (4) appear to be subject to different sets of learning and genetic influences.

The most compelling evidence for the distinctions between these constructs comes from factor analytic and developmental research. The main distinguishing feature between Gf and Gc is the amount of formal education and acculturation that is present either in the content of, or operations required during, tests used to measure these abilities. It is well established that Gf depends to a much smaller extent on formal education experiences than does Gc. Moreover, while Gc remains constant or improves slightly over the course of an individual's life span, Gf generally declines as a function of age. Besides Gf and Gc, evidence suggests the existence of broad visualization (Gv), broad auditory function (Ga), short-term acquisition and retrieval (SAR), tertiary storage and retrieval (TSR), and broad speediness (Gs). In isolation, each construct represents a broad organization of ability that involves mental processes, for which each factor is purported to have a neurophysiological counterpart.

1.2.2 Systems Theories of Intelligence

Two contemporary theorists—Gardner (1993) and Sternberg (1985)—have proposed intelligence models that attempt to be fairly encompassing in dealing with both the internal and external world of the human being. Because such theories view intelligence as a complex system, they are often referred to as *system models*, a point of departure used to demarcate them from the structural models covered above. Such systems models, in expanding the subject matter of intelligence research, include concepts that structural models would not necessarily view as intelligence. Perhaps because of their breadth, EI researchers often embrace systems theory accounts of intelligence more strongly than they do structural theories. For example, one will find no mention in Goleman (1995) of structural models of human cognitive abilities, although he cites Gardner's theory to support scientific evidence for EI quite frequently.

Multiple intelligences. Gardner's (1993) theory of "multiple intelligences" derives from consideration of criteria, such as domains where extraordinary degrees of talent/giftedness are exemplified, deficits in brain-damaged individuals have been isolated, or there appears an evolutionary history and plausibility. In all, Gardner posits seven independent types of intelligence. These include: linguistic intelligence, spatial intelligence, logical-mathematical intelligence, musical intelligence, bodily-kinesthetic intelligence, intrapersonal intelligence, and interpersonal intelligence. The final two intelligences cover the individual's attempts to understand both their own and other people's behaviors, motives, and/or emotions. Clearly, both of these constructs are relevant to EI.

Triarchic theory. Sternberg (1985) has also emphasized a departure from traditional conceptualizations, defining intelligence as "purposive adaptation to, and selection and shaping of, real-world environments relevant to one's life" (p. 45). By recourse to various analogies, Sternberg shows that academic intelligence, as assessed by psychometric tests, is imperfectly related to the ability

to function intelligently in everyday life. On this basis, he goes "beyond IQ" to emphasize different aspects of intellectual functioning, prominent of which is practical intelligence (PI), a concept that contributors to this volume actually discuss in some detail. According to Sternberg, PI is especially dependent on acquired tacit knowledge, which is procedural rather than declarative, informal rather than formal, and generally learnt without explicit instruction. In short, tacit knowledge is reflected in knowing what to do in a given situation, and getting on and doing it. It occurs without ever necessarily being taught what to do, how to do it, or being able to articulate why you are doing it.

Practical, social, and emotional intelligence share a focus on acquired knowledge (declarative and procedural), flexible cognitive-retrieval mechanisms, and problem solving that does not lend itself to one correct solution. Recently, Hedlund and Sternberg (2000) argued that the main distinguishing feature between each concept lies in the content of the knowledge, and the types of problems, emphasized. Thus, "unlike many approaches to understanding social and emotional intelligence, the tacit-knowledge approach ... limits the definition of practical intelligence to cognitive ability (such as knowledge acquisition) rather than encompassing an array of individual differences variables" (Hedlund & Sternberg, 2000, p. 157). Elsewhere, we have suggested three categories of tacit knowledge that directly impinge upon EI: managing self, managing others, and managing tasks (Matthews et al., 2002).

Concluding thoughts on intelligence theories. This brief foray into theories of intelligence suggests that the concept of EI has a richer history than many of its principal advocates often imply. Our commentary also suggests that paramount to the development of EI models should be how constructs comprising it align with intelligence models (whether they be structural or systems approaches). This issue raises many questions; for example, is EI really a new form of ability or can it be subsumed under one or more already existing constructs? Presently we know very little of how EI relates to broad cognitive abilities, or how EI relates to practical and social intelligence. Because these are important scientific issues, in several chapters that follow, contributors take up these issues in considerable detail.

1.3 EMOTIONS THEORY

In this section, we give the reader some background on consensus and controversies surrounding the study of emotions that contributors to this book will often draw upon, albeit sometimes implicitly. Our aim is to equip the reader with sufficient information to critically evaluate the status of EI models, measures, and applications discussed throughout the book for its correspondence with features outlined in the account of emotions theory that follows. Notably, this topic is often given a relatively minor role in accounts of EI, though underlying many of the approaches discussed in the current volume are issues highlighted throughout this section.

In particular, we will come to find that there are a range of EI theories. One reason for this state-of-affairs appears to be the fact that psychological theories of emotions result in several, incompatible approaches. Emotions have been related to a set of largely independent (i.e., modular) brain systems; to a central executive control system residing in the frontal cortex; to dimensions of subjective experience measured by questionnaires; and to information-processing routines for self-regulation. Indeed, from a scientific standpoint, the subjective nature of emotions constitutes a complex problem, which specialists are forced to grapple with. Although there are physical counterparts to emotions (e.g., facial expressions), they are primarily defined by labels attached to conscious awareness (e.g., feelings of sorrow). Psychological science has a materialist basis; hence it is enigmatic why any material object, including the brain, has the property of awareness (Matthews et al., 2002). The broad answer to this problem has been to construe emotions as corresponding to some underlying process or system, which can be described in materialist terms. Thus conceived, emotions might represent a type of learning, specific brain systems, properties of information-processing mechanisms, and so forth.

Researchers also differ in their conceptions of the correspondences between emotions and physical reality. A disconnect between theorists concerns the centrality of subjective experience. Biological theorists are inclined to downplay subjective emotion (see, e.g., Damasio, 1999; Panksepp, 1998). For them, emotion is (1) fundamentally a state of specific neural systems, (2) activated by motivationally significant stimuli, and (3) a construct difficult to observe. The activity of the system is expressed through various responses including autonomic nervous system activity, behaviors, and subjective feelings, which are conceptually distinct from emotions (Damasio, 1999). Conversely, emotions may be seen as a subset of conscious experience. This approach is identified with the operationalization of emotions through self-report measures. There is a large literature on the measurement of emotions and feeling states, which uses standard psychometric techniques to identify and validate dimensions of feeling (see Matthews et al., 2002).

Another disjuncture among emotions theories concerns how emotions interrelate with cognition and motivation. Emotions are typically associated both with evaluations of personal significance and with motivations to act. For example, fear correlates with evaluations of personal threat and with the inclination to escape the feared object. Traditionally, emotion (subsumable under the superordinate category of *affect*), motivation (also referred to as *conation*), and cognition make up a three-fold classification used in many areas of psychology. Emotion thus represents a distinct system, separate from motivation and cognition, though interacting with them. Given separate domains, there are various conceptions of the inter-relationships between them. One view is that emotions are chained to motivations and cognitions (Plutchik, 1980);[1]

[1]It is interesting to note that most prominent social psychological theories of attitude–behavior relationships—for example, the theory of reasoned action and theory of planned behavior (see Schulze & Wittmann, 2003)—contain exactly such links as one of their cornerstones.

another is that emotions "combine motivational, cognitive, adaptational, and physiological processes into a single complex state that involves several levels of analysis" (Lazarus, 1991, p. 6). Viewed from this perspective, the feasibility of studying EI comes to depend on the way that a researcher assumes affect, conation, and cognition are linked.

Yet another disconnect among theories of emotions refers to the extent to which feeling states are free-floating in some specific interaction with the external environment. A distinction is often made between emotions and moods (e.g., Ortony, Clore, & Collins, 1988). An emotion is transient, tied to a particular stimulus (or event), and appears quite complex and differentiated because it reflects an individual's cognition of an event. Moods, by contrast, are more free-floating, need not refer to any particular object, and may persist longer than emotions. Moods also appear more easily reduced to a small set of basic dimensions. Much emotions theory explicitly suggests that emotions are grounded in specific interactions with the environment, a proposition that jars with the actual content of emotions measures, which often assess general feelings, rather than feelings about some event.

1.3.1 Issues in Conceptualizing Emotions

Singular or multiple? Emotion may be defined as a high-level mental property (e.g., Lazarus, 1991) or as an attribute of physiological functioning (Damasio, 1999). Emotions may also be identified with parts of conscious experience, with latent systems whose state may be unconscious, or with psychophysiological systems of causal relevance. Currently, there is little that is definitive in the empirical evidence to decide which definition is the most efficacious. Generally, it is useful to apply a three-level cognitive science framework (Pylyshyn, 1999). Depending on the research context, it appears useful to see emotion as (1) a property of brain systems, (2) information-processing, or, (3) abstracted personal meanings that do not map onto neural or cognitive architectures in any simple way (Matthews et al., 2002).

It appears useful to distinguish two families of emotions theory. The first type of theory starts with a conceptual analysis of emotion, distinguishing emotions from other aspects of mental life and attempting to delineate defining features of general and specific emotions. Different instances of theory differ in fundamental issues relating to definition, consciousness, and causality. The common theme, however, is that emotion is a construct, which may be distinguished from the subjective feelings that are one of several manifest expressions of emotions. This approach may be grounded in terms of models from cognitive psychology (Lazarus, 1991) and neuroscience (Panksepp, 1998) or in philosophical-conceptual terms (Ben Ze'ev, 2000). The implications of the model may be explored empirically through studies of various types of response, including self-report, overt behavior, and physiology.

The second type of theory starts with an operationalization of affect, for example, through a questionnaire that measures the intensity of feelings (e.g., happiness). Research then moves to explain the causes and consequences of

the constructs indexed by the questionnaire. Mood research is usually of this kind. For example, Thayer (e.g., 1996) has identified energy and tension as two fundamental aspects of mood, and explored their antecedents and psychological consequences in empirical studies. However, there is reason to suspect that more specific emotions can be grounded in the same operational approach and some authors have developed self-report emotions measures (see, e.g., Izard, Libero, Putnam, & Haynes, 1993). Whereas the first approach addresses emotion primarily as a universal psychological quality, the second is especially concerned with individual differences: why people are more or less emotional than one another and the behavioral consequences of this individual variation.

Central or peripheral? Another key conceptual issue in the study of emotions is the extent that emotions are based in physical reality. If emotions reflect the workings of a material system, it is important to identify the system (or systems) concerned. Historically, debates surrounding the source of emotions have addressed whether emotions are centrally or peripherally generated (i.e., whether emotions are a direct reflection of some brain system, or whether emotions are constructed from cues provided by peripheral signals; e.g., sweaty palms). The centralist view gains credence from evidence that emotions are influenced by damage to certain brain areas and by drugs such as cocaine, heroin, and ecstasy that affect neurochemistry. Support for the peripheralist position comes from studies showing that, within limits, the way humans experience bodily activity seems to feed into emotional experience (e.g., Parkinson, 1996).

Centralist thinking can be traced to Darwin's view that emotions are concomitants of physiological reactions (e.g., crying when sad evolved from the response of the eye to a foreign object). Darwin's studies of emotions aimed to show that responses were innate, appearing reflexively to trigger stimuli of evolutionary significance. Contemporary studies emphasize specific brain systems believed to have evolved to handle stimuli that are motivationally significant. These include evolutionarily relatively primitive systems, such as the amygdala, and areas in the frontal lobes of the cerebral cortex, whose development is an especially human characteristic. Evidence for the role of these systems in emotion comes from studies of experimentally-induced brain lesions in animals, and accidental damage in humans (e.g., Damasio, 1999). Links between the various neurotransmitters of the brain and emotions are also important (Panksepp, 1998). The general position is that various brain systems analyze incoming stimuli for reward, punishment, and other motivational implications, and concurrently produce both emotions and physiological change.

The peripheralist perspective, although acknowledging biology, emphasizes a more psychological basis for emotions. Its progenitor, William James, saw emotion as a form of perception based on awareness of signals from peripheral bodily organs, such as the heart and skin. Common sense suggests that if we encounter a snake, this event causes a state of fear, and so we run away. James turned common sense around by proposing that the threatening event elicits pre-organized bodily reactions. These include physiological responses

such as accelerated heart rate, shallow breathing, and the like, and behaviors, such as flight. Awareness of these responses is emotion: running away precedes fear. While peripheralism fell out of favor in the first part of the twentieth century, the principal legacy of this tradition remains focused interest in the role of feedback from physiological systems in producing emotions (e.g., Damasio, 1999). Moreover, James' work, by referring to individual's personal idiosyncrasies, memories, and associations as shaping emotions, introduced psychology into emotions research.

Cognitive theories. The cognitive revolution, which commenced in the early 1960s, led to a fundamental reexamination of almost every domain of psychological enquiry. The idea that mental processes can be compared to symbolic computer programs allowed theorists to detach emotions from biological substrate. Studies conducted under this framework found that both subjective distress and autonomic nervous system responses (e.g., skin conductance) depended on the orientation given to the individual and their strategy for dealing with distressing material (e.g., Lazarus & Alfert, 1964). The cognitive approach was also bolstered by clinical studies suggesting that emotional disorders derived from maladaptive cognitions (e.g., Beck, 1967). These theorists pointed to the role of faulty knowledge and styles of interpreting events as the underlying source of cognitions.

Cognitive theories can be expressed in both centralist and peripheralist terms. They are centralist to the extent that information-processing directly outputs emotional states. For example, Simon (1967) suggests that emotions reflect interruptions to ongoing behavior; it has also been argued that appraisal processes generate emotions. Evaluating an event as a threat (consciously or unconsciously) may necessarily produce anxiety, and anxiety may require a prior threat appraisal. As with biological centralism, this concept of emotions suggests that there exists a concomitant, central (cognitive) process. However, there is not necessarily any simple one-to-one mapping between specific cognitions and emotions. Averill (1980), for example, makes an important distinction between pre-reflective and reflective experience. Pre-reflective awareness is the raw stuff of experience, generated, presumably, by unconscious analysis of events, and common to animals and humans. Reflective experience refers to the subsequent, meaning-based reconceptualization of experience. Extending this line of reasoning, transactional theories (e.g., Lazarus, 1991) see emotions as an index of some abstracted personal meaning. Specific information-processing routines, such as a threat appraisal, may feed into the personal meaning, but do not rigidly determine it. Instead, the emotion reflects a construction of meaning based on the various cues provided by analysis of the eliciting event.

Functions of emotions. Following on from the legacy left by Darwin, evolutionary psychology views emotions as resulting from natural selection, operating around the Pleistocene epoch, when our species separated from its lower primate precursors. Hence, we might expect that emotions will sometimes

conflict with adaptation to modern cultures and technology. In many countries, spiders are non-existent (or trivial) sources of threat, so phobic responses to house spiders will simply be disruptive, however adaptive they might have been in earlier environments. Other adaptive challenges such as handling conflict with other people and seeking a mate may not have changed so much, with emotions playing the same roles as in prehistory.

If emotions are adaptive, then that specific emotion has, through natural selection and/or learning, the function of promoting some desired outcome. However, it is also clear that emotions may have a range of consequences, some unintended. We might distinguish direct and indirect consequences of emotions. A direct consequence would reflect the adaptive purpose of the emotion, such as, in the case of fear, a mobilization for flight (a biological preparedness), or readiness to compete in a high stakes examination (a culturally-influenced acquired personal meaning). An indirect consequence would be an outcome unrelated to adaptive function, such as the distraction that may result from anxiety, or the health problems that may follow from chronic stress.

1.3.2 Issues in Measuring Emotions

Dimensions of emotions. Normal scientific practice implies a good operationalization of emotions, that is, reliable and valid scales that represent a focus for research linking emotions scales to causes and consequences. In fact, dimensional approaches to emotions have been surprisingly controversial, reflecting a rift between conceptually-driven and data-driven theories. For example, Lazarus (1991) argues that providing dimensions to emotions obscures the distinctive relational themes to which each emotion relates. According to this view, emotions are seen as discrete states, rather than points in a multidimensional continuum, although the strength of the emotion may vary continuously. However, both categorical and dimensional approaches raise a vital issue: the differentiation of emotions. People experience different emotions such as sadness and joy, shame and pride, perhaps reflecting a few basic underlying emotions just as the color spectrum is based on three primary colors (Plutchik, 1980).

Categories of basic emotions. For this reason, many of the principal theories of emotions attempt to draw up lists of basic emotions on rational grounds, with the aim of distinguishing qualitatively different categories of emotions corresponding to fundamental adaptive functions. Modern approaches distinguish emotions that (1) are cross-culturally universal, (2) may be found in higher animals, and (3) correspond to some evolutionary challenge. Plutchik (1980) claims that fear, anger, joy, sadness, acceptance, disgust, anticipation, and surprise are primary emotions that are associated with characteristic stimulus events, inferred cognitions, behaviors, and adaptive effects. Ekman (e.g., 1993), on the basis of universal facial expressions, picks out happiness, fear, surprise, anger, distress, disgust, and contempt. He also cautions, however, that there may be other basic emotions that do not have a unique facial signal

(e.g., contentment). Panksepp's (1998) list is based on discrimination of mammalian brain systems for fear, rage, expectancy (behavioral facilitation), and systems for more complex social behaviors such as maternal nurturance.

We could compile many other lists from the corpus of research in this field, but their general style is relatively similar. Although the distinctions between emotions seem sensible, and categorization of some kind is essential, basic emotions have notable problems (see Ben Ze'ev, 2000, for a conceptual critique). In particular:

1. Different theorists disagree on the criteria for deciding what is basic. What appears basic may differ depending on whether we look at brain systems, at facial expressions, or at personal meanings of emotions.
2. Most basic emotions systems emphasize evolved functionality; emotions correspond to specific adaptive tasks linked to evolutionary challenges. Unfortunately, there is no definitive way of deciding what constitutes these key adaptive challenges.
3. It is unclear that there is any simple mapping between emotions and adaptive challenges. For example, joy may be felt in situations involving escape from danger, friendship, nurturance, and personal accomplishment.
4. It is unclear whether some emotions are primary, and others are secondary, perhaps being blends of primaries (Panksepp, 1998). Panksepp (1998), for example, downgrades the status of both low-level, reflex-like responses such as startle and disgust, and higher sentiments found only as subjective human states.

Dimensions of mood and affect. An alternative perspective investigates the structure of emotional experience in empirical data using a dimensional approach to operationalize affect. Techniques such as factor analysis may indicate how many dimensions need to be differentiated in order to account for covariation in emotions indicators. Strictly speaking, this research usually addresses mood rather than emotions; it is easier to measure feeling states persisting for a few minutes than it is to measure transient states closely tied to changing external events. Various methods, some quite sophisticated psychophysically, have been used in mood assessment (Matthews et al., 2002). There are reliable and valid questionnaires for many emotions/mood states (e.g., Spielberger, Sydeman, Owen, & Marsh, 1999). Also widely used are adjective checklists, on which people rate how well mood descriptors (e.g., tense, tired) apply to their current feelings (e.g., Thayer, 1989).

Most researchers agree that there are only a few dimensions of mood (e.g., Thayer, 1989). In contrast to basic emotions, these dimensions are bipolar, contrasting opposite qualities, such as a continuum of states from energetic to languid. The structure may be as simple as two dimensions: one for positive affects and one for negative affects (Watson & Clark, 1992). Thayer (1989, 1996) offers a similar scheme for self-report arousal distinguishing energetic arousal

(vigor vs. tiredness) and tense arousal (nervousness vs. calmness). Dimensional models of this kind have proved very useful for organizing empirical data on the biological and cognitive antecedents of mood, and on their psychological consequences (Thayer, 1989).

Studies of mood are challenging to most basic emotions models. On the one hand, they highlight dimensions that basic emotions theories neglect, such as the energy-tiredness continuum. On the other hand, they suggest that some distinctions are too fine-grained to represent people's actual experience. Fear, anger, and unhappiness may be conceptually distinct, but in actual fact, they tend to co-occur. Anger, for example, is experientially different from other negative emotions, but aversive events often provoke both anger and sadness (Berkowitz, 1993). Clark and Watson (1991) show that the correlation between anxiety and depression measures is often as high as those between alternate measures of anxiety or of depression. Notwithstanding, possible explanations for the mismatch between concepts and data include:

1. Basic emotions research misses an essential level of organization of human feeling states, in terms of two or three dimensions of mood or basic affect. It follows that there is no simple isomorphism between dimensions of basic affect and the more differentiated categories of emotions evident in brain systems, facial expressions, and personal meaning.
2. There may be isomorphism between moods and underlying systems. (Watson & Clark, 1992), for example, relate positive and negative affect to brain systems for reward and punishment, implying that these systems are more basic than the multiple systems identified by Panksepp (1998) and others.

A reasonable solution to such difficulties is to identify a small number of dimensions of basic affects that contribute to both mood and emotions states. Conventional scales seem to do a good job of measuring these affects and the empirical literature shows how these basic affects fit with psychological functioning (see Matthews, Deary, & Whiteman, 2003, for a review). Within the universe of affect, there may be continuous rather than discrete differentiation, such as temporal persistence, intensity, and accessibility to consciousness. Thus construed, mood and emotion might be better seen as rather loosely defined terms that signal the extent of explicit linkage of the feeling state to precipitating events.

Concluding thoughts on emotions theories. The complexities evidenced in emotions theories have implications for developing theory and measures of EI, as well as determining the efficacy of applications in real-life settings. For example, if developing a measure of emotional perception—a core component in many EI approaches—should one attempt to incorporate dimensions of mood, or basic categories of emotions, and if so, which model? If an intervention is developed, can it really be successful if emotions are primarily a function of neurons and neurochemistry? This brief exposition also suggests that the most

comprehensive theories of EI will minimally attempt to address neurophysiological, information-processing, and adaptive functions. If nothing else, these passages should also serve to highlight that more popular claims for the EI construct should be treated with circumspection: understanding the nature of emotions is clearly a complex scientific enterprize.

1.4 TRAIT MODELS OF PERSONALITY

Personality traits may be defined as stable, dispositional characteristics that influence behavior across a variety of different situations (e.g., sensation-seeking; see Matthews et al., 2003, for a review). They are typically distinguished from abilities as representing styles of behavior, rather than efficiency of performance output. Some authors (e.g., Wechsler, 1958) have used *personality* as a broad umbrella term to cover both intelligence and qualitative styles of behavior, though this approach is certainly not viewed as mainstream.

The scientific study of traits began in the early years of the twentieth century, and has been preoccupied with two questions. The first issue is how many different traits should be distinguished from one another. Answers to this question have ranged from two to more than thirty. However, there are now signs of some limited consensus on the dimensional structure of personality. As with ability theory, trait psychologists typically adopt higher-order models, with a level of 20–30 relatively narrow primary factors supporting a super-ordinate level of broader secondary factors or super-factors. The dominant view is that there are five robust super-factors: Extraversion, Neuroticism, Conscientiousness, Agreeableness, and Openness (Costa & McCrae, 1992; Goldberg, 1993; De Raad, 2000).

The second issue is the theoretical basis for traits: what underlying processes are responsible for individual differences in personal characteristics? The dominant paradigm for studying this issue has been neuroscience models, reflecting the influence of DNA on personality. Eysenck (1967) proposed that traits were controlled by individual differences in the excitability of key brain systems. Extraversion, for example, was thought to relate to a circuit controlling arousability of the cerebral cortex in response to stimuli. There is an extensive psychophysiological literature that provides partial support for such hypotheses (Matthews & Gilliland, 1999). In recent years, there has been growing interest in cognitive psychological accounts of personality traits, which may be related to individual differences in processing and evaluating events, and choice of action (e.g., Matthews, Schwean, Campbell, Saklofske, & Mohamed, 2000).

The Big Five. The Big Five or Five Factor Model (FFM) is that model of personality that almost all of the authors contributing to the present book refer. Indeed, McCrae and John (1992) suggest that researchers "adopt the working hypothesis that the five-factor model of personality is essentially correct in its representation of the structure of traits and to proceed to its implications for personality theory and its applications throughout psychology" (p. 176). While

there are alternative models of personality, notably Eysenck's (e.g., 1992) three-factor model (which discriminates Extraversion, Neuroticism, and Psychoticism), there is some convergence between different models and near-universal consensus on Extraversion and Neuroticism as basic personality dimensions (Zuckerman, 1998). Consequently, we will use the FFM as the basis for discussing trait models of personality, acknowledging that other conceptions also have merit.

The Big Five may be summarized thus:

- *Extraversion (E)* includes dimensions of sociability, liveliness, and talkativeness. This construct has at its core whether the individual likes to be alone (introversion) or with others (extraversion), and whether they are vigorous and energetic (introverts tend to be less so than extraverts).
- *Neuroticism (N)* contrasts people described as emotional, anxious, and highly-strung (neuroticism), with those seen as unemotional, calm, and comfortable with themselves (emotional stability).
- *Agreeableness (A)* is a dimension best perceived as interpersonal in its manifestation, containing aspects of sympathy, compassion, and generosity (as for the other personality factors, individuals have these qualities to greater or lesser extent).
- *Conscientiousness (C)* includes achievement striving, organization, scrupulousness, and responsibility.
- *Openness to new experiences (O)* includes willingness to entertain novel ideas and unconventional values. Openness is also the trait most related to cognitive intelligence, correlating around $r = .30$ with crystallized intelligence (Ackerman & Heggestad, 1997).

Despite several accounts that are critical of some aspects of the FFM (e.g., Block, 1995; Eysenck, 1992), various lines of converging evidence support its scientific credibility. These include:

1. Analyses of personality-descriptive words, in English (and other languages), which suggest that the domain of personality descriptors are almost completely accounted for by five robust factors (e.g., Goldberg, 1993). In short, the Big Five Factors appear to be embedded in natural language.
2. Factor analytic studies of well-established personality questionnaires, either in isolation or when combined, frequently demonstrate the five factors at the item level (e.g., McCrae & Costa, 1995).
3. The five factors relate to psychologically meaningful constructs that emerge from various approaches to studying personality (i.e., genetic research, experimental studies, longitudinal designs, biological studies, and so forth).
4. The five factors appear universal in that, it is claimed that they appear in all cultures (although debate continues on how closely personality models correspond to one another cross-culturally [e.g., De Raad, 2000]).

5. The five factors provide added value in that they predict a variety of characteristics over and above the trait itself. For example, knowing that a person is extraverted tells us not just that she is lively and sociable, but also predicts her vocational interests, her risk of various mental disorders, and her performance on laboratory tasks.

The psychological processes underlying the Big Five is also receiving increasing attention, although there is much more evidence relating to extraversion and neuroticism than to the remaining three factors. Generally these traits appear to be comprised of multiple processes, represented at different levels of abstraction including individual differences in (1) neural function, (2) information-processing, and (3) high-level cognitions of personal meaning (Matthews, 1997). For example, extraversion-introversion relates to (1) arousability of the neocortex and subcortical reward systems, (2) information-processing routines influencing attention, memory, and language use, and (3) a tendency to evaluate situations as challenging, and calling for direct action. The different component processes associated with a trait may be seen as supporting a common adaptation; handling demanding social environments in the case of extraversion (see, e.g., Matthews, 1997).

Concluding thoughts on theories of personality. As for intelligence, this brief account of trait approaches to personality should suggest to the reader that demonstrating the extent that personality is independent of EI is an important research topic. The Big Five personality factors variously contain elements of sociability (both E and A), require dealing with the personal value of emotions (N), managing one's behavior (C), or thinking about one's private life (O); all of which find parallels in popular approaches to defining EI (e.g., Goleman, 1995). As we shall see, this too then is a topic that many of the contributors will frequently have recourse to address.

1.5 METHODOLOGICAL ISSUES

Almost any published empirical study in the area of EI draws on mathematical-statistical methods to analyze its data. This section is intended to provide a rough guide to facilitate the distillation of useful information from the results of such analyses, as reported in the chapters of this book. It is written for those readers who do not possess elaborate background knowledge on methodological concepts, terminology and procedures, and for those who feel in need of a refresher. Our treatment is, of course, very simplified and cursory due to the limited space that can be devoted to these topics. Hence, readers are encouraged to additionally consult the pertinent literature we refer to in the passages that follow.

Before we begin, consider the following scenario: You are surfing the world wide web, looking for interesting internet sites on EI. After a short time, you find a "Test yourself" website. On the pages of this website you find a test claiming to measure EI. You decide to take the test and are required to respond

to a series of questions like "I am known for making other people happy" and "I talk a lot about my feelings" on a graded response scale from "strongly disagree" to "strongly agree". After receiving your result (which enthusiastically points out your very high EI), you begin to wonder if this test measures anything psychologically meaningful and what the idea behind designing such a test might be. For the moment, you assume the test does measure EI (the result is just too good to believe). Now you wonder about the quality of this alleged EI test. More specifically, you are interested in the precision to which your EI score can be estimated with this assessment procedure. You also ask yourself whether it was really your EI that determined your responses or rather some other characteristic that the assessment procedure is not supposed to measure (e.g., your extraversion or even your inclination to give responses that are socially desirable). Questions of this type, pertaining to the concepts behind, and the quality of, psychological assessment are the subject of this section. They are often discussed under the headings of reliability (precision) and validity (relation of the variable of interest to responses). The following subsections provide more details on these (and other terms) that are required for a basic understanding of psychological assessment.

1.5.1 Psychological Assessment: Key Terms and Concepts

Two of the most fundamental questions raised in this book relevant to the assessment[2] of EI are whether EI exists at all as a meaningful psychological characteristic of humans, and if so, how can it be measured. For the example given above, the answers to these questions that might be given by the authors of the questionnaire are: It is assumed that EI exists, it can be measured, and a self-report approach to assessment is obviously the appropriate procedure.

As will become evident throughout the current book, the answer to the first question (i.e., the existence of EI) is a contentious issue in the scientific literature; something you probably have suspected after finishing reading the review of emotions theory. We will not address this question here, preferring instead to leave this issue to the chapter authors. The same is true for a description of the many different assessment procedures, purportedly measuring EI, and which of these might be most appropriate for this purpose. However, to introduce concepts and key terms in psychological measurement we have to presume that there are answers to these questions. We simply assume, for example, that the first question can be answered affirmatively. With regards to the second question (i.e., how EI might be measured), we recognize that there are many different ways. We use self-report as an example, mainly because of its simplicity, and focus on concepts relevant to the evaluation of existing assessment procedures.

[2]We use the terms *assessment* and *measurement* rather loosely and interchangeably in this chapter. For an overview and in-depth treatment of measurement approaches and concepts as well as test theories fundamental for psychological measurement, see, for example, Hambleton, Robin, and Xing (2000); Lord and Novick (1968); McDonald (1999); Michell (1990).

Latent variables. As a first step, we make the following widely adopted assumptions about EI: a) it is a characteristic that varies across humans (i.e., it is a variable), b) it is not directly observable with available assessment procedures (i.e., it is a latent variable), but they allow for inferences about EI, and c) persons with different EI differ to a certain degree and this can be expressed numerically (i.e., it is a quantitative latent variable). Whereas point a) and c) might be intuitively plausible assumptions in the context of assessment, the status of EI as a latent variable requires some additional comments (for general discussions of this topic, see Bollen, 2002; Borsboom, Mellenbergh, & van Heerden, 2003).

An important implication of conceptualizing EI as a latent variable is that items of an EI questionnaire, for example, are considered to be *indicators* of EI. As a latent variable, EI is assumed to determine the responses to an appropriate set of indicators. Any given set of indicators can be more or less appropriate depending on the extent to which responses are determined by the latent variable EI, but a set of indicators does not define what EI is. This means that proponents of self-report assessment approaches assume that agreement with statements (as given above) are a consequence of a person's high EI. Correspondingly, disagreement would be indicative of low EI. In other words, observed responses are assumed to correlate with EI. If the correlation is strong, then an indicator can be considered to be good, because it closely reflects, or is very informative concerning, the underlying latent variable. If EI only weakly determines the responses, then the correlation is also weak. Furthermore, if EI is a determinant common to a set of indicators, then all of the indicators should correlate depending on their strength of relationship with the common cause (i.e., EI).

Correlations. What does it mean to state that a correlation between two variables is strong? A correlation is numerically expressed as the correlation coefficient, which is symbolized by r. It has a clear definition, intensely studied distributional properties, and a clear (technical) interpretation (see, e.g., Hotelling, 1953; Schulze, 2004). For present purposes, the following interpretative aid should suffice. The correlation coefficient can take on any value in the interval $[-1, 1]$. Three values in this interval are especially important as anchors for interpretation. The minimum and maximum (-1 and 1) represent what can be called "perfect" correlations. That is, the relationship between two variables is such that the relative position of values for one variable maps onto the relative position of values in the other. The difference in interpretation between a positive and negative correlation is that, for the former, high values for one variable are associated with high values in the other. For the latter, high values for one variable are associated with low values in the other. If, for example, the correlation between two EI self-report indicators was $r = 1$, then strong agreement for one indicator would imply strong agreement in the other as well. For the case of $r = -1$, strong agreement for one indicator would imply strong disagreement for the other. This happens, for example, when one of two self-report indicators is negatively worded (e.g., "I can never tell when

someone is sad"). Another important value for interpretations is $r = 0$. This value indicates the absence of a linear relationship between two variables, that is, knowing the value for one of the variables does not allow any prediction for the value of the other variable. The correlation coefficient is extremely important to understand in assessing the efficacy of EI research, since in almost all empirical studies correlations are reported.

Constructs and factors. Before more details are provided concerning concepts and indices for the quality of measures, a comment concerning the use of the terms construct and factor appears in order. Although we can not discuss the many methodological subtleties associated with these two terms, the reader should be aware of the fact that the terms construct, the name of the variable of interest (e.g., EI), factor, and latent variable are often used interchangeably in the literature. This bears certain problems (see, e.g., Borsboom & Mellenbergh, 2002) and blurs the distinction of theoretical terms (constructs and their names) and mathematical-statistical entities (latent variables, factors) that are intended to correspond to theoretical terms to a certain degree. In fact, the issue of this correspondence is at the very heart of the problem of validity, to be addressed in the next subsection. Hence, the reader is advised to bear such a distinction in mind, but to be prepared for use of the terms as synonyms.

Criteria for the evaluation of measurement procedures include their objectivity, reliability, and validity. The first criterion refers to the extent to which results depend on the situation in which assessment takes place, the dependency of the scoring procedure on the person (or device) who (which) translates responses into scores, and the dependency of the score interpretation on the person who arrives at them. Ideally, if none of these dependencies exists, then objectivity is said to be given. The other two criteria of test evaluation are detailed below.

1.5.2 Reliability

According to the definition of classical test theory (see, e.g., Lord & Novick, 1968), reliability is a property of a test that expresses the proportion of observed score variability between respondents that can be attributed to their latent variable scores. If an observed variable (e.g., the sum of responses to a set of items) correlates perfectly with a latent variable (e.g., EI), then the proportion of observed variability attributable to the latent variable is 100%, no error of measurement is present, and therefore the precision of measurement (reliability) is perfect. Of course, this is an unrealistic, extreme, case. Nevertheless, it illustrates the basic concept and, at least partly, enables an interpretation of reliability estimates reported in empirical studies.

There are many ways to estimate reliability (see, e.g. McDonald, 1999), but the range of possible numerical results is the same for all of them. Although technically possible, negative values are not acceptable for any reliability estimate, because reliability is conceptualized as a proportion. Hence, the lowest value for reliability is 0. The case of perfect reliability is ordinarily not

expressed as a percentage (as above) but directly as a proportion. Thus, the maximum reliability is 1. Values between zero and one indicate the degree of precision, or reliability. There is no consensus among researchers on a generally accepted threshold value that leads to the conclusion that a measure is reliable. However, for EI research, inspection of the literature seems to indicate that values of .70 or larger are considered as satisfactory by most researchers.

The most often used reliability estimate to be found in EI research is probably Cronbach's α (Cronbach, 1951). Although there are many interpretational issues associated with this coefficient (Cortina, 1993), the general guidelines for interpretation given above apply to this specific coefficient as well.

1.5.3 Validity and Validation

There is much debate in the methodological literature on what test validity actually is (cf. Cronbach, 1988; Lord & Novick, 1968; Messick, 1995). We present a conceptualization that at least partly goes back to the seminal paper by Cronbach and Meehl (1955) and that is widely adopted in the literature as well as in the chapters of this book.[3] Additionally, we find it reasonable to make a distinction between test validity and validation, where the former is a property of a test and the latter designates the process of collecting evidence on test validity (see Borsboom, Mellenbergh, & van Heerden, 2004).

There are different forms of validity: content validity, concurrent or predictive validity, and construct validity. Content validity is said to be given when the test content is a representative sample of the target domain of behaviors. Concurrent validity refers to the association (most often measured by the correlation coefficient) of test results with certain criteria that occur or exist simultaneously to the test situation, whereas predictive validity refers to the association with criteria that occur in the future (e.g., prediction of future academic success with an EI measure). Of course, the choice of criteria is the most critical aspect for this type of validity and has to be theoretically justified.

Lastly, construct validity is closely associated with procedures to develop and test scientific theories (Cronbach & Meehl, 1955). It can not be expressed as a single coefficient, but rather is connected to the analysis of a whole network of associations between the test of interest and other tests, which are supposed to measure different constructs. Theoretical assumptions about these associations have to be available when inspecting such a network and are taken into account to assess the conformity of observed results (i.e., many correlations between several measures) with theoretical assumptions as an indicator of construct validity. It should be noted, however, that there are many more scientific activities, even examination of content and predictive validity, which are sup-

[3]Note that it deviates from the latest unified conceptualization presented in the Standards for Educational and Psychological Testing (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999), where validity is defined as "The degree to which accumulated evidence and theory support specific interpretations of test scores entailed by proposed uses of a test" (p. 184).

posed to inform an assessment of the construct validity of a measure (Cronbach & Meehl, 1955). Nevertheless, assessment of the so-called convergent and discriminant validity of a measure is among the most important activities of construct validation.

Convergent validity is said to be given when theory states that some constructs are related (but not identical) with one another (e.g., EI and other forms of intelligence) and corresponding correlations between test scores at the observational level are in accordance with such statements. Discriminant validity is said to be given when correlations between measures reflect the theoretical assumption of non-related constructs (e.g., EI and extraversion). In this case, correlations of zero between tests should be observed to assign discriminant validity. A systematic way of analyzing entire matrices of correlations and testing the fit of theoretical statements about the relations between constructs, on the one hand, and with relations between tests at the observational level, on the other, is validation with multitrait multimethod (MTMM) matrices (Campbell & Fiske, 1959). Advances in the statistical literature (see, e.g., Schmitt & Stults, 1986) have led to the application of sophisticated analysis techniques, not envisioned by Campbell and Fiske (1959), which can be found in this book. Readers not familiar with the required statistical background can nevertheless profit from inspecting these results when bearing in mind the overall purpose of such analyses as briefly sketched in the present chapter.

In sum, the process of establishing a high quality measure that is reliable and valid involves a larger number of effortful activities (for an EI related overview, see, e.g., Matthews et al., 2002; Matthews, Emo, Zeidner, & Roberts, in press). It is highly unlikely that for any of the currently available public, and free, EI tests on the internet, evidence of the qualities described above is available. Hence, if you find yourself asking the types of questions described at the beginning of this section, there is likely to be no definitive answer to them. In fact, as will be evidenced by the content of the chapters of this book, even in the scientific literature evidence is still in the process of being collected, and to date there are not as many high quality measures of EI available as we might wish.

1.6 GENERAL DESIGN AND ANALYSIS ISSUES

Most studies in the field of EI research use so-called correlational designs. As its name implies, the correlation coefficient plays a central role in this methodology. It also refers to so-called *observational studies*, where phenomena of interest are only observed and no purposeful manipulation of them is implemented. This type of design is often contrasted to experimental research, where manipulation is a defining feature. However, it might be argued that this distinction is too strict and has a far too strong influence on thinking about design and analysis, which is deeply rooted in the history of psychological research (Cronbach, 1957, 1975). Nevertheless, what is important to bear in mind, is that experimental designs clearly do have their virtues over correla-

tional designs with respect to inferences about causal relationships. Thus, the reader is advised to be critical when confronted with causal inferences on the basis of results from correlational studies. It should also be borne in mind that the simple fact of carrying out an experiment is not sufficient to draw causal inferences (see Shadish, Cook, & Campbell, 2002).

The main analysis strategy in the literature is to compute correlations (see above) and use multiple regression analysis (see Draper & Smith, 1998). The latter goes beyond correlations in that variables are categorized into those that predict (also called *independent variables*) and the one that is predicted (also called criterion or *dependent variable*). Among the most often focused statistics in regression analysis is the coefficient of determination (symbolized by R^2), which represents the proportion of observed variance explained in the criterion by a set of predictors. When examining a set of predictors, it is often of interest whether an additional predictor (e.g., EI) does add a significant portion of variance explained in the criterion (e.g., academic success). This is assessed by the difference between R^2 without the additional predictor and R^2 with the predictor. This strategy is of importance and often used in EI research in the context of assessing the so-called incremental predictive validity of a predictor. The incremental (i.e., added) predictive validity is simply the difference between the two coefficients of determination.

Finally, it should be mentioned that in a regression model, the regression coefficients are frequently a basis for interpreting the results. These coefficients are weights attached to the predictors. Especially in their standardized form, they are often interpreted as "measures of variable importance" or as if they were correlations. Except for some special cases, rarely given in individual differences research, such interpretations are at least problematic and often are plainly wrong (see Holling & Schulze, 2004). When predictors are intercorrelated, interpretation of regression weights is an intricate subject. The reader is referred to the pertinent literature (e.g., Draper & Smith, 1998) for clarification of this issue.

1.7 APPLICATIONS OF EMOTIONAL INTELLIGENCE

Before closing, a comment on applied applications, which is also a major focus of the current volume, would appear in order. For many, a central element underlying EI is the impetus to improve psychological functioning in real life. Individuals may enjoy richer, more fulfilling, lives if they have better awareness and control of their own emotions, and those of others. Organizations benefit from the increased productivity, satisfaction, teamwork, and organizational commitment of emotionally intelligent persons. Society, in general, gains from alleviation of problems that may result from poor emotion-management skills, such as violent crime, drug abuse, and some forms of mental illness. And in the education context, inculcating self-awareness, self-control, conflict resolution, empathy, and cooperation might not only create better citizens (Goleman, 1995), but also impact considerably on academic achievement.

As in the case of theory, there is a considerable body of scientific knowledge that is not always adequately acknowledged by proponents of EI. Clinical psychology offers a range of therapeutic techniques for improved emotion-management, especially in the fields of anxiety, stress, and mood disorders. Occupational psychology offers life-skills coaching, stress management techniques, and training programs for motivational enrichment. Dealing with the emotional problems of students has been a central part of school psychology since its inception. Again, as you read through the chapters you must confront an important question: Can EI add to these efforts? We preface this open question with two possibilities (see also Matthews et al., 2002). First, *emotional dysregulation* may define a specific set of problems that have not been sufficiently recognized in existing practice. Second, practitioners in applied fields may have been improving EI without necessarily realizing it. If so, an explicit understanding of EI as a focus for real-world interventions may improve existing practice and suggest new techniques for hitherto intractable problems.

1.8 CONCLUDING COMMENTS

We trust that this brief overview of these vast fields of psychological enquiry has left the reader with a set of critical tools to evaluate each of the chapters that follow. Equally, we trust that you may choose to explore them in more depth, since we could easily have written a book length treatment on any of these topics. Hopefully, each overview should have given you a sense of the many issues that need to be resolved in developing a scientifically sound program of research into understanding the nature of EI, should it actually exist.

Author Note

The ideas expressed in this manuscript are those of the authors and not necessarily of ETS. While both of the first two authors are currently at ETS, they would like to acknowledge the support of both Sydney University and the Westfälische Wilhelms-Universität Münster where they first conceptualized the idea of this volume (and ensuing chapters), and remain affiliated.

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