The Springer Series on Human Exceptionality

Con Stough
Donald H. Saklofske
James D.A. Parker
Editors

Assessing Emotional Intelligence

Theory, Research, and Applications

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This book is dedicated to:

My students interested in EI, particularly Felicia Heng and Dr. Ben Palmer who forced me to confront my somewhat narrow view of "intelligence" – CS

Vicki, my beautiful and gifted wife, friend and colleague – DHS

Laura Summerfeldt – JDAP

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Contents

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Part I
Some Theoretical Thoughts on EI

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A Brief Analysis of 20 Years of Emotional Intelligence: An Introduction to Assessing Emotional Intelligence: Theory, Research, and Applications

Con Stough, Donald H. Saklofske, and James D.A. Parker

Twenty Years of Emotional Intelligence

Interest in Emotional Intelligence can, in part, be gauged by the amount of research activity it has stimulated since first making an appearance in the psychological literature about 20 years ago. To set the scene for the chapters that follow in this book we analyzed the number of theory, research, and application papers that have been published on EI by year and subject area. As shown in the tables below, there has been an increasing amount of empirical data and commentary published on the topic of EI, especially since the start of the 21st Century. What stands out is the number of published commentaries of the construct of EI with particular reference to how EI relates to standard psychological measures and constructs. In some ways, our review of the published material on EI illustrates a considerable diversity of opinion in which there is a solid stream of papers criticizing and or critically examining the construct validity of EI as well as a strong and growing arm of research evaluating how EI might be used in various applications across the workplace, health and educational settings. Clearly the conjecture over the reliability and validity of current measures as well as the construct validity of EI is not slowing the amount of research, the number of special issues or interest in EI from a very wide range of disciplines and practice areas (e.g., psychology, medicine, industry, education, neuroscience, etc.). Although measures of EI are at a fairly preliminary phase in their development (first or second versions are available for most measures), research on the applications of EI scores across several applied areas is on in earnest.

The data presented here were generated by conducting a SCOPUS search for any journal publications with the words "Emotional Intelligence" captured in either the publications' keywords, title or abstract. It was important to limit the search to the two word phrase "emotional intelligence" as the word "emotion"

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identifies more than 66,000 publications and the word "intelligence" identifies a staggering 128,000 plus publications! By comparison to these older subject areas of psychology, emotional intelligence is still in its infancy! SCOPUS also identifies the words "emotional intelligence" in other published works such as patents, world wide web, etc., but as these are numerous and often without peer review, we considered these "publications" outside our current analysis (although still interesting).

Analysing the bar chart below in which we plot the number of SCOPUS publications across several years and several year bands we can see that there has been a steady increase in the number of publications focusing on EI from about 1998 (a potential lag time from the publication of the popular book by Daniel Goleman in 1995) in which there were 14 publications. This number steadily rises per year until 2006 in which there were 145 publications with a 2006 date. At the time of conducting this analysis (mid 2008) there were 118 SCOPUS publications on EI, which would translate into approximately 250 publications with a 2008 date by the end of 2008. It should be noted that this search is likely to underestimate the total number of publications for a number of technical reasons relating to how papers are added and archived into SCOPUS. However, if taken as a guide, and assuming that the number of publications on EI relates in some positive manner to the amount of research being undertaken on EI, then these numbers suggest that research into EI is growing and that we might expect around 250–400 publications per year for 2009 and 2010. This would result in approximately 1300 papers focused on EI between 2006 and 2010 (Fig. 1).

Three hundred publications per year for the next few years may lead to significant developments in research on emotional intelligence and in particular on issues of test construction, test reliability and validity. In fact, some of the most often consulted articles published in such major journals as *Personality and Individual Differences* are focused on EI. Most popular research and commercial measures of EI are now in their second version. Consequently we might expect significant improvements in test construction and perhaps some positive resolution to some of the issues concerning construct validity that have been the

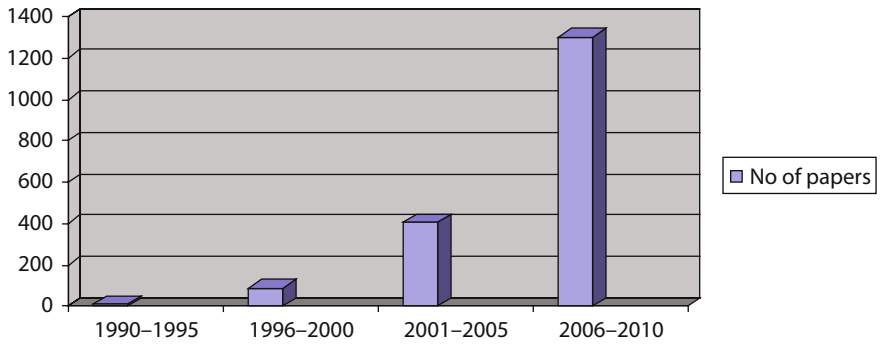

Fig. 1 Number of EI papers listed in SCOPUS by year

focus of some authors' energy, particularly the discriminant validity of EI over existing constructs such as personality and intelligence. Clearly there is growing interest in the construct, which should lead to significant advances in both the measurement and application of emotional intelligence to the workplace, health psychology and perhaps some under-studied areas of application.

However, an analysis of the number of publications with EI in the title, keywords and/or abstracts, does not necessarily substantiate that the publication is specifically concerned with the study of EI. Some publications may only tangentially describe or mention EI, and many publications are commentaries rather than empirical studies. Therefore the current exercise is not designed to be definitive but rather provoke some thoughts about the growing interest in EI and where this research is heading.

To further understand how the construct of EI is being used in these 952 publications we assessed their different subject or discipline areas. First we removed 46 publications that used the words "emotional intelligence" in a way that was qualitatively different from the psychological sense (e.g., intelligent engineering). After this process there were 906 SCOPUS publications with the words "emotional intelligence" remaining. Of these we inspected every article and attempted to allocate the publications to subject/discipline areas. We decided that a single paper within the original set could only be allocated to one particular discipline area, although many publications crossed several discipline areas. Where there was some ambiguity we decided on the basis that the most direct relation to a discipline area could be ascertained and externally agreed to by an independent researcher. We used the following areas to describe papers:

1. Workplace (industrial and organizational psychology, management, personnel psychology, training)
2. Psychometric and Construct Validity (test construction, reliability, validity, relations with other psychological constructs — particularly personality and intelligence (IQ))
3. Neuroscience
4. Health (health psychology, psychiatry, clinical disorders, health promotion)
5. Education (primary, secondary or tertiary training, scholastic results, student attrition, selection)
6. Cross-culture
7. Sport
8. Other

The results of this analysis are described in Table 1 below. It can be seen that publications concerned with EI in our search focused on (in order of frequency): workplace, psychometric and construct validity, health, education, neuroscience, culture and sport. However the majority of publications were focused on the workplace, psychometric and construct validity, education and health areas. Relatively few publications appear in the areas of culture, sport or neuroscience.

Table 1 Number of EI related papers by discipline area

	Number of papers	Percentage of papers
Workplace	337	35.4
Psychometric/construct validity	224	23.5
Neuroscience	31	3.3
Health	157	16.5
Education	134	14.1
Cross-culture	17	1.8
Sport	6	0.6
Other	46	4.8

Clearly there are few publications in the area of cross culture and sporting applications, which appears odd given the high face validity of the construct to both of these areas. For instance the role of emotions in understanding opponents in sporting competitions and the management of emotions in elite athletes appear to be important areas for future research. Similarly how current measures of EI compare across different geographical and language barriers is an important topic for many multi-national organizations. The selection of chapters for this book has been chosen at least in part to help stimulate future research across as many discipline areas as possible.

Organization of "Assessing Emotional Intelligence: Theory, Research, and Applications"

Not surprisingly the organization of our book is reflective of the contents of Table 1 where there is an emphasis on both workplace and psychometric/test development research and commentary. However in order to facilitate future research in under-represented areas, we intentionally sought out authors who could expertly and insightfully write chapters on the measurement and place of EI in relation to clinical disorders, biological processes, cross-cultural comparisons, and sports. These areas would seem to be highly promising for the study and application of EI- there is certainly the appearance of face validity. Although the specialization of affective neuroscience is an active area of research, relatively little is known about the biological basis of current methods of measuring and assessing EI, which can, in turn, provide researchers with the foundations to understand how individual differences relate to a wide array of abilities and behaviours associated with emotion.

This book is arranged according to several different conceptual sections. We start with this very short chapter describing the recent interest in EI and in particular, what areas of psychology and other fields have examined EI for the purpose of determining its relevance to understanding human behavior. As shown above, the data presented show the increase in publications in the area over time and where these papers have been published. This analysis raises some

questions about which areas are lacking research and where we may expect research to be focused in the future. The second chapter in this first part discusses the construct itself with particular reference to its construct validity. In what is certain to be an important chapter in any advanced class addressing basic issues of test reliability and validity, Gignac outlines the type of reliability and validity estimates that are important for the construct and measures of EI. In a systematic analysis he examines the measures required to assess all aspects of reliability and validity, the research that has been undertaken previously in this area within the context of EI and provides commentary on this research. Given the number of individual papers and commentaries on the construct validity of measures of EI, this chapter is an important integration of a large body of research. Gignac's chapter establishes some important conceptual and measurement issues that the reader can apply to the chapters to follow.

In Part II, five chapters are allocated to different measures of EI. The focus of these chapters differs somewhat according to the research focus of each measure. In the first of these chapters (Chapter 3), Papadogiannis, Logan, and Sitarenios present a comprehensive description of the theoretical underpinnings and empirical research on the most often used ability measure of emotional intelligence, the MSCEIT. This and related measures created by Mayer and Salovey, along with Caruso, was one of the very first to both attempt to measure EI and to operationally define it as an "ability". The next chapters describe other important measures that are regarded as trait measures. While a number of scales have appeared in recent years, we have included chapters only on the more established scales such as the EQi (Wood, Parker, and Keefer), the TEIQue (Petrides), the GENOS and SUEIT (Palmer, Stough, Harmer, and Gignac) and the Assessing Emotions Scale (Schutte, Malouff, and Bhullar). These chapters provide comprehensive analyses of the theoretical foundations, psychometric properties, and research findings related to the selected scales.

In Part III, six chapters are presented in which the application of EI is the focus. Given the very great interest in EI from the business world, the first three of these chapters are concerned with the workplace. In the first of these chapters Furnham discusses research and issues relating to the training of EI. In the second chapter in this part, Reid provides a thorough examination of the relationship between performance measures and several EI measures including the MSCEIT. Jordan, Murray, and Lawrence bring together the considerable published work and commentaries in the area of EI and industrial and organizational psychology, providing insightful linkages across a number of work domains and outcomes in the third chapter in this part. These chapters are intended as an important contribution to the field of EI and the psychology of the workplace and will be useful to both IO research psychologists and HR practitioners.

In recent years there has been considerable interest in the potential relevance of EI to health, psychological disorders, and everyday problems and education. Keefer, Parker, and Saklofske examine the potential relevance of EI to health

and health-related behaviors. In contrast to an exclusive physical approach to describing and treating health issues, EI research has shown its relevance to adapting a healthy life style. In the next chapter Hansen, Lloyd, and Stough discuss the current state of knowledge in the area of EI and clinical disorders. Although there is now emerging research in the area of EI and health variables, there have been relatively and surprisingly few studies examining EI across psychological and psychiatric disorders. In the final chapter of this part, Parker, Saklofske, Wood, and Collin provide some linkages between EI and educational outcomes. In recent years, a number of studies have demonstrated the relationship between EI and scholastic variables ranging from achievement and retention to student failure and early leaving. These studies also suggest that developing EI within educational settings may improve a range of outcomes for students and institutions and will be a useful resource for educational psychologists, teachers and school administrators.

The final part (Part IV), "New Directions and Conclusions" provides some initial linkages between some new areas of EI research. The universality of EI is examined by Ekermans. Cross-cultural studies are of critical importance as we study not only how well current measures of EI "travel" across cultures and language groups, but how robust EI is in a description of human emotions, their definition, management, and relevance. It is certainly well known that sport involvement and accomplishments are much more than physical actions. In recent years, sports psychology has had an increased presence in the training of elite athletes but also in examining ways to improve the physical health of the general population. The chapter by Stough, Clements, Wallish, and Downey looks more closely at the potential relevance of EI in sporting activities.

EI has certainly caught the attention of the public since the publication of Goleman's book in the mid 1990's. At the same time, skeptics within the scientific psychology community have been either very critical or much more cautious about the "significance" of the EI construct. At the same time, both the research and applied fields of psychology have carefully and systematically subjected EI to "empirical tests" as the growing number of publications would attest. For these reasons, this book concludes with an in-depth commentary by Orchard, MacCann, Schulze, Matthews, and Roberts in which these authors outline some new areas of research for EI and some potentially useful new measures.

We feel very confident that all of the chapters published in this book will contribute to stimulating new areas of EI assessment, research, and application. We are most grateful to the chapter authors for their contributions to this book. Their fair but critical analyses of EI will do much to ensure the scientific integrity of future research and applications. In turn, this will result in the kind of evidence-based findings that will determine the relevance of EI in the study of individual differences. Thank you all. We are very grateful to both Judy Jones and Angela Burke at Springer for their tremendous support throughout the preparation of "Assessing Emotional Intelligence: Theory, Research, and Applications".

Psychometrics and the Measurement of Emotional Intelligence

Gilles E. Gignac

It may be suggested that the measurement of emotional intelligence (EI) has been met with a non-negligible amount of scepticism and criticism within academia, with some commentators suggesting that the area has suffered from a general lack of psychometric and statistical rigour (Brody, 2004). To potentially help ameliorate this noted lack of sophistication, as well as to facilitate an understanding of many of the research strategies and findings reported in the various chapters of this book, this chapter will describe and elucidate several of the primary psychometric considerations in the evaluation of an inventory or test purported to measure a particular attribute or construct. To this effect, two central elements of psychometrics, reliability and validity, will be discussed in detail. Rather than assert a position as to whether the scores derived from putative measures of EI may or may not be associated with adequate levels of reliability and/or validity, this chapter will focus primarily on the description of contemporary approaches to the assessment of reliability and validity. However, in many cases, comments specifically relevant to the area of EI will be made within the context of reliability and/or validity assessment.

Test Score Reliability

Introduction

Overwhelmingly, the concept of reliability in psychology tends to be interpreted within the context of composite scores. In practice, a composite score usually consists of an aggregation of equally weighted smaller unit scores, where those unit scores are typically derived from item responses or subtest scores within an

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inventory. While any group of scores can technically be aggregated to form a composite score, a psychometrically defensible composite will be associated with item/subtest scores that exhibit a particular level of "inter-connectedness". Throughout the history of psychometrics, various concepts and methods have been formulated to represent and estimate the degree of inter-connectedness between the corresponding item scores.

While the various methods of reliability estimation are associated with conspicuous differences, all forms of test score reliability may be argued to be based on the notion of repeated measurements (Brennan, 2001). In its purest Classical Test Theory (CTT) form, the reliability of measurement represents the hypothetical distribution of scores expected from repeated measurements derived from the same individual, under the pretence that the individual's memory of the previous testing session is erased (from this perspective, the notion of test score reliability may be considered to be based on a "thought experiment"; Borsboom, 2005). The wider the distribution of scores (i.e., the larger the standard deviation), the less reliability one would ascribe to the scores as an indicator of a particular dimension or attribute. As the prospect of erasing the minds of individuals is not exactly practical, various other methods of estimating reliability have been devised to approximate the scores that would be expected to be derived from the "thought experiment". From this perspective, the most well-known are "parallel forms reliability" and "test–retest reliability". Within the context of reliability estimation via a single-testing session the most well-known reliability methods are "split-half reliability" and "Cronbach's alpha" (α). Less well-known methods of estimating internal consistency reliability are based directly upon latent variable model solutions. The most well-established method of estimating the internal consistency reliability of a composite score via a latent variable model solution is known as "McDonald's omega" (ω).

Prior to describing the above methods of reliability estimation in detail, it should be emphasized that reliability should not be viewed as a property of a test, per se. Instead, reliability should be interpreted as a property of scores derived from a test within a particular sample (Thompson & Vacha-Haase, 2000). This issue is not merely semantic, as the implications are directly relevant to the practice of testing and measurement in psychology. Specifically, because reliability is not a property of a test, researchers can not rely upon previous estimates of reliability to support the use of a test in their own work. Consequently, researchers are responsible for estimating and reporting the reliability of their scores based on their own data. The possibility that a particular test will yield scores of a particular level of reliability across samples and settings is a hypothesis to be tested, rather than an assumption to be made. The generalizability of a reliability estimate may be tested within a "reliability generalization" framework, a concept and method which will not be described in any further detail in this chapter (interested readers may consult Shavelson, Webb, & Rowley, 1989, for an accessible discussion of reliability generalization).

Types of Reliability Estimation

Parallel Forms Reliability

In contemporary psychometric practice, parallel forms reliability (a.k.a., alternative forms reliability) is rarely reported, despite contentions that it may be the most fundamentally sound method of estimating reliability (e.g., Brennan, 2001). Parallel forms reliability is based on the premise of creating two tests or two inventories which yield composite scores associated with the same parameters (i.e., means and variances) and are justifiably regarded to measure the same construct. In practice, participants would complete form A and form B during two different testing sessions separated by approximately two weeks (Nunnally & Bernstein, 1994). The squared correlation between the composite scores obtained from the two forms would represent an estimate of reliability of the scores derived from the inventories, individually.

The methodology of parallel forms reliability can be applied in a such a way as to offer the opportunity to identify three sources of "error" variance: (1) systematic in item content between tests (which, realistically, is expected because items are not random samples drawn from a population of items); (2) systematic differences in scoring (more common in scenarios where a rating is made by a test administrator); and (3) systematic changes in the actual attribute of interest (Nunnally & Bernstein, 1994). Thus, the capacity to segregate these three sources of measurement error via parallel forms reliability may be viewed as particularly valuable. However, the procedure is rarely observed in the applied literature. To my knowledge, there has yet to be a published instance of parallel forms reliability in the emotional intelligence literature. Thus, the temporal variation in EI (source #3) as distinct from "pure" measurement error has yet to be determined. Perhaps the primary reason why parallel forms reliability is so rarely reported in the applied literature is due to the difficulties of creating a second parallel test with the same mean and variance characteristics as the first test, not to mention the same validity. A less onerous reliability procedure that may (justifiably or unjustifiably) be viewed as sharing some properties of parallel forms reliability is known as test–retest reliability.

Test–Retest Reliability

Rather than create two separate forms considered to measure the same attribute and have participants respond to the separate forms at two different testing sessions (i.e., parallel forms reliability), an alternative reliability methodology consists of creating a single test and having participants respond to the items at two different points in time. The correlation between the corresponding time 1

and time 2 scores represents a type of reliability methodology known as "test–retest reliability". Test–retest reliability is indicated when the correlation between the scores is positive, although no widely acknowledged guidelines for interpretation appear to exist.

In its purest form, the premise of test–retest reliability may still be considered predicated upon the Classical Test Theory notion of a "thought experiment" (see, Borsboom, 2005), as the participants are assumed to have largely forgotten the questions and responses once the second testing session takes place. Such an assumption may be plausibly challenged, however, particularly given that the time interval between testing sessions may be as little as two weeks. For this reason, the utility of the test–retest method as an indicator of measurement error has been seriously challenged (e.g., Nunnally & Bernstein, 1994). Despite these criticisms, the use of the test–retest method appears to continue unabated in most disciplines in psychology, including EI. It remains to be determined what reliability related information may be drawn from this type of research.

Despite the problems associated with the interpretation of a test–retest reliability coefficient as an indicator of reliability, the observation of "stability" (as the method of test–retest reliability is often preferentially called, e.g., Matarazzo & Herman, 1984) in trait scores across time may be suggested to be important in practice. That is, if peoples' level of EI is shown to fluctuate widely across time (in the absence of any systematic treatment effects), it is doubtful that the scores could ever be found to correlate with any external attribute of interest that would be expected to be relative stable (e.g., well-being, job performance, etc.). Thus, although the supposed importance of test–retest reliability may be questioned, the importance of test–retest stability can probably not. Consequently, an examination of test–retest stability should nonetheless be considered when evaluating the scores of a psychometric inventory.

Internal Consistency Reliability

In contrast to parallel forms reliability and test–retest reliability, internal consistency reliability can be conceptualized and estimated within the context of a single administration of a single set of test items. Consequently, it is much more convenient to estimate, which may explain its popularity. The two most popular methods of estimating internal consistency reliability are the split-half method and Cronbach's alpha (α). A more sophisticated approach to internal consistency reliability has also been established within a latent variable framework, known as McDonald's omega (ω), which is beginning to gain some popularity, as it is more flexible in accommodating data that do not satisfy the rather strict assumptions associated with Cronbach's α.

Split-Half Reliability

Split-half reliability may be the simplest method of internal consistency estimation. In effect, a particular inventory is split into two halves and the summed scores from those two halves are correlated with each other. The correlation between the two summed halves may be considered conceptually equivalent to the correlation between two parallel forms. However, the correlation between the two halves would be expected to underestimate the reliability of the scores derived from the entire test. Consequently, split-half reliability is often formulated as (Nunnally & Bernstein, 1994):

$$r_{kk}\,\frac{2r_{12}}{1+r_{12}}$$

where r_{kk} = the reliability of the whole test and r_{12} = the correlation between two half-tests. Thus, the greater the positive correlation between the two halves, the greater the reliability estimate.

The widely acknowledged problem with the split-half method to the estimation of reliability is that one is required to determine how the inventory will be split into two separate halves. Thus, while most investigators tend to split a scale into halves of odd and even items, there is no compelling qualitative or quantitative reason for doing so. Other seemingly justifiable splitting methods are easily conceived, which have been demonstrated to yield different estimates of reliability (Brownell, 1933).

Another problem with the split-half reliability method is pertinent to time-limited tests. Specifically, time-limited tests based on items that are ordered in terms of difficulty tend to yield upwardly biased estimates of reliability, as the correlation between particular halves may be found to be higher than would otherwise be expected had the items been administered individually (Cronbach, 1960). Given these limitations, a generalization of the split-half method has been devised, known as Cronbach's α, which represents the average reliability of all possible split-halves (Cronbach, 1951).[1]

Cronbach's Alpha (α)

Cronbach's α is the most popular approach to the estimation of internal consistency reliability (Peterson, 1994). It is typically considered to range between .00 and 1.0; however, estimates can technically be negative in the

[1] Occasionally read in the contemporary literature is internal consistency reliability based on the Kuder–Richardson 20 formula. The KR20 reliability procedure predates Cronbach's α, but was limited to dichotomously scored items from which "proportion correct" and "proportion incorrect" information could be derived for each item. When the items are of equal difficulty, a more simplified formulation can be used to estimate reliability (i.e., KR21).

event the covariances between the items are, on average, negative in direction. A relatively accessible formulation of Cronbach's α is:

$$\alpha = \frac{k^2 * \overline{COV}}{\sum S^2, COV}$$

where k = number of items used to calculate the composite score, $\overline{COV}$ = mean inter-item covariance, and $\sum S^2, COV$ = the sum of the square variance/covariance matrix (Cortina, 1993). Based on the formula above, it is apparent that reliability will increase as a function of two parameters: the number of items included in the analysis; and (2) the magnitude of the average positive association between the items. The numerator term of the formula represents the "true score variance", while the denominator represents total variance. For this reason, reliability may be referred to as the ratio of true score variance to total variance (Lord & Novick, 1968).

It should be emphasized that the correct application of Cronbach's α is based on the observation of three assumptions (Lord & Novick, 1968), which appear to be only rarely acknowledged in the literature. There is also evidence to suggest that two of the three assumptions are probably rarely satisfied in practice (Gignac, Bates, & Lang, 2007).

Firstly, it is assumed that the error variance associated with each item is not correlated with the true score variance term. This assumption is primarily of theoretical interest, and may be expected to be satisfied if the remaining two assumptions are also satisfied.

The second assumption states that each item must contribute an equal amount of variance to the true score variance term. Technically, this assumption is referred to as tau-equivalence. Effectively, the second assumption implies that the single-factor model underlying the covariances between the items is associated with a factor solution with equally sized factor loadings. While this assumption may be expected to be rarely achieved in practice, the consequence of violating the tau-equivalence assumption is not usually very consequential (Reuterberg & Gustafsson, 1992). When the tau-equivalence assumption is not satisfied, Cronbach's α will tend to underestimate the true reliability of the scores. For this reason, Cronbach's α is sometimes referred to as a "lower-bound estimate of reliability" (Novick & Lewis, 1967). The tau-equivalence assumption may be tested within a confirmatory factor analytic model, where the factor loadings are constrained to equality. It is probably safe to say that the assumption of tau-equivalence has never been tested on the items of any scale in the EI literature.

The third assumption states that the error terms ("residuals") associated with all of the items must not correlate with each other. In effect, this assumption may be said to be observed when the items conform to a well-fitting, single-factor model, as tested via confirmatory factor analysis (CFA). In the event that the single-factor model is not found to be well-fitting, which would imply some correlations between the residuals, the Cronbach's α estimate will be upwardly biased if the sum of the correlated residuals is positive (Raykov, 2001).

Fortunately, there is a formula that can calculate accurate estimates of internal consistency reliability based on data which are neither tau-equivalent nor consistent with the absence of correlated error terms. This equation has been formulated within the context of latent variable modeling and is known as McDonald's omega (ω).

MacDonald's Omega (ω)

The most popular method used to estimate the internal consistency reliability of composite scores within a factor analytic or latent variable framework is known as omega (ω), which was first formulated by McDonald (1970). For the purposes of this chapter, two omegas will be distinguished: ω_A and ω_B. The first omega (ω_A) is to be used in that case where there are no correlations between the error terms of the items, but where the factor loadings may not be equal across all items. In accordance with Hancock and Muller (2001), it may be formulated as:

$$\omega_A = \frac{\left(\sum_{i=1}^{k} \lambda_i\right)^2}{\left(\sum_{i=1}^{k} \lambda_i\right)^2 + \sum_{i=1}^{k} \delta_{ii}}$$

where λ_i = standardized factor loading and δ_{ii} = standardized error variance (i.e., $1–\lambda_i^2$). In contrast, the second omega (ω_B) is to be used in that case where there are correlations between the error terms of the items (Raykov, 2001). It may be formulated as:

$$\omega_B = \frac{\left(\sum_{i=1}^{k} \lambda_i\right)^2}{\left(\sum_{i=1}^{k} \lambda_i\right)^2 + \sum_{i=1}^{k} \delta_{ii} + 2 \sum_{1 \le i < j \le k} \delta_{ij}}$$

where λ_i and δ_{ii} are defined as above andδ_{ij} is equal to the correlations between item error terms. Cronbach's α and ω_A will yield the same reliability estimates only in the case where the underlying single-factor model solution is tau-equivalent and well-fitting. As the assumptions associated with Cronbach's α are likely not met in practice, it may be argued that the latent variable approach to the estimation of internal consistency reliability is decidedly the most appropriate. The explicit emphasis on first achieving a well-fitting model in CFA may also be considered an advantage. Despite the fact that the latent variable approach to the estimation of reliability has been well established for several years, only a small number of empirical investigations appear to have ever estimated ω_A or ω_B in psychology, only one of which may be related to EI (i.e., Gignac, Palmer, & Stough, 2007).

In the area of personality, Gignac, Bates, et al. (2007) demonstrated that internal consistency reliabilities associated with the subscales of the NEO-FFI were all overestimated when the correlations between the item residuals were ignored. For example, the Extraversion subscale scores were initially found to be associated with an internal consistency reliability of .83, which dropped to .77 when the correlated residuals were included into the ω_B formulation. Across all five personality dimensions, the non-biased internal consistency reliability estimates were all demonstrated to be below .80 (Gignac, Bates, et al., 2007), which is the recommended minimum for basic research (Nunnally & Bernstein, 1994).

The assumption that none of the items may correlate with each other, independently of the factor they are all hypothesized to measure, in effect states that the single-factor model underlying the plausibility of the scale must be demonstrated to be associated with adequate levels of model-fit when tested via CFA. Researchers in the area of EI (and psychology in general) appear only very rarely to first test the plausibility of the single-factor model for their data. Thus, the internal consistency reliability estimates reported in the EI literature should probably be viewed as upwardly biased.

Methods for estimating the reliability of composite scores that are derived from items that form part of a multi-dimensional model are being developed based on the same latent variable framework described above. For example, Gignac, Palmer, et al. (2007) applied ω_A to a well-fitting direct hierarchical factor model (a.k.a., nested factor model) solution based on the 20 items of the Toronto Alexithymia Scale-20 (TAS-20). The TAS-20 has been reported to measure three inter-correlated subscales, corresponding to Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF), and Externally Oriented Thinking (EOT; Parker, Bagby, Taylor, Endler, & Schmitz, 1993). Based on Cronbach's α, the reliabilities for the subscale scores were estimated at .83, .81, and .65, respectively, which corresponded closely to what other investigators have reported. In contrast, the ω_A estimates derived from the well-fitting, multi-factor model solution were .56, .31, and .42 respectively. These reliability estimates are so low as to question the utility of the subscale composite scores as unique indicators of the dimensions they are purported to measure. It should be noted that the TAS-20 is not expected to be the only inventory to exhibit very low levels of unique reliability at the subscale level, when estimated from a direct hierarchical model. In fact, based on preliminary analyses (available from the author), the index scores within the WAIS-III have also been found to be associated with ω_A estimates less than .50.

Appreciating the Importance of Reliability

Several reliability estimation methods have been described above, with McDonald's ω_A and/or ω_B endorsed as likely the most appropriate method to employ in most cases. Next, an appreciation for achieving respectable levels

of reliability will be discussed based on two concepts: (1) the standard error of measurement, which will emphasize the implications of reliability for the meaningful interpretation of scores, and (2) the effects of imperfect reliability on the estimation of effect sizes in empirical studies, which will emphasize the importance of disattenuating effect sizes such as Pearson correlations and Cohen's *d*, prior to interpreting the practical significance of the results reported in an empirical study.

Standard Error of Measurement

A relatively accessible approach to the understanding of the importance of reliability may be achieved by considering the estimation of 95% confidence intervals for a particular score derived from a test. Suppose a particular intelligence test yielded scores associated with an internal consistency reliability of .70, the commonly cited demarcation criterion for minimum acceptability (Peterson, 1994). Suppose further that the mean of the scores was 100 and the SD was 15. Based on the standard error of measurement formula, one could estimate with 95% confidence the range of intelligence observed scores a person would yield under the pretence that they were tested a theoretical infinite number of times (assuming their memory was erased; or, alternatively, were administered an infinite number of parallel tests). The formula for the standard error of measurement of an observed score is:

$$\text{SEM} = \text{SD}\sqrt{1 - r_{xx}}$$

where SD = standard deviation and r_{xx} = reliability. Thus, based on a standard deviation of 15 and a reliability estimate of .70, the standard error of measurement of the observed score in this case is equal to 8.22 IQ points:

$$\text{SEM} = 15\sqrt{1 - .70}$$
$$\text{SEM} = 8.22$$

.

However, the estimate of 8.22 corresponds only to 68% of the distribution of infinite observed scores (i.e., one standard deviation above and below the point-estimate of 100). To estimate the 95% confidence interval (CI95%), the SEM must be multiplied by 1.96, which corresponds to 95% of the *z* distribution. Therefore, $\text{IQ}_{\text{CI95\%}} = 1.96 * 8.22 = 16.11$. Thus, a composite IQ score of 100, which is derived from a sample associated with a reliability estimate of .70, may be expected to range between 83.89 and 116.11, i.e., somewhere between dull and bright. Such a range should be viewed unimpressively, as the conclusion that an individual's observed score is somewhere between dull and bright can be said about nearly anyone, without even having any knowledge relevant to their completed IQ test.

Clearly, a meaningful interpretation of a point-estimate score depends upon the confidence with which an individual's observed score is represented by the point-estimate yielded from the psychometric testing. As the reliability of the scores decreases, the range in interval estimates increases. Based on the example provided above, it would be understandable if someone viewed a reliability estimate of .70 in a critical manner. Further discussion relevant to recommended standards of reliability is provided below.

While the consequences of low levels of reliability can be appreciated relatively clearly when presented in the context of the standard error of measurement, a consequence of low levels of reliability that is perhaps neglected in the literature is relevant to the issue of score meaningfulness and/or interpretability. As stated above, internal consistency reliability represents the percentage of variance in the observed scores that is true score variance. In effect, however, researchers can only be expected to formulate an understanding of the nature of an aggregated score based on how the scores relate to the actual behaviours/cognitions that yielded them. Thus, if there is a substantial difference between observed scores and the true scores, then it is difficult to imagine how an accurate understanding of the nature of the composite scores can be generated. Stated alternatively, if reliability is low, it is difficult, if not impossible, to discern which elements of the behaviours or cognitions are the contributors to the true score variance associated with the composite scores. It is likely for this reason that Cliff (1983) asserted that latent variables defined by only three indicators with factor loadings of .70 or less remain very ambiguous. As factor analysis and internal consistency reliability have direct corollaries, Cliff's (1984) assertion may be viewed as relevant to any group of composite scores associated with a reliability of .75 or less.[2] Thus, both applied psychometrists and pure researchers should have an interest in achieving respectable standards for reliability with their scores, irrespective of the fact that pure researchers may have legitimate recourse to statistical analyses that can disattenuate the effects of imperfect reliability (see next section). Ultimately, in the absence of meaningfulness, it is difficult to discern the utility of reporting an effect between two variables.

Reliability and Effect Size

While reliability and validity are generally regarded as separate psychometric concepts, they are inextricably interwoven, because typical validity studies report effect sizes (e.g., correlations, Cohen's *d*, etc.) to support arguments of validity.[3] That is, it is well established that the magnitude of effect sizes will be

[2] $\omega_A = \frac{\sum (.70 + .70 + .70)^2}{\sum (.70 + .70 + .70)^2 + (.51 + .51 + .51)} = \frac{2.10^2}{2.10^2 + 1.53} = \frac{4.41}{5.94} = .74$

[3] Of course, the interface between validity and reliability is further blurred by the close correspondence between factorial validity and internal consistency reliability.

attenuated as a function of the reliabilities of the scores associated with the variables included in the analysis (Baugh, 2002).

Consider, for example, an estimated correlation of .35 between a predictor and criterion associated with reliabilities of .70 and .80, respectively. The maximum correlation that can be observed between these predictor and criterion scores is not |1.0|. Instead, the maximum correlation is equal to:

$$\begin{aligned} r_{\max} &= \sqrt{r_{xx} r_{yy}} \\ r_{\max} &= \sqrt{(.70)(.80)} \\ r_{\max} &= \sqrt{.56} \\ r_{\max} &= .75 \end{aligned}.$$

Consequently, it has been recommended that observed correlations be disattenuated for the purposes of interpretation, which is achieved by dividing the observed correlation by the corresponding maximum correlation (Nunnally & Bernstein, 1994). Thus, for this example,

$$r' = \frac{r_{\text{obs}}}{r_{\max}} = \frac{.35}{.75} = .47.$$

Some debate has surrounded the appropriateness of the "double correction", i.e., where the reliabilities of both the predictor scores and the criterion scores are used to disattenuate the effect size (see Muchinsky, 1996). It has been recommended that in applied research contexts (e.g., personnel selection, clinical diagnosis, etc.) only the single correction be used, where the reliability of only the criterion is taken into consideration. The reason why such a recommendation is sensible is based on the fact that individuals and/or organizations, in practice, can operate only at the level of predictor scores composed of both true score variance plus error variance. That is, they do not have access to true scores – only observed scores. Consider a human resource department that has estimated a group of prospective employees' IQ. That department is left with using the IQ scores derived from the IQ testing, which will be invariably contaminated by measurement error. Thus, there is no recourse to disattenuation formula in applied settings (with respect to predictor variables).

It will be noted that the disattenuation effects observed with correlations can also be observed for effect sizes based on mean differences (e.g., Cohen's *d*). The reliability levels of the scores do not have an effect on the point estimates of the means. Instead, reliability has an effect on the corresponding standard deviations. Specifically, when scores are less than perfectly reliable, the standard deviations tend to be larger than would otherwise be the case. Thus, the

denominator of the Cohen's *d* formula needs to be corrected to obtain the dissatenuated standardized mean difference:

$$d' = \frac{\overline{X}_1 - \overline{X}_2}{SD_{\text{pooled}}(\sqrt{r_{xx}})}.$$

It should also be made clear that the effect sizes reported in structural equation modelling studies are "automatically" disattenuated for imperfect reliability based on the same Classical Test Theory principle applied above (Fan, 2003). Thus, ostensibly large effect sizes reported in a SEM study may have been "achieved" based on latent variables with underlying composite score reliability of questionable respectability (Cohen, Cohen, Teresi, Marchi, & Velez, 1990; Gignac, 2007).

Given the above, validity research reported in EI empirical studies should be evaluated within the context of the reliability of the scores used in the analysis and whether the reported effects have been disattenuated or not. In the context of convergent validity, the absence of an effect may be due to unacceptably low levels of reliability, rather than absence of a true effect. Conversely, evidence in favour of discriminant validity should also be interpreted within the context of the reliability of the scores, as unacceptably low levels of reliability may dictate the absence of an association between two variables.

Recommended Standards for Reliability

The most frequently cited recommendation for minimum levels of internal consistency reliability is .70 (Peterson, 1994). From a reliability index perspective, a recommendation of .70 corresponds to a correlation of .84 between observed scores and true scores.[4] Consequently, a recommendation of .70 would suggest that a minimum of 70% of the observed score variance must be true score variance. However, it is at best misleading to suggest that Nunnally (1978) recommended .70 as a minimum demarcation criterion for internal consistency reliability. As pointed out by Lance, Butts, and Michels (2006), Nunnally (1978) recommended .70 only for early stage research. For basic research, Nunnally (1978) recommended a criterion of .80, and for clinical decision making a minium reliability level of .90+ was encouraged. Given the relatively early stage at which emotional intelligence research may be regarded, a minimum reliability criterion of .70 may be considered acceptable. However, if emotional intelligence research is to be considered basic research rather than exploratory, efforts should be made to improve the reliability of the scores so as

[4] Some investigators have erroneously equated true scores with constructs scores (e.g., Schmidt & Hunter, 1999). It should be noted that scores devoid of measurement error (i.e., true scores) are not necessarily scores associated with any construct validity (Borsboom & Mellenbergh, 2002).

to ensure levels above .80. The application of EI to clinical or workplace settings may be expected to require minimum reliability levels of .90.

It has been observed that self-report measures of emotional intelligence tend to be associated with relatively adequate levels of internal consistency reliability, while ability based subtests of EI, such as the MEIS/MSCEIT, tend to struggle to achieve even minimum standards of reliability for exploratory research (Matthews, Zeidner, & Roberts, 2002). Proponents of the MSCEIT have countered that while the individual subtests of the MSCEIT may suffer from a lack of reliability, the reliabilities do achieve respectable standards at the branch and total score level (Mayer, Salovey, Caruso, & Sitarenios, 2003).

There is reason to seriously question such assertions, however. Consider the magnitude of the inter-subscale correlations within the MSCEIT V2.0 reported in Mayer et al. (2003). For example, the correlation between the Faces and Pictures subscales (which form the Perceiving branch score) was reported to equal .347. Summed together, the Faces and Pictures subscales form the Perceiving branch score. Based on the split-half reliability formula (see above), a correlation of .347 amounts to an internal consistency reliability of .51, which is substantially lower than the reliability estimate of .91 reported for the Perceiving branch by Mayer et al. (2003). What could be the explanation for the substantial difference in the split-half reliability estimate calculated above and the Cronbach's α estimate reported by Mayer et al. (2003)?[5]

It is likely that Mayer et al. calculated their branch level reliability estimates based on correlation matrices that included all of the items of the Faces subscale and all of the items of the Pictures subscales. Such a procedure may seem appropriate; however, it is important to consider the assumptions associated with the estimation of internal consistency reliability, as described in detail above – in particular, the assumption that the item error terms ("residuals") can not correlate with each other. In practice, this assumption implies that the items used to calculate the reliability estimate must conform to a well-fitting, single-factor model as determined by confirmatory factor analysis. Thus, no two items can share unique variance with each other.

To appreciate the importance of the well-fitting, single-factor model assumption, consider that Green, Lissitz, and Mulaik (1977) were able to demonstrate that a composite score associated with data that conformed to a completely orthogonal five-factor model were found to be associated with a Cronbach's α of .81, when reliability was estimated at the item level. In contrast, the corresponding Cronbach's α based on the inter-correlations of the five corresponding subscales would be .00, as the five factors were simulated to be completely orthogonal. Ultimately, Cronbach's α should never be viewed as an index of homogeneity (i.e., unidimensionality). Instead, the accurate application of Cronbach's α assumes the data have already been demonstrated to be consistent

[5] While it is true that split-half reliability estimates and Cronbach's α estimates will not usually yield the same values, such a large discrepancy can not reasonably be expected to be due to the different formulations.

with a well-fitting, single-factor model. To my knowledge, this has never been demonstrated with any of the MSCEIT subscales, not to mention any of the branches or the total scale.

When the internal consistency reliability estimate of .51 was calculated above for the Perceiving branch score based on the split-half reliability formula, the corresponding CFA model in such a case is necessarily impossible to disconfirm, as there are only two "items" (subtests, more precisely) and, consequently, a single correlation. Thus, the assumption of no correlated error terms (or a well-fitting, single-factor model) is necessarily satisfied. In contrast, the estimate of .91 reported by Mayer et al. is assumed to be based on a corresponding CFA model of 50 items (Faces = 20 items; Pictures = 30 items). In the event that any of the 50 items were to correlate positively with each other above and beyond the shared variance accounted for by the global factor, the .91 estimate would be an overestimate. It is suggested, here, that the more accurate estimate of the internal consistency reliability of the Perceiving branch scores is closer to .51 rather than .91. Based on the same split-half reliability procedure used above and the inter-subscale correlations reported in Table 2 of Mayer et al. (2003), the branch level score reliabilities for the Facilitating, Understanding, and Managing branches were estimated at .52, .74, and .73, respectively. Thus, all below the .80 recommendation for basic research (Nunnally & Bernstein, 1994). For an accessible demonstration of the application of CFA in the estimation of internal consistency reliability (ω_A and ω_B), readers are referred to Gignac, Bates, et al. (2007).

Internal Consistency Reliability Versus Test–Retest Reliability

It is important to distinguish parallel forms reliability (or test–retest reliability) from internal consistency by noting that the two types of reliability have no necessary association with each other. That is, composite scores may be demonstrated to be associated with very high levels of parallel forms reliability (or test–retest reliability) but very low levels of internal consistency reliability. Consider the three following variables: height, intelligence, and extraversion. The correlations between these variables measured in adults would all be expected to be less than .20, which would preclude any meaningful aggregation of the scores (and a very low level of internal consistency reliability). However, these same aggregated scores would be expected to have very high levels of test–retest reliability, because all three of the scores would not be expected to change over a time period of, say, 2 weeks. Because the individual variable scores would not be expected to change, the corresponding composite scores would also not be expected to change, resulting in a substantial level of test–retest reliability. Thus, evidence in the EI literature that suggests substantial test–retest reliability for the MEIS or MSCEIT (e.g., Brackett & Mayer, 2003), or any other instrument for that matter, should not be interpreted as in any way indicative of substantial internal consistency reliability.

Validity

Introduction

The process of measurement in psychology is generally consistent with the ascription of numbers to attributes according to a rule (Stevens, 1946). In contrast, the purpose of measurement in psychology is generally to "make inferences from observed test scores to unobserved constructs..." (Sireci, 1998, p. 84). The enterprise of validity research is relevant to the evaluation of the plausibility of those inferences.

As was the case for reliability described above, validity is not a property that can be ascribed to a test, per se. Instead, it is the interpretation of a score derived from a test that may be declared valid. Thus, the scores derived from a test may be considered valid in one case and invalid in another. Ultimately, the user of a test is left with the responsibility of justifying the use of the scores in a particular context. Many approaches to the assessment of validity have been devised over the years, the most common of which are face validity, content validity, factorial validity, predictive validity, incremental predictive validity, concurrent validity, discriminant validity and multitrait–multimethod (MTMM) validity.

Face Validity

Face validity is arguable the least sophisticated approach to the assessment of test validity. It refers to the degree to which, at least superficially (i.e., "on the face of it"), the items within an inventory appear to measure the attribute or construct of interest. Face validity is not typically estimated with a numerical coefficient or index. Consequently, the broader research and test taking community generally makes an informal assessment of the face validity of a test.

Unlike all other forms of validity, high levels of face validity have not categorically been regarded as a positive attribute. For example, Cattell and Warburton (1967) expressed reservations about inventories with high levels of face validity, because they believed that there was a positive correlation between high face validity and the probability of high levels of simulation (i.e., "faking good") on the part of test takers. That is, for the items of a test to be associated with high face validity, the items must be considered to be measuring the attribute of interest in an obvious manner. However, if individuals can easily discern the purpose of an item, they will be in a better position to respond in such a way as to present themselves in an unrealistically positive manner. Thus, argued Cattell and Warburton (1967, p. 35), face validity "defeats the real art of the psychologist, which is to produce the find of test that disguises (from the subject) what it measures." As the items from a typical self-report measure of EI appear to be associated with a high level of face validity, they would be appraised critically from the Cattell/Warburton perspective.

However, it may be beneficial to distinguish between different purposes for administering an emotional intelligence questionnaire or test. Specifically, for the purposes of personnel selection, it may be beneficial for the items of an inventory to be associated with low levels of face validity, as this would militate against the possibility of socially desirable responding. In contrast, if the purpose of the psychometric testing was to provide individuals the opportunity to learn more about themselves, then high levels of face validity may be regarded as advantageous.

Content Validity

Content validity is indicated when the items within a test or inventory may be justifiably contended to be an accurate representation of the entire domain of interest. The concept of content validity initially emerged from educational psychology. Achievement tests, for example, can be evaluated for content validity relatively straightforwardly, as the boundaries of a particular achievement test can be expected to be easily described and agreed upon. For instance, an exam for an undergraduate course in statistics should encompass the material that was covered in the lectures and labs throughout the semester. Questions that are included in an exam that were not covered in the lectures or labs would clearly compromise the content validity of the achievement test. In other cases, the exam may be based on a disproportionately large number of items from only three or four lectures, rather than spread relatively evenly across all lectures/labs. Again, the content validity of the test would be in question in this case.

Outside the domain of achievement testing, the prospect of evaluating content validity is much more difficult, as experts in the field can be expected to disagree on the theoretical boundaries of the construct. The construct of emotional intelligence is certainly no exception. For example, should the attribute of "empathy" be included in the measurement of EI? On what basis might it be included or excluded? Given that there are no widely acknowledged empirical protocols to determine whether a facet should or should not be viewed as within the boundaries of a construct, the issue is generally left to theoretical argumentation. EI is not the only construct in psychology that may have difficulty in specifying clearly its construct related boundaries.

Consider the construct of personality, which has been suggested to encapsulate the ways "individuals differ in their enduring emotional, interpersonal, experiential, attitudinal, and motivational styles" (McCrae & John, 1992, p. 175). On what basis were these domains judged to be the domain of personality rather than another individual differences attribute? If one were to suggest that the area encapsulated by personality may be overexpansive, on what basis may this assertion be supported? The issue of content validity in the area of personality has implications for the possibility that emotional intelligence may be redundant with personality, as suggested by several commentators

(e.g., Landy, 2005). For example, consider the Openness to Experience personality dimension within the NEO PI-R, which incorporates a facet called "openness to feelings". If a substantial correlation between this personality facet and an emotional intelligence subscale were observed, would this indicate construct redundancy for EI? Perhaps it could be countered that "openness to feelings" is better conceived as a facet of EI rather than personality. On what basis might this contention be convincingly refuted? This rather thorny issue relevant to the content validity of personalty and emotional intelligence is not intended to be resolved here. Instead, an appreciation of the nature of the concept of content validity and some of its implications are described.

Readers may have noted that face validity and content validity have been referred to as a property of the test, rather than a property of the scores derived from a test. It is effectively impossible to discuss face and content validity as a property of scores, as they are obviously properties of the items which make-up the test. This issue has not gone unnoticed in the validity literature, and for this reason, some experts have argued that neither face validity nor content validity are truly justifiable elements of psychometric validity (e.g., Guion, 1977).

Factorial Validity

The term "factorial validity" is not frequently observed in the literature, despite the fact that it plays a central role in the validity assessment of scores derived from a measure. As Nunnally (1978, pp. 112–113) contended, ". . .factor analysis is intimately involved with questions of validity. . . . Factor analysis is at the heart of the measurement of psychological constructs." Guilford (1946, p. 428) considered factorial validity more central to any other type of validity evidence, as it addressed the question, "'What does this test measure?', rather than, 'Does this test measure what it is supposed to measure?'". While Guilford's (1946) assertion may be criticised, the point to be taken from the above passages is that factorial validity is crucially important to the validity enterprise, as it helps determine what composite scores derived from an inventory measure from a dimensional perspective, or more specifically, how many dimensions are measured by the scores of an inventory? Secondly, by interpreting the loadings within the factor solution (i.e., strength and direction), the nature of those dimensions may be discerned.

The utility of the factorial validity research strategy is relevant to both theory and practice for the domain of EI. Theoretically, the demonstration of factorial validity is important, as the various models of EI postulate the existence of narrower dimensions, such as emotional management and emotional perception, for example, in addition to a global emotional intelligence factor. From a more practical perspective, factorial validity results help an investigator or test developer determine which items should be used to define each subscale.

While the term "factorial validity" is not very frequently used in the literature, factorial validity studies are, in fact, very commonly published in academic journals. There are two primary types of factorial validity studies: exploratory (unrestricted) and confirmatory (restricted). The more impressive factorial validity evidence may be derived from confirmatory factor analysis (CFA), as simple structure is specified and tested statistically within a restricted factor analytic framework. Consequently, largely arbitrary decisions such as rotation (oblique vs. orthogonal) and determining salient vs. non-salient loadings in EFA are obviated in CFA.

Effectively, if a developer of an emotional intelligence inventory asserts that the scores from that inventory measures a global emotional intelligence factor and four subfactors, factor analysis can help test the plausibility of such an assertion. In the event that a CFA model consistent with the developers (or EI model proponents) assertion is found to be associated with adequate model-fit, the test developers' assertion may be considered at least partly supported. The problem of equivalent models and non-equivalent models does seriously undermine assertions of factorial validity (see Tomarken & Waller, 2003), particularly in the context of data that are associated with a relatively strong global factor. In such cases, a large number of different models may be found to be associated with acceptable levels of CFA model-fit. Consequently, factorial validity evidence is not sufficient to justify the use of inventory for any particular purpose. Invariably, factorial validity evidence must be complimented by other types of validity evidence, such as convergent and discriminant validity (described below). However, because factorial validity evidence helps determine how to score an inventory, it must be conducted prior to the assessment of other quantitatively based methods of validity research. Consequently, factorial validity evidence is generally sought prior to convergent or discriminant validity evidence. That is, prior to correlating composites scores derived from the inventory with criteria, the researcher must know how to aggregate the various items together to represent the various factors/constructs.

It will be noted that factorial validity has much in common with internal consistency reliability. This argument may be appreciated from at least two perspectives. First, data for a factorial validity study can be obtained from a single administration. Secondly, as discussed above, sophisticated approaches to the estimation of internal consistency reliability (i.e., ω_A and ω_B) are based on factor solutions. In effect, factorial validity may be regarded to be at the interface between validity and reliability, which seriously undermines the notion that reliability and validity are separate concepts.

Predictive Validity

Predictive validity may be the oldest type of research method to help justify the valid use of scores derived from a measure. Perhaps not coincidently, it is also

based on a straightforward methodology. Specifically, the predictor variable is measured across all participants, then, at a later date (ideally), the criterion variable is measured across all of the same participants. If the correlation coefficient between the predictor and criterion scores is statistically significant (or preferably practically significant), the scores from the measure may be said to be associated with predictive validity. In educational psychology settings, predictive validity studies were devised to determine whether intellectual intelligence tests could predict future academic performance. In such cases, an understanding of the nature of intellectual intelligence was irrelevant. That is, so long as the scores from the measure predicted the criterion of interest, the scores from the measure were deemed valid. For this reason, McGrath (2005) has distinguished between research strategies focused on predictive accuracy versus those that are focused on representational accuracy, as the two are not necessarily compatible.

Typically, predictive validity studies are based on statistical techniques such as correlations or multiple regression, where the percentage of variance accounted for in the dependent variable (e.g., performance) is reported as r^2 or R^2. Precisely how large an r^2 value has to be to indicate predictive validity is a source of some contention. Judgements based purely on statistical significance testing have been thoroughly criticised (see Harlow, Mulaik, & Steiger, 1997), as large sample sizes may be expected to detect miniscule effect sizes. Cohen (1992) has suggested some guidelines for interpreting effect sizes, which have become well-cited in the literature. In the context of correlations, Cohen (1992) suggested that a small, medium, and large correlation may be considered to be equal to .10, .30, and .50, respectively. Cohen's (1992) guidelines were based on his experience of doing research and reading other published articles. In contrast, Hemphill (2003) conducted a quantitative review of meta-analyses to ascertain the range of effect sizes actually reported in the literature. Hemphill (2003) found that the lower third, middle third, and upper third correlation sizes were equal to <.20, .20–.30, and <.30. Thus, the Hemphill (2003) guidelines differ non-negligibly from Cohen's (1992) guidelines. In particular, a large effect is considered to be a correlation of .30 or greater, rather than a correlation of .50 or greater.

Bold claims have been made about the predictive validity associated with emotional intelligence as a predictor of job performance, many of which have been criticised as outlandish, even by proponents of the EI construct (see Mayer, Salovey, & Caruso, 2000, for example). Further, it has been argued that in the case of emotional intelligence, evidence of *incremental* predictive validity must be demonstrated rather than simply predictive validity (Zeidner, Matthews, & Roberts, 2001).

Incremental Predictive Validity

Incremental predictive validity is a conceptually identical to predictive validity, with the exception that the predictor(s) of interest must demonstrate some

unique capacity in predicting an external criterion (e.g., job performance). Further, the data are generally subjected to hierarchical multiple regression, where a statistically significant increase in percentage of variance accounted for in the dependent variable is expected to be observed based on the addition of the variables of interest to the regression model. As was the case with predictive validity, it is more impressive when the criterion is measured at a time later than when the predictor variables were measured, so as to militate against the possibility of method effects (Spector, 1994). Landy (2005) has argued that the issue of incremental predictive validity is of central importance to the case of emotional intelligence for two reasons. Firstly, parsimony in the number of constructs should be sought in any science; and, secondly, the empirical evidence based on scores derivable from putative emotional intelligence measures have not yet demonstrated incremental predictive validity above well-known measures of personality and/or intellectual intelligence.

One particularly common problem in the EI incremental predictive validity studies is the failure to take into consideration the reliability of the scores included in the regression analysis. Analytical techniques such as multiple regression and path analysis assume that the variables used to represent the attributes or constructs are measured without error (Pedhazur, 1997). Failure to take this assumption into consideration can have serious interpretative problems for multiple regression and path analysis, particularly if the variables have been measured with differential levels of reliability (as would likely be the case in practice). As demonstrated in a section above, the maximum correlation between two composite scores is not necessarily equal to 1.0. Rather, the maximum correlation is equal to the square root of the product of their reliabilities. If the composite scores included in the analysis are associated with different levels of reliability, then the potential effects of independent variables on the dependent variable will be, to some degree, contingent upon the reliabilities of the scores, rather than their true association.

One approach to overcome the reliability issue in multiple regression or path analysis is to disattenuate all of the correlations within the corresponding correlation matrix prior to performing the analysis, based on the same disattenuating procedure described above for a single bivariate correlation. While such a procedure does have some appeal, it is very rarely observed in the literature possibly for several reasons, one of which may be because structural equation modelling (SEM) is a statistical technique that can decompose true score variance from error variance, allowing for the estimation of effect sizes that are not attenuated by measurement error.

However, even those empirical EI studies that have disattenuated the effects obtained in their analyses, either through the classical disattenuation procedure or the more sophisticated SEM approach, tend to be associated with other serious limitations. Perhaps the most common limitation are the measures chosen to represent the control variables. That is, while it is widely acknowledged that emotional intelligence may not be associated with incremental predictive validity due to its shared variance with self-report personality

and/or intellectual intelligence, the studies that test incremental predictive validity hypotheses tend to only use incomplete measures of personality and/or intellectual intelligence (Landy, 2005).

Hunsley and Meyer (2003) have suggested that a semi-partial correlation of .15–.20 be considered supportive of incremental predictive validity. Thus, the predictor(s) must be demonstrated to share a minimum of between 2.3 and 4.0% unique variance with the criterion, independently of the association between emotional intelligence and control variables such as personality and intellectual intelligence. The fact that Hunsley and Meyer (2003) suggested the use of a semi-partial correlation should not go unnoticed, as it is the appropriate analysis in the incremental predictive validity case, despite the fact that most (if not all) of the incremental predictive validity research in the area of emotional intelligence has made use of either partial correlations or multiple regression.

In effect, the absence of a statistically significant beta weight associated with an independent variable within a multiple regression equation does not necessarily preclude the possibility that that independent variable may share some unique variance with a criterion, independently of the shared variance between that independent variable and the control variables, as estimated via a semi-partial correlation. Multiple regression and semi-partial correlation are not the same statistical analyses. When independent variables are entered into a multiple regression, the analysis will attempt to build a regression equation that will maximally predict the dependent variable, based on the estimation of unique beta weights for each independent variable (Pedhazur, 1997). In contrast, a semi-partial correlation is simply a Pearson correlation between a dependent variable and one independent variable that has been residualized from one or more other independent (control) variables. In the semi-partial correlation case, there is no attempt to build a regression equation based on all of the independent variables to maximally predict the dependent variable. Ultimately, the performance of a multiple regression analysis is an implicit or explicit attempt to build a model to represent the associations between a number of independent variables and one dependent variable. In contrast, in no justifiable way can a semi-partial correlation be said to represent a theoretically relevant model.

Incremental predictive validity hypotheses are also frequently operationalized statistically within the context of mediation analyses or partial correlations. Again, just as multiple regression and semi-partial correlation are not the same analysis, mediation via multiple regression and partial correlation are also not the same analysis. A partial correlation is a Pearson correlation between a residualized independent variable and a residualized dependent variable, where the independent variable and the dependent variable have both been residualized against one or more control variables. In contrast, a mediation analysis via multiple regression is a model that combines both bivariate regression and multiple regression, from which indirect and direct effects between the independent variable and the dependent variable can be estimated (Alwin & Hauser, 1975).

The distinctions discussed above between multiple regression, semi-partial correlation, mediation, and partial correlation are not simply pedantic, as the coefficients derived from the analyses will very likely yield at least numerically different results, which may occasionally result in substantively different conclusions (Werts & Watley, 1968). The majority of the incremental predictive validity research in the area of EI appears to make use of multiple regression to determine whether EI can be demonstrated to be associated with incremental predictive validity. Unfortunately, those studies rarely report the corresponding semi-partial correlations to determine EI's unique capacity to correlate with the criterion. Thus, the incremental predictive validity research reported in the EI literature must be interpreted cautiously on this account, as well as the fact that researchers rarely first disattenuate the correlations for imperfect reliability prior to conducting the analyses.

In contrast to multiple regression and Pearson correlations, which assume the independent and dependent variables are measured without error, the data analytic strategy of structural equation modelling (SEM) can accommodate observed variables associated with some level of measurement error, as the observed variables are typically modelled with other observed variables to form latent variables, which are devoid of measurement error (Bollen, 1989). Consequently, the effects (i.e., correlations or beta-weights) obtained between latent variables in SEM are not attenuated due to imperfect reliability.

Only a minority of the incremental predictive validity research in the EI literature to-date has used SEM. While there are clear advantages of using SEM to test empirical hypotheses in the area of individual differences, its application in the area of EI raises an interesting question relevant to the adequacy of models of personality, which may be considered relevant to whether mixed-model measures of EI may justifiably contend to be redundant with self-report measures of personality. This issue will be addressed more fully in the section on discriminant validity (below); however, it will be noted that the implications are equally relevant to the incremental predictive validity research strategy (discussed here).

Concurrent Validity

The concurrent validity research strategy is based on the attempt to demonstrate a theoretically justifiable empirical association between the scores from one measure with those of another measure (or variable, e.g., current salary), where the scores from both measures are collected during the same testing session. The fact that the data are collected during the same testing session is what distinguishes concurrent validity from predictive validity. Collectively, concurrent validity and predictive validity are known as convergent validity or criterion-related validity.

Typical concurrent validity studies in the area of EI consist of collecting the scores from one putative measure of EI with those of another putative measure of EI. This instance of concurrent validity is not regarded highly, as the observation of a positive correlation between the scores of the two inventories does not necessarily imply that either of the inventories yields valid scores of EI, as it is certainly possible that neither of the inventories is useful at measuring EI. Some experts in psychometrics have suggested that the only justifiable instance of correlating two inventories together to demonstrate concurrent validity for the scores of one of the inventories is the case where a short form is correlated with its corresponding long form (e.g., Anastasi, 1996).

More impressive instances of concurrent validity are those where the scores of a putative inventory are correlated with theoretically relevant variables such as age, salary, achievement, performance, mental illness, etc. – that is, scores that are less likely to share method variance with the scores derived from the inventory of interest. In the area of EI, one particularly important instance of concurrent validity that has been argued to be crucial to establish is a positive association between EI scores and age (Mayer, Caruso, & Salovey, 2000). To date, the research that has tested the "age hypothesis" has been decidedly mixed. Even in those instances where a positive correlation is observed, the correlation is not particularly large ($<.15$). An issue that has not been addressed very well in this area is the possibility that emotional intelligence may be exclusively associated with crystallized intelligence (Gc), suggesting that EI and intelligence studies need to model intellectual intelligence via SEM for the purposes of representing unique sources of intelligence. It is possible that ability based EI measures may yield appreciable associations with an orthogonal Gc factor of intellectual intelligence. The failure to measure and model intellectual intelligence as a multi-factor construct is a general limitation to all EI research that has attempted to incorporate intellectual intelligence as either a concurrent validity relevant variable or a control relevant variable.

A problem in the area of EI and validity assessment literature relevant to construct validity is the possibility that EI may be susceptible to the "jingle fallacy", which represents the case where two measures that are purported to measure the same construct are in fact measuring different constructs (Block, 2000). The jingle fallacy may be argued to be relevant to the area of EI, particularly within the context of ability-based model measures of EI and mixed-model measures of EI. That is, measures from both models are often referred to as measures of "emotional intelligence", yet the reported correlations between ability-based model measures and self-report measures is so low as to suggest that they measure largely different attributes. Consequently, while two measures may sound similar ("jingle"), they can nonetheless be demonstrated to measure largely unique sources of variance. Concurrent validity research is especially important to confirming or disconfirming jingle fallacies.

A particularly problematic issue in conducting convergent validity research in psychology is the specification of how large an effect needs to be to support an argument in favour of validity. Rarely do psychology researchers make such

specifications, and the area of EI is certainly no exception. For example, with respect to the hypothesized correlation between age and EI, how large of a correlation would need to be observed to support the hypothesis? Would a correlation of .15 be sufficient? This unresolved issue is especially problematic in light of Meehl's sixth law of soft psychology: "Everything correlates with everything." Thus, it may be contended that the observation of a statistically significant correlation between the scores derived from two measures should not necessarily be viewed as evidence in favour of an argument postulating concurrent validity (e.g., ability-based EI correlating with mixed-model EI). Instead, to be especially compelling, the magnitude of the correlation should be specified and confirmed by empirical results. While exact specifications may be unrealistic in most any area of psychology, suggestions of small, moderate, or large correlations should probably be made.

In the context of ability-based measures and mixed-model measures, it is suggested here that a disattenuated correlation of at least .50 should be observed to support contentions of concurrent validity. An interesting comparison can be made by referring to the intellectual intelligence literature, where several studies have demonstrated a correlation of approximately .30 between ability-based intellectual intelligence and self-reported intellectual intelligence. Based on this research, it is doubtful that ability-based measures of EI and self-report measures of EI will ever be demonstrated to converge sufficiently to support concurrent validity, if mixed-model measures of EI, as measured via self-report, are measuring anything akin to ability EI. Interestingly, intellectual intelligence researchers appear not to interpret the coefficient of .30 as evidence of concurrent validity.

It will be noted that some researchers have acknowledged the distinction between ability-based EI and mixed-model EI, such that mixed-model EI measures are referred to as "trait EI". It is argued here that this does not solve the jingle-fallacy problem, as the acronym EI incorporates the word "intelligence". Ultimately, if a mixed-model or trait-based measure is not clearly measuring a cognitive ability, it serves no credible benefit to refer to the measure in any way as an "intelligence".

Finally, it will be noted that the confirmation of the jingle fallacy in the area of EI does not necessarily imply that self-report measures relevant to emotions are necessarily devoid of any utility or validity. There does remain the plausible possibility that self-report measures relevant to emotions may represent attributes relevant to typical performance rather than maximal performance, which may prove to serve greater utility in applied settings.

Discriminant Validity

Discriminant validity is the opposite of convergent validity. Thus, in contrast to hypothesizing the existence of a correlation between EI scores and a criterion,

discriminant validity would be observed when the scores from an EI inventory are found not to correlate with a criterion that is theoretically postulated to be unrelated to EI. To a non-negligible degree, the establishment of discriminant validity can facilitate an understanding of the nature of the underlying construct, as it can be equally as informative to learn with what the inventory scores do correlate as it is to learn with what they do not correlate. In fact, some methodologically oriented experts have recommended that factor analyses be performed with the inclusion of one variable with which one or more of the factors should not be found to be defined to help understand the nature of the factor(s) (Mulaik, 2007, personal communication).

In addition to facilitating an understanding of the nature of the underlying construct an aggregate of scores may represent, discriminant validity also plays a central role in evaluating "jangle fallacies". As described above, the "jingle fallacy" is observed when the scores from two measures purported to represent the same or similar constructs in fact measure different constructs ("jingle" because the name of the measures is the same). In contrast, the "jangle fallacy" is observed when the scores from two measures purported to represent two different constructs in fact measure the same construct ("jangle" because the name of the measures is different).

The jangle-fallacy may be observed in the case of EI, as the developers of both ability-based measures and mixed-model measure contend that their inventories are not redundant with intellectual intelligence and/or personality. However, while EI inventories may be labelled by their creators with a different name ("emotional intelligence"), the reliable variance derivable from the putative EI inventories may in fact be measuring intellectual intelligence and/or personality.

While the proliferation of constructs and inventories and psychology should probably not be condoned in the absence of any unique construct validity, it may be argued that it is unreasonable to insist that mixed-model measures of EI demonstrate a non-negligible amount of unique construct validity, independently of five factor model of personality, as has been suggested by others (e.g., McCrae, 2000). The justification of this argument is predicated upon the fact that there is yet to be a single CFA study that has demonstrated the plausibility of the five-factor model of personality (or any other theorized model for that matter; see review in Gignac, Bates, et al., 2007). While many attempts have been made, they have invariably failed to be associated with adequate model fit, suggesting that the five-factor model is implausible. In contrast to personality, there have been several publications documenting the plausibility of EI models based on putative measures of EI via CFA (see various chapter of this volume). Consequently, it may be argued to be unjustified to compare measures of EI associated with well-fitting models against popular measures of personality, all of which have been demonstrated to be inadequate via CFA. Surely advocates of personality need to first demonstrate the plausibility of their models, prior to making assertions that other well-fitting models are redundant with personality. Gignac, Bates, et al. (2007) have suggested that the dimensions of the FFM may be excessively complex and over-expansive, as even the individual

dimensions of FFM are associated with poor CFA fit when tested individually. Further, Gignac (2006) obtained a multiple *R* of .93 by regressing the Depression facet from the NEO PI-R onto 11 other NEO PI-R facets, suggesting that at least one of the facets within the NEO PI-R failed to demonstrate discriminant validity from the NEO PI-R! Thus, a substantial amount of psychometric work associated with well-known measures of personality may be required, prior to suggesting these measures as some sort of "gold-standard" with which newly developed measures should be compared.

With respect to ability-based models of EI, contentions have been made that they may lack sufficient discrimination from intellectual intelligence (Landy, 2005). While there are a number of studies that have attempted confirm and/or disconfirm the discriminant validity of the MSCEIT, most, if not all, of these studies suffer from the limited manner in which intellectual intelligence was measured (Landy, 2005).

An example of where such a criticism would apply is the study by Mayer, Caruso, et al. (2000), where an attempt was made to demonstrate that the MEIS was correlated with intelligence, which would support concurrent validity. However, it was also expected that the correlation would not be so strong as to contra-indicate discriminant validity. To test this hypothesis, Mayer, Caruso, et al. (2000) correlated total MEIS (the precursor to the MSCEIT) scores with a single subtest of intelligence (Vocabulary),[6] which yielded a correlation of .36. Obviously, a single subtest is not a comprehensive measure of intelligence. It should not even be considered comprehensive measure of crystallized intelligence. A comprehensive measure of intelligence would require a minimum of 7–9 subtests selected from a diverse group of intelligence sub-factors to allow for the modelling of a general factor, in conjunction with possible sub-factors such as Gc, Gf, and WM (each defined by 3–4 subtests). Consequently, the reported correlation of .36 would certainly be expected to be an underestimate of the true correlation between the MEIS and intellectual intelligence. How large the disattenuated association may be between the MEIS/MSCEIT and an intellectual intelligence battery as estimated via SEM does not yet appear to have been determined.

The Mayer, Caruso, et al. (2000) study may also be criticised for not taking reliability into consideration. That is, observed correlations based on imperfectly reliable scores will be attenuated (see above section on Reliability). For this reason, it may be argued that it is imperative to report disattenuated correlations for the purposes of confirming or disconfirming discriminant validity contentions (as well as convergent validity). Such an effect may be accomplished by using the Classical Test Theory disattenuation formula first proposed by Spearman (1904). Alternatively, the correlation between EI and the criterion may be estimated within a structural equation modelling (SEM)

[6] Technically, the Vocabulary measure consisted of only 60% of the items of a full Vocabulary subtest, as only 30 of the 50 items from the standard Vocabulary subtest were chosen in the Mayer, Caruso, and Salovey (2000) study.

framework, where the measures would be represented by latent variables that are devoid of measurement error (Bollen, 1989). For this reason, the correlations between latent variables are not attenuated by measurement error.

Multitrait-Multimethod (MTMM) Validity

Multitrait-Multimethod (MTMM) validity is not typically referred to as a type of validity, per se. Further, it is not typically applied within the context of attempting to confirm the validity of the scores from a single test or inventory. Instead, MTMM research strategies are more specifically concerned with the possible confirmation or disconfirmation of the plausibility of a construct (Campbell & Fiske, 1959). All validity research may be regarded as series of research strategies that, when the results are interpreted as a whole, may be supportive of the plausibility of a postulated construct (Angoff, 1988). The MTMM research strategy may be applied in such a way as to incorporate all forms of quantitative validity research strategies. Consequently, it may be argued that the enterprise of validity is culminated within the MTMM research strategy.

At its most basic level, MTMM validity is indicated when the scores derived from two different methods of measurement, which are putatively measuring the same construct, are demonstrated to correlate positively (in this basic case, it may be more appropriate to use the term Single Trait-Multimethod (STMM) validity). In the case of emotional intelligence research, MTMM validity would be indicated in the event that an ability-based measure of EI was found to correlate positively with a self-report measure of ability-based EI. A more impressive indication of MTMM validity would be observed in the event that the sub-factors of the ability-based measure of EI were found to have correlated more strongly with the self-report based inventory congruent sub-factors, in comparison to the remaining "heterogenous" sub-factors. Within this context, the sub-factor correlations between factors purported to measure the same trait may be referred to as intra-group correlations. In contrast, the sub-factor correlations between different traits may be referred to as extra-group correlations. The initial methods proposed to evaluate the pattern of relations between measures within a MTMM approach to validity testing suffered from either a lack of statistical significance testing or elegance (or both). A method based on confirmatory factor analysis, however, is both elegant and statistically useful from a validity confirmation or disconfirmation perspective (e.g., Marsh & Byrne, 1993). A fictitious example of a MTMM CFA model created to test the plausibility of an emotional intelligence construct is presented in Fig. 1. It can be observed that there are three "trait" latent variables: Emotional Perception, Emotional Expression, and Emotional Management. Each of the three traits is defined by four measured variables: a self-report measure, an other-report measure, an ability-based measure, and a physiological measure. To account for the expectation that measures derived from the same method

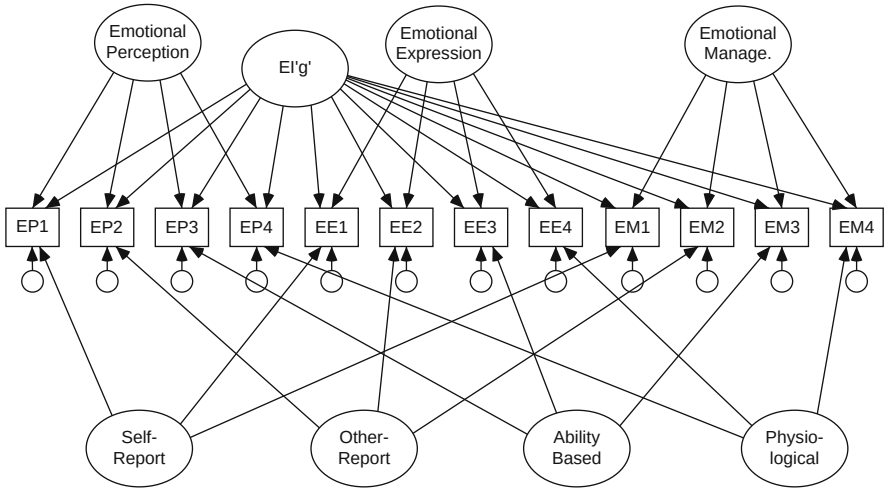

Fig. 1 An example of a MTMM CFA model within the context of emotional intelligence research

would likely share unique variance, an additional four latent variables have been included in the model to account for the methods used to measure the three emotional intelligence traits. In the event that this CFA model were to yield a factor solution with statistically significant positive loadings and adequate model fit, evidence in favour of MTMM validity would be indicated. The model could be expanded to include external criteria variables to test hypotheses relevant to concurrent validity, predictive validity, and discriminant validity.

A Note on the Association Between Reliability and Validity

It has been asserted that of the two primary psychometric properties of scores, validity evidence should be considered more valuable or impressive than evidence for reliability. While this statement will not be challenged here, it should nonetheless be made clear that reliability is a necessary but not sufficient condition for validity. Thus, in the absence of reliability, there is no possibility for validity. Consequently, it may be considered feasible to undertake criterion-related validity research, only once comprehensive reliability and factorial validity assessments have been completed.

Conclusion

In this chapter, the topics of reliability and validity in relation to the evaluation of psychometric scores were introduced and described in some detail. Test–retest reliability was described; however, its actual utility as an indicator

of reliability was questioned, although its value as an indicator of stability was supported. Internal consistency reliability was discussed; however, the application of the ubiquitous Cronbach's alpha was criticized in favour of a more modern reliability estimation technique known as omega, which can accommodate more realistic assumptions associated with data typically obtained in practice. All common forms of validity were discussed, from face validity to MTMM validity. Some problems in the interpretation of discriminant validity were noted, particularly as it relates to whether observed coefficients of .00 must be observed to indicate discriminant validity (within sampling fluctuations), or whether the observation of small correlations may also be indicative of discriminant validity. Otherwise, the testing and interpretation of validity study results appear to be relatively straightforward, although, admittedly, high quality validity studies (e.g., MTMM studies) are difficult to resource and implement in practice.

In conclusion, the contents of this chapter may be considered a relatively comprehensive review of a number of well-established psychometric considerations in the evaluation of scores derivable from a psychometric measure. However, this chapter should not be considered an exhaustive treatment of the area, as topics such as Item Response Theory (IRT), reliability generalization, and differential item functioning, for example, were not treated in any detail, if at all. Readers interested in learning more about psychometrics may consider consulting a classic text such as Nunnally and Bernstein (1994).

It should be made clear that the psychometric principles described in this chapter can by applied to virtually any discipline in psychology that uses psychometric measurements of some description, rather than only the area of emotional intelligence. Thus, although the proposed measures of emotional intelligence should be evaluated within the context of the reliability and validity considerations described in this chapter, the other measures with which EI is "competing", both in terms of construct space and commercial application space, should be evaluated just as rigorously.

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Part II
Research on Measures of EI

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An Ability Model of Emotional Intelligence: A Rationale, Description, and Application of the Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT)

Peter K. Papadogiannis, Deena Logan, and Gill Sitarenios

Since the best selling book by Goleman (1995), an escalating interest in the construct of emotional intelligence (EI) has made its way into popular press, academic textbooks, and peer reviewed journals. Despite this growing interest, the measurement of EI has come under scrutiny (Landy & Conte, 2004; Matthews, Zeidner, & Roberts, 2002). This scrutiny centers on the lack of agreement between researchers on how to define EI as a construct. In turn, identifying the most amenable means for measuring EI has presented challenges to researchers resulting in several derivatives of the EI construct (MacCann, Matthews, Zeidner, & Roberts, 2004). Currently, numerous theoretical models of EI are being advocated in the popular and academic press, as well as a variety of published and unpublished instruments claiming to assess it.

There are two main theoretical approaches to assessing emotional intelligence. The first approach is known as the mixed-model framework, which generally comprises self-report instruments that measure a combination of cognitive, personality and affective attributes. Examples of instruments that subscribe to this framework include the Emotional Quotient Inventory (EQ-i; Bar-On, 1997), the Schutte Self-Report Emotional Intelligence Test (SSREIT; Schutte et al., 1998), and the Emotional Competence Inventory (ECI; Sala, 2002). The second approach is known as the ability model framework, which views EI as a traditional intelligence and is comprised of a set of skills that combines emotions with cognition (Mayer, Salovey, & Caruso, 2008). The Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, & Caruso, 2002) is the pre-eminent ability measure of EI. The purpose of this chapter is to provide a rationale for an ability-based model of EI, coupled with a description of the prevalent literature supporting the development and application of the MSCEIT. Specifically, the first part of this chapter will review the theory behind the ability model of emotional intelligence. Subsequently, the chapter will

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look at the psychometric properties of the MSCEIT and will discuss its influence in various settings. Finally, the chapter will discuss future directions of the MSCEIT, which will include research on the development of the MSCEIT: Youth Version (YV).

The MSCEIT is known as an ability model of EI because of its capability to measure one's capacity to reason with emotional content and to use the emotional content to enhance thought. The MSCEIT differs from the self-report mixed-model measures of EI as a result of the nature and style of the assessment. Specifically, MSCEIT respondents are asked to solve emotional problems rather than being asked to self-perceive and rate the extent to which their emotional skills are being used.

Salovey and Mayer (1990) first defined emotional intelligence as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and action" (p. 189). From their original definition, Mayer and Salovey (1999) created the Multi-Factor Emotional Intelligence Scale (MEIS), a 402-item four branch ability measure of EI. However, research with the MEIS shed light on several shortcomings of the original format. The authors made several amendments to scale content and added new scales (Mayer, 2000). Mayer and Salovey, with the help of David Caruso, honed their model of emotional intelligence and proposed a new four-branch measure of emotional intelligence known as the MSCEIT (Mayer et al., 2002). The four branches of related emotional skills include (1) the ability to identify or perceive emotions, (2) the ability to use emotions to facilitate thought, (3) the ability to understand emotions, and (4) the ability to manage one's emotions and the emotions of others.

Perceiving Emotions

The first branch of the four branch model of the MSCEIT measures the ability to perceive or identify emotions accurately. Emotional perception involves paying attention to and accurately decoding emotional signals in individuals and objects. The *Perceiving Emotions* branch comprises items that require the respondent to identify how much of a particular emotion (happiness, sadness, fear, anger, surprise, disgust, excitement) is expressed in a picture of a face, a natural landscape, or color pattern.

Zuckerman, Lipets, Koivumaki, and Rosenthal (1975) found that an individual's perception of emotion is related to their ability to assess emotions in others. For that reason, Mayer, Caruso, and Salovey (2000) indicated that the perception branch will allow for a focus on the self and emotional self awareness, as well as encompassing the ability to be receptive and sensitive to other people's emotional information (i.e., affect sensitivity and affect receiving ability).

Using Emotions

The *Using Emotions* branch examines an individual's ability to use emotions to impact cognitive processes. This branch requires the ability to mobilize the appropriate emotions and feelings to assist in certain cognitive activities such as reasoning, problem-solving, and decision-making. The ability to match one's affective response to a given situation can directly influence an individual's cognitive organization, allowing information to become more easily accessible, as well as helping the cognitive system to attend to information that is important (Easterbrook, 1959; Mandler, 1975; Simon, 1982).

There is a considerable body of research that has examined individuals' synesthesic experiences to emotions and internal feeling states. For example, Oatley and Duncan (1992) examined experienced emotion, while Levenson (1994) investigated the subjective experiences of temperature during an emotional experience. Scherer and Wallbott (1994) conducted a cross-cultural survey of subjective reactions to emotional states, including breathing and heart rate, perceived temperature, and bodily sensations, while Fromme and O'Brien (1982) and Adams and Osgood (1973) studied color sensations in response to emotion. It was the work by the aforementioned authors in their respective disciplines that provided the initial empirical support for the development of this branch of the MSCEIT. As a result, the *Using Emotions* branch comprises items that tap one's synesthetic ability, requiring the participant to match an emotion or mood to a sensory experience. For example, an individual with a high level of skill in *Using Emotions* may easily connect with others because of insight gathered from analyzing emotional and mood content. This insight may increase effectiveness in areas such as creative thinking, problem-solving, and group leadership.

Understanding Emotions

The third branch of the MSCEIT measures the ability to comprehend the many relationships between emotions and how emotions progress by transitioning from one emotion to another. The Understanding Emotions branch comprises questions examining emotional transitions and changes, as well as emotional blends and combinations. An individual with an enhanced ability to understand emotions is equipped with a rich emotional vocabulary that enhances an understanding of the complex relationships between emotions that permit an accurate description of different feelings.

The ability to understand emotions allows individuals to recognize pertinent emotional cues from the past and in the present, and furthermore predict the extent of future emotional expression in both the self and others. For example, an athletic coach with a high level of emotional understanding can identify with the emotional content of his/her players so as to appropriately relate, inspire, and motivate the

team to perform at its highest level. A mentor may understand when an apprentice is feeling overwhelmed with a particular task simply by the words and/or tone of expressions that the apprentice emits. In either case, the ability to understand the subtle differences of the vast array of emotions that are ever present in one's daily communications can facilitate not only one's interpersonal relationships but the level of their personal and professional performance.

Managing Emotions

The ability to manage one's emotions and the emotions of others is measured in the fourth branch of the MSCEIT. The principal goal of the *Managing Emotions* branch is to measure an individual's ability to understand and use his or her own emotions effectively. This branch is examined through items addressing the individual's ability to maintain emotions (e.g., preserving a good mood), repair emotions (e.g., calming down after feeling angry), and generate emotions appropriate for a given situation (e.g., motivating and supporting a coworker before an important oral presentation).

The Managing Emotions branch is also composed of items that investigate an individual's ability to dampen an overly good mood when a reduction in level or intensity is appropriate. For example, in a decision-making process an overly positive mood may be detrimental to making the best decision possible. Positive emotions such as happiness, elation, and exuberance tend to be associated with an overestimation of the likelihood for positive outcomes and an underestimation of the probability for a negative outcome (Pham, 2007). A mismatch of mood and context may impact the chances of making the appropriate decision.

Each of the four branches of the MSCEIT is measured by two task scales (see Table 1). The Perceiving Emotions branch includes the Faces and Pictures tasks. The Faces task comprises four faces, including one male and three females, varying in age and ethnicity. Each face is rated on a five-point scale ranging from 1 (no emotion) to 5 (extreme emotion) for its degree of surprise, anger, sadness, fear, happiness, and excitement. The Pictures task includes three

Table 1 MSCEIT factor structure

Total emotional intelligence							
Area 1				Area 2			
Experiential emotional intelligence				Strategic emotional intelligence			
Branch 1		Branch 2		Branch 3		Branch 4	
Perceiving Emotions		Facilitating thought		Understanding Emotions		Managing Emotions	
Task A Faces	Task E Pictures	Task B Facilitation	Task F Sensations	Task C Blends	Task G Changes	Task D Emotion Management	Task H Emotional Relations

photographed landscapes and three color patterned pictures. For each landscape and color pattern, the respondent is asked to rate the degree of emotion expressed in the picture. Each is rated on a five-point scale ranging from 1 (no emotion) to 5 (extreme emotion) on each of six emotions (i.e., happiness, sadness, fear, anger, surprise, and disgust).

The Facilitating Thought branch contains the Facilitation and Sensations tasks. The Facilitation task contains five situations that ask a respondent to rate each of three emotions for their helpfulness in the situation. Each of the emotions (e.g., anger, sadness, surprise) is rated on a five-point scale ranging from 1 (not useful) to 5 (useful). The Sensations task is comprised of 5 items examining the similarity of an emotion or feeling with a sensation. For example, how much is the emotion of surprise like the sensations of cold, slow, and sharp. Each sensation is rated on a five-point scale ranging 1 (not alike) to 5 (very much alike).

The Understanding Emotions branch includes the Changes and Blends tasks. The Changes task is made up of thirteen multiple-choice questions that measure an individual's knowledge of experiencing possibly conflicting emotions in certain situations and understanding how emotions transition from one to another (e.g., how contentment can change into joy). The Blends task is composed of twelve multiple-choice questions assessing an individual's ability to analyze complex or blended emotions. The Blends questions are in multiple-choice format and ask respondents to analyze how one emotion may be a combination of two or more simple emotions (e.g., pleasure and anticipation combine to create optimism).

The Managing Emotions branch contains the Emotional Management and Emotional Relations tasks. The Emotion Management task includes five emotionally charged vignettes, which ask the participant to evaluate the effectiveness (i.e., the ability to preserve or improve a mood) of five possible actions using a five-point scale ranging from 1 (very ineffective) to 5 (very effective). The Emotional Relations task examines 3 interpersonal vignettes, evaluating the effectiveness (i.e., maintaining or improving interpersonal relationships) of 3 possible actions using a five-point scale ranging from 1 (very ineffective) to 5 (very effective).

Development of the MSCEIT

The MSCEIT normative sample is based on data collected from more than 50 research sites amassing 5000 participants. The majority of the data was collected in the United States, with data also collected in the United Kingdom, Canada, Malta, South Africa, Australia, Switzerland, Scotland, the Philippines, India, Slovenia, and Sri Lanka. Participants ranged in age from 17 to 79 years with a mean age of 24.13 years (SD = 9.89).

MSCEIT Scoring

The MSCEIT offers two scoring options: General Consensus and Expert Consensus. The General Consensus option compares individual item responses to the responses given by the normative sample. Responses that match the responses of the normative sample more closely are awarded a higher point value. For example, if 70% of the normative sample selected "A" for a particular item, an individual who chooses option "A" would receive a score of .70 for that item. If 21% selected "B", a response of "B" would yield a score of .21. The point value associated with a particular item response matches the proportion of the normative sample who selected that same response for a given item.

The Expert Consensus scoring criteria is similar to the General Consensus approach, but instead of using the normative sample's responses to establish the scoring key, a panel of 21 emotions experts was used to determine the scores associated with the response options for each item. For example, if 18 of the 21 experts chose "D" as the correct response for a given item, a response of "D" was assigned a score of .86 (18 divided by 21). The expert sample was drawn from members of the International Society for Research in Emotions (ISRE). Membership to ISRE is open to scientists and scholars who have demonstrated a commitment to research in the affective sciences. The 21 experts included 10 men and 11 women ranging in age from 30 to 52 years with a mean age of 39.4 years ($SD = 6.40$).

The correlation between the expert-based and general-consensus-based item response frequencies is high. Mayer et al. (2002) found correlations ranging from $r = .93$ to .99 for total, area, branch, and task scores. These correlations indicate a strong correspondence between the item response endorsements made by the experts and those of the normative sample. In short, the responses selected as the best according to the experts generally corresponded to the responses selected by the general consensus.

Factorial Validity

The factorial validity of an inventory indicates the extent to which the factor structure (i.e., the number of scales and the content of those scales) is empirically and theoretically justified. The authors of the MSCEIT believe that the construct of emotional intelligence is best described by a one, two, and four oblique (correlated) factor model (Mayer et al., 2002). Using a sample of over 2112 participants, a confirmatory factor analysis examining the range of permissible factor structures representing the MSCEIT revealed a progressively better fit from a one-factor model to a four-factor model (Mayer, Salovey, Caruso, & Sitarenios, 2003). The best fitting four-factor model revealed a norm fit index ranging from .98 to .99 across models. Additional research lends further support to the four-factor model (Brackett & Mayer, 2003; Day & Carroll, 2004; Livingstone & Day, 2005).

Reliability

The MSCEIT has been found to be reliable at the Total, Area, and Branch scale levels. Mayer et al. (2002) reported a full-scale reliability of $r = .91$, coupled with Area reliabilities of $r = .90$ (Experiential) and $r = .85$ (Strategic). Furthermore, Brackett and Mayer (2001) reported Branch scale reliabilities ranging from $r = .74$ to .89 and a test–retest reliability of $r = .86$. However, the MSCEIT's Task scales have been found to be somewhat less reliable. For example, Mayer et al. (2002) found Task reliabilities ranging from .64. to .88. Livingstone and Day (2005) found Task reliabilities ranging from .52 to .80, while Palmer, Gignac, Manocha, and Stough (2005) reported scores ranging from .48 to .86. As a result, test administrators should be cautious when interpreting scores at the Task level, placing greater emphasis on the Branch, Area, and Total scores.

Discriminant Validity

If the MSCEIT is a unique and distinct measure of emotional intelligence, then it should not be highly correlated with measures of divergent constructs. For example, the MSCEIT should not be highly correlated with tests of cognitive intelligence, or self-report scales focusing on well-being or optimism. Test-to-test correlations can range from .0 to 1.0 (or from .0 to –1.0). Generally speaking, those that intercorrelate between $r = .00$ and .25 are considered unrelated to minimally related with one another. Intercorrelations ranging from $r = .25$ to .50 indicate minimal to moderate overlap, while intercorrelations ranging from $r = .50$ to .75 are deemed moderate to highly related concepts. Lastly, inventories that share common themes and arguably assess the same underlying constructs produce intercorrelations between $r = .75$ and 1.00, indicating instruments that for practical purposes are equivalent. Sometimes, however, inventories that are highly overlapping-to-equivalent may maintain subtle differences that are of theoretical importance.

Relationship Between the MSCEIT and Other Measures of EI

The ability model that underpins the MSCEIT should render it different from self-report measures of EI, both because of its focus on EI as an actual intelligence, and also because of its unique approach to measurement. For those reasons, it is expected that the MSCEIT would show low correlations with self-report scales of EI. Most studies examining the relationship between the MSCEIT and self-report measures of emotional intelligence have found low to moderate correlations. Livingstone and Day (2005) found that the MSCEIT and EQ-i had a low to moderate intercorrelation ($r = .13$–.31) in a military sample. Brackett and Mayer (2003) showed that the MSCEIT was minimally

related to the EQ-i ($r = 6.21$), as well as the Schutte Self-Report Emotional Intelligence Test (Schutte et al., 1998; $r = .18$). Finally, Brackett, Rivers, Shiffman, Lerner, and Salovey (2006) reported a low correlation ($r = .19$) between the MSCEIT and a self-report measure of EI (SREIS) that was created by the authors to map onto the emotional abilities measured by the MSCEIT.

Relationship Between the MSCEIT and Measures of Personality and Intelligence

Research examining the relationship between the MSCEIT and general personality measures has generally revealed low to moderate correlations and in some instances no relationship. Dantas and Noronha (2006) explored the discriminant validity of the MSCEIT with the 16PF (Conn & Rieke, 1994) in a sample of undergraduate students, and found low positive correlations with Extraversion ($r = .12$), Softness ($r = .25$), and Tough Mindedness ($r = .19$). In another study, Brackett and Mayer (2003) found no relationship between the MSCEIT and the personality scales of Extraversion, Conscientiousness, and Neuroticism, but there were moderate associations with Agreeableness and Intellect. Finally, Warwick and Nettelbeck (2004) reported that the MSCEIT was not significantly related to the personality characteristics of Openness, Extraversion, Conscientiousness, Neuroticism and Interest in Affiliation; however, significant correlations were evident for Agreeableness, Emotional Knowledge, and Abstract Reasoning.

Empirically, there appears to be sufficient discriminant validity between the MSCEIT and various general intelligence measures. Lopes, Salovey, and Straus (2003) found that verbal intelligence, as measured by the WAIS-III vocabulary subscale, was moderately correlated ($r = .39$) with the Understanding Emotions branch, and was not significantly correlated to the remaining three branches of the MSCEIT. Although Zeidner, Shani-Zinovich, Matthews, and Roberts (2005) found a moderate link between verbal IQ and Total MSCEIT, a study of college students ($n = 330$) by Brackett, Mayer, and Warner (2004) only demonstrated a modest relationship between MSCEIT Area and Total scores and student Verbal SAT scores. Finally, Marquez, Martin and Brackett (2006) found a low correlation between the MSCEIT and a general intelligence (IGF-r5; Yuste, 2002) measure using a sample of Spanish high school students who completed both measures.

Application of the MSCEIT

This section will highlight the impact of the MSCEIT in organizational, educational, and social settings, as well as clinical and health fields (see also Mayer et al., 2008, for a discussion of the "significance of EI").

Organizational Settings

In an attempt to popularize the construct of emotional intelligence, several extravagant claims were made about the influence of EI on individual and group workplace performance; however, these declarations relied heavily on anecdotal evidence and unpublished empirical work (Day & Kelloway, 2004). Although empirical evidence for emotional intelligence in organizations has yet to live up to its original billing, the MSCEIT has made some valued strides, specifically in the areas of leadership, management, and job performance.

In a study of 38 supervisors within a large manufacturing organization, Kerr, Garvin, Heaton, and Boyle (2006) assessed the relationship between MSCEIT scores and leadership effectiveness as measured by subordinate ratings. Their results indicated that MSCEIT scores were able to predict leadership effectiveness, particularly the branches within the Experiential EI area (i.e., Perceiving and Facilitating). In a separate study, 30 senior pastors participated in a leadership development experience program. Kanne (2006) examined the relationship between emotional intelligence and transformational leadership (Multifactor Leadership Questionnaire; Avolio & Bass, 1995) with the pastor sample and found a link between the MSCEIT and the transformational leadership scales of individualized consideration, idealized influence-attributes and idealized influence-behaviours. The results demonstrate that a leader's ability to identify and use emotional content is crucial in garnering follower respect, support, and trust.

In a study of 41 Australian public service managers exploring the relationship between the MSCEIT, personality (16PF), cognitive intelligence (WASI; Wechsler, 1999), and leadership effectiveness, Rosete and Ciarrochi (2005) found that higher MSCEIT scores were associated with higher leadership effectiveness. In a study of two groups of managers (from public and private organizations), Giles (2001) found a positive relationship between aspects of managers' EI (specifically the Managing Emotions branch in one organization and Understanding Emotions branch in another) and commitment to the organization among their subordinates. In a study by Day and Carroll (2004), participants engaged in a cognitive decision-making task that was representative of a typical managerial task. To perform well on the task, participants had to weigh job-related information (e.g., performance ratings) most heavily, and non-job related personal information (e.g., number of children) least heavily in deciding which employees to retain during downsizing. The Perceiving Emotions branch of the MSCEIT predicted individual performance on the task, but no effects were found for the other branches.

There has also been research that has failed to demonstrate a relationship between the MSCEIT and leadership or management behaviour. Weinberger's (2002) investigation of the relationship between EI and transformational leadership using the MSCEIT and the Multifactor Leadership Questionnaire (Avolio & Bass, 1995) found no significant correlations.

Educational Settings

Preliminary investigations between the MSCEIT and academic performance have thus far been inconclusive. Using year-end grades as a criterion, Barchard (2003) tested if the MSCEIT Research Version 1.1 (Mayer, Salovey, & Caruso, 1999) would predict academic success beyond what could be predicted by cognitive abilities and the Big Five dimensions of personality. Results showed a relationship between academic success and total MSCEIT, as well as with 3 separate task scores of the Understanding Emotions branch (i.e., Blends, Transitions, and Analogies). Unfortunately none of the MSCEIT scores were incrementally predictive of academic success over and above cognitive ability and personality (O'Conner & Little, 2003). examined the relationship between emotional intelligence and academic achievement (i.e., cumulative GPA) in college students. Results indicated that the MSCEIT was not a strong predictor of academic achievement, although the MSCEIT correlated highly with indices of cognitive ability but minimally with personality dimensions.

In a study comparing academically gifted ($n = 83$) and non-gifted ($n = 125$) high school students, Zeidner et al. (2005) examined emotional and verbal intelligence. Measures included the Schutte Self-Report Inventory (SSRI), the vocabulary subtest of the Hebrew version of the Weschler Intelligence Scale for Children (WISC-R-95), and the MSCEIT. Data analysis illustrated that gifted students scored higher on the MSCEIT, but lower on the SSRI. Findings suggest that individual differences are measure dependent, with the profile of scores variable across EI assessment procedures. Further analysis illustrated that the MSCEIT resembles a type of intelligence, whereas findings with the SSREIT did not. Specifically, the MSCEIT total score was correlated with the cognitive ability scale of Vocabulary.

Clinical and Health Settings

A variety of studies have investigated the impact of emotional intelligence in clinical and health settings. Using the MSCEIT, Brackett, Mayer, and Warner (2004) found that males scoring lower in EI on Perceiving Emotions and Using Emotions had more negative outcomes such as increased illegal drug use, alcohol consumption, deviant behaviour, and negative relations with friends (rs = –.28 to –.45). These EI factors were significant even after controlling for academic achievement scores and scores on a Big Five personality measure. Similarly, a negative correlation was found between total MSCEIT scores and social deviance ($r = –.20$) in a sample of university students ($n = 207$) (Brackett & Mayer, 2003).

Researchers have also investigated the link between emotional intelligence and psychological health. In a study by Bastian, Burns, and Nettelbeck (2005), higher MSCEIT scores were associated with higher life satisfaction, better perceived problem-solving, stronger coping ability, and lower anxiety. Another

study investigating stress and EI using the MSCEIT (Matthews et al., 2006) showed that lower emotional intelligence was related to increased worry and avoidance coping. In a unique neuropsychological study conducted by Jausovec, Jausovec, and Gerlic (2001), individuals with higher MSCEIT scores required less cognitive effort to solve problems.

Social Settings

Preliminary research in social settings has demonstrated that the MSCEIT can be a helpful predictor of one's ability to manage social interactions, as well as one's social environment. In the first of two studies by Lopes et al. (2004), a sample of 118 university students from the USA, found that the Managing Emotions branch was positively related to the quality of interactions with friends. In the second study using 103 German university students, Managing Emotions scores were positively related to the perceived quality of interactions with members of the opposite sex and positive relationships overall.

The relationship between the ability to regulate one's emotions and the quality of interactions with one's peers was investigated (Lopes, Salovey, Cote, & Beers, 2005) in a sample of university students ($n = 76$). The authors created an emotion regulation scale by choosing 29 MSCEIT items reflecting an individual's intrapersonal and interpersonal emotion regulation abilities. After controlling for Big Five personality traits (BFI-44; John & Srivastava, 1999), emotion regulation ability was associated with both self-reports and peer nominations of interpersonal sensitivity and pro-social tendencies. Another study by Lopes et al. (2003) examined the link between the MSCEIT and the quality of one's interactions. Using a sample of university students ($n = 103$), the authors concluded that the MSCEIT was positively related to concurrent self-reports of satisfaction with social relationships. Additionally, those students who scored high on the Managing Emotions branch of the MSCEIT were more likely to report positive relations with others (results remained significant after controlling for the Big Five personality traits) than those individuals who scored low on the inventory.

Kafetsios (2004) examined the relationship between attachment style and emotional intelligence using a relationship questionnaire (RQ; Bartholomew & Horowitz, 1991) and the MSCEIT. Findings demonstrated that secure attachment was positively related to all branches of the MSCEIT, with the exception of the Perceiving Emotions branch.

Future Directions

Up to this point we have highlighted the theoretical and empirical underpinnings of the MSCEIT, as well as evidence to support its ability to predict outcomes in various domains. There is still much research that needs to be

completed in order to validate other aspects of inventory use. The authors believe that in order for EI research to progress using the MSCEIT, it is necessary to (a) examine how EI changes over a lifespan, (b) examine EI cross-culturally, and finally (c) continue to examine the inventory's predictive and incremental validity in various domains.

Researchers of individual development have maintained that changes in cognition and emotion continue to proceed beyond childhood into adolescence and throughout adulthood (Malatesta & Izard, 1984; Perry, 1968); however, few studies have compared emotional intelligence scores across age groups. One issue that has plagued lifespan EI research has been the lack of measurement tools targeting younger samples (i.e., children and adolescents). Research that has examined emotional intelligence development has generally focused on understanding adult EI development.

The following section discusses a new assessment that uses an ability model that specifically assesses emotional intelligence in younger age groups. This new tool will help to alleviate the aforementioned issue, while supporting and expanding the growth of knowledge focusing on the construct of EI.

MSCEIT: Youth Version

The MSCEIT: Youth Version (YV) is a 101-item assessment of emotional intelligence for youth between the ages of 10 and 18 years. The inventory measures the same principal areas of emotional intelligence as the adult MSCEIT, and is an ability-based scale that measures how well respondents perform tasks and solve emotional problems. The instrument is divided into four branches: Perceiving Emotions, Facilitating Thought, Understanding Emotions, and Managing Emotions. The Perceiving Emotions and Facilitating Thought branches together compose the area of Experiential Emotional Intelligence, while Understanding Emotions and Managing Emotions branches combine to form the Strategic Emotional Intelligence area. A Total score is also derived, which is the average of the two area scores. Although the general framework is the same for both the youth and adult versions of the MSCEIT, the adult MSCEIT has eight sections, with two separate but related tasks for each of the four branches, while the structure of the MSCEIT: YV does not further divide beyond the branch level.

The items for the Perceiving Emotions branch (Branch 1) measure the emotional content of faces. Eight faces are used, including four boys and four girls, varying in age (10–18 years) and ethnic background. The displayed emotions vary in terms of strength and valence for each face and respondents indicate on a five-point scale the extent to which each of six emotions (e.g., surprise, anger, sadness, fear, happiness, disgust) are present in the target face. Rather than choosing the one emotion that is most evident, each of the four emotions is rated individually as to the extent that it is present in the target face.

The Facilitating Thought branch (Branch 2) is comprised of the synesthesia items. These items involve matching sensory experiences (such as color, temperature, and speed) to emotions, and vice versa. There are six item parcels, each with four items. Within each parcel, respondents indicate on a five-point scale the extent to which an emotion (e.g., anger, worry, or happiness) feels like different sensations (e.g., red, cold, or slow). Alternately, for some items, respondents indicate the extent to which a combination of sensations feels like each of four emotions. As with Branch 1, respondents are not to choose the one sensation that best matches the given emotion, but rather each of the four sensations is judged one at a time on how closely it resembles the emotion.

The Understanding Emotions branch (Branch 3) contains three types of items, all with multiple-choice response formats. Unlike Branches 1 and 2, respondents are instructed to select only the correct answer, and do not rate each response option individually. The three types of items include Emotional Definitions, Emotional Transitions and Changes, and Emotional Blends. The Emotional Definition questions involve selecting the correct term for the described feelings. The Emotional Transitions and Changes items involve identifying emotions that follow described events. Four groups of emotions were included in this set of questions: emotions that are a reaction to events that have occurred, those that arise in reaction to anticipated events, those that are a reaction to agents, and those that are a reaction to objects. For the Emotional Blends items, respondents indicate which combination of feelings makes up a given emotional state.

The Emotional Management branch (Branch 4) consists of six stories that ask the respondent to figure out how to help the target individual (either self or a specified other) feel a certain way. Accompanying each story are three suggested actions that are each rated on a five-point scale with regard to how helpful each action would be in attaining the given emotional state. Again, respondents are not instructed to choose the most helpful action, but are to judge each action individually on how helpful it would be in the given context.

Scoring

The MSCEIT: YV provides only one method of scoring, as a decision was made to eliminate General Consensus scoring. The reasoning for this was that for many items the most frequently endorsed response by youth was clearly not the correct choice. It was therefore not feasible to base a scoring key on the general consensus of youth. It was decided that the scoring system would be based on a veridical scoring criteria. That is, the correct response to each item was determined with the help of a panel of experts in the field of emotions and emotional intelligence, as well as being based on a research and theoretical criteria.

For Branch 1 (Perceiving Emotions), to determine the extent to which each emotion was displayed by the target face, the expert judges were provided with

both visual and verbal information to describe the prototypical emotion face. The visual information consisted of published photographs with the displayed emotions labeled by facial emotion expression experts. The verbal information consisted of descriptions of the facial features of a prototypical emotional expression. These descriptions were based on the work of a number of recognized authorities in the field of emotion (e.g., Ekman, 1972; Ekman & Friesen, 1975; Faigin, 1990; Frois-Wittmann, 1930; Izard, 1971). The facial expression of each emotion was described in three sections: (1) eyebrows and forehead; (2) eyes, lids, and bridge of nose; and (3) lower face, including cheek, nose, mouth, chin, and jaw.

For Branch 2 (Facilitating Thought), the criteria for matching emotions to sensory experiences was based on a review of a large body of research examining people's subjective or synesthesic experiences of internal feeling states (e.g., Adams & Osgood, 1973; Davitz, 1964; Fromme & O'Brien, 1982; Hupka, Zaleski, Otto, Reidl, & Tarabrina, 1997; Levenson, 1994; Oatley & Duncan, 1992; Rimé, Philippot, & Cisamolo, 1990; Scherer & Wallbott, 1994). For example, there is research showing fear to be experienced as both violet and cold, and pride has been connected to feelings of warmth and vibrancy.

Scoring for Branch 3 (Understanding Emotions) was based on a number of sources. For the Emotional Definitions items, definitions from a standard English-American dictionary (Merriam-Webster, 1983) were provided. A volume by Ortony, Clore, and Collins (1988) based on a strong foundation of emotional theory and empirical evidence was used to develop the Emotional Transitions items. This work describes different classes of emotions and the types of events or agents that would bring about such emotions. To determine scoring criteria, expert judges were provided with type specifications, token emotions, and contextual examples for each class of emotions. The scoring criteria for the Emotional Blends items was based mainly on Plutchik's (1984) work, as well as several other authorities on emotional blends (Kemper, 1987; Parrott, 1991). A summary of the relevant literature was provided in the form of a list of combinations of emotions accompanied by the corresponding emotions identified by those blends.

The stories used as the context in which to apply the suggested emotion management strategies for Branch 4 (Managing Emotions) address a range of social issues for different stages of adolescence, and cover the following four broad aims of mood regulation, each of which could be applied to the regulation of emotion in oneself or in others: emotion dampening, emotional repair, emotional maintenance, and generation of emotions. Specific actions that serve as the response options represent a selection of commonly employed coping strategies including behavioural action, changing one's own perceptions or feelings internally, social support, mental distraction or suppression, obsessing, and avoidance. While some types of strategies might overall be objectively viewed as more effective than other methods, the suitability of each strategy might be dependent on the particular situation or individual involved. To guide the task of assigning scores associated with the suitability of each suggested

action, the expert judges were provided with information based on the work of a number of researchers in the field of emotional regulation (e.g., Epstein, 1996; Folkman & Lazarus, 1988; Gross, 1999; Isen, Clark, Shalker & Karp, 1978; Mayer & Stevens, 1994; Moos, 1988; Thayer, 1996). This information covered common emotional issues of adolescence, pertaining to both emotional self-management and emotional relationships with others, as well as descriptions and criteria for evaluating the efficacy of typical emotion management strategies.

Description of Sample

The original MSCEIT: YV normative sample used for development consisted of 2000 respondents. Fifty-two percent ($n = 1040$) of the respondents were female and 46.4% ($n = 928$) were male (1.6% did not report their gender). The mean age of the sample was 13.22 years (SD = 2.57), ranging from 10 to 18 years. Respondents were recruited from across the United States, with the majority being from Arizona, Utah, New York, and Texas.

Preliminary Analyses

Preliminary analyses showed that across all branches, areas, and the total score, females scored significantly higher than males. This was the case for the overall sample, as well as for most scales within each age group (in one-year intervals). This supports the findings of various studies with the MSCEIT (Ciarrochi, Chan & Caputi, 2000; Day & Carroll, 2004; Mayer & Geher, 1996). Examination of age effects revealed low to moderate correlations between age and EI, with the older participants scoring higher than the younger participants on all scales. For most scales, this relationship was stronger for females than it was for males. Tests of means comparing age groups also showed an increase in EI scores with age, with females showing larger mean differences between the age groups.

Consistent differences between males and females across most scales suggest the importance of separate gender norms. With regard to age, consistent differences between age groups also suggest the use of separate age norms. Appropriate age categories will be determined once additional normative data is collected. Reliability analyses showed acceptable to high levels of reliability, with Cronbach's alpha values ranging between .72 and .88 for the various scales. The weaker reliability coefficients were found with Area 1 and its two associated Branches (1 and 2), and the stronger reliability coefficients were found with Area 2 and its two associated Branches (3 and 4). Spearman-Brown split-half coefficients ranged from .80 to .93, with the same pattern among the scales as above.

Scale intercorrelations have shown weak to moderate correlations among the four branches and a moderate correlation between the two area scores, with the weakest correlation between Branches 1 and 2 and the strongest between Branches 3 and 4. This provides some evidence that the various components of the MSCEIT: YV are measuring unique but related aspects of emotional intelligence. Furthermore, preliminary confirmatory factor analyses have shown promising results in support of the theoretical factor structure of the MSCEIT: YV.

The MSCEIT: YV is currently in development and is expected to be completed in the near future. Normative data is still being collected, and as such, the information presented in this chapter represents preliminary analyses only. At this time, a number of reliability and validity studies are underway, with the results becoming available at the time of the instrument's release. The information gathered on the MSCEIT: YV will give both researchers and practitioners additional understanding and meaning with regard to early stages of emotional development.

Cross Cultural EI

Another important question regarding emotional intelligence development that needs to be explored further is whether or not the results of EI scores can be generalized across cultures. Research focused on emotional expression and interpretation has shown that both adults and children are adept at interpreting the emotional expressions of those from similar and different cultural backgrounds (Ekman, Friesen, O'Sullivan, & Chan, 1987). Research from over 30 different countries has reported a high level of agreement in the judgments of facial expressions (Ekman, 1994). Matthews, Roberts and Zeidner (2004) found that self-report measures of EI showed satisfactory internal consistency reliability across a variety of cultures. Also, ethnic differences in MSCEIT scores show small differences among ethnic groups of the normative sample, with only 6.7% variability in scores between Whites, Blacks, Hispanics, and Asians (Mayer et al., 2002).

There is, however, evidence to suggest that there may be cultural variability in some of the abilities linked to emotional expression and emotional intelligence. Elfenbein (2006) suggested that the expression of emotion may vary across cultures. Recent research revealed increased levels of communication of emotion within the same cultural group, as well as the expression and judgements of (Elfenbein & Ambady, 2002, 2003). Matsumoto's (1989, 1992) research with American and Japenese participants reported differences in emotions judgment, as well as the recognition of emotions. In Fatt and Howe's study (2003), the Emotional IQ inventory was given to local and foreign undergraduate students ($n = 100$) in Singapore. Results showed that foreign students had higher EI scores than their local counterparts, and the belief is that out-groups experience and perceive more novel stimuli within the in-group and thus score higher on EI.

Cross-cultural EI research is still in its early stages; therefore, more research within and across various cultures needs to be conducted so we can better understand the connection between culture and emotional intelligence.

Continued Validation

Although the MSCEIT has shown promise in measuring emotional intelligence as an actual ability, there is still a need for future research to focus on predicting behaviors, especially predictive ability above and beyond that of other inventories. Continued predictive and incremental validity studies in the aforementioned settings will be beneficial in expanding our knowledge base in those areas.

Future MSCEIT research may also benefit from non-traditional areas of investigation such as neuropsychology and various performance arenas (e.g., athletic performance, musical performance, etc.). With regard to neuropsychological areas of research, cerebral imaging suggests a relationship between emotions and the ability to solve complex personal and serial problems (Vega & Redondo, 2003). In a research study conducted by Jausovec, Jausovec, and Gerlic (2001), individuals with high and average emotional intelligence scores were asked to solve various emotional tasks from the MSCEIT while their EEG was being recorded. Significant differences were observed between the two groups in the theta, lower-2 alpha, and upper alpha band. Those with high emotional intelligence also displayed less desynchronization in the upper alpha band, as well as more left hemispheric theta desynchronization.

In another study, Jausovec and Jausovec (2005) investigated gender differences in resting EEG in relation to emotional intelligence. Findings revealed that males with lower emotional intelligence scores had a decrease in brain activity, whereas an opposite pattern of brain activity was observed in females with higher EI. This difference was most pronounced in the upper-alpha band, which is related to semantic memory processes. It was further found that highly emotionally intelligent males displayed greater decoupling of frontal brain areas, whereas highly emotionally intelligent females showed more coupling between frontal and parietal/occipital brain areas. Similar, but less pronounced differences were observed for the two area scores of strategic and experiential emotional intelligence.

In the field of sport psychology, emotions and emotional intelligence have been identified as important factors in maximizing sport performance (Hanin, 2000; Jones, 2003; Lazarus, 2000). The ability of an athlete to understand and manage emotional information is considered to be a critical component in determining an athlete's level of performance (Hardy, Jones, & Gould, 1996; Orlick & Partington, 1988). The complex and unpredictable nature of sport can prompt a heightened level of emotional reactivity, and the inability to cope may lead to undesirable outcomes. While there is some awareness of the potential

utility of using emotional intelligence to better understand athletic performance, very little research has examined the impact of EI in this area.

Miller, Fink, and Pastore (2004) examined the relationship between emotional intelligence and leadership styles of 15 Division I college coaches. Miller's results showed that the coaches identified various EI factors as important competencies that may facilitate leadership. In a research study conducted by Papadogiannis, Logan, Gervais, and Mann (2007), findings showed that increased levels of emotional intelligence was associated with higher levels of awareness, analytical/conceptual functioning, and attentional flexibility, as well as lower levels of external and internal distractibility.

With regard to musical performance, Resnicow, Salovey, and Bruno (2004) asked 24 undergraduates students to complete the MSCEIT and a listening inventory of classical piano to identify emotions in music. Emotional intelligence and emotion recognition in the music task was significantly correlated, and it was suggested that similar processes may be involved in emotional intelligence and the identification of emotion in music.

Conclusions

The theoretical and empirical evidence discussed in this chapter suggests that the MSCEIT is a reliable and valid measure of emotional intelligence and lends support to the notion purported by McEnrue and Groves (2006) that the ability model of the MSCEIT makes it one of the more promising measures of EI in use today. Although the MSCEIT was created only recently, the instrument has been shown to predict important psychological and behavioral outcomes in various domains, including clinical, health, organizational, and educational settings.

Even with the MSCEIT's ability to predict outcomes in various settings, much research is still needed to gain a deeper understanding of the construct of EI. In order to establish the MSCEIT as a successful measure of emotional intelligence, researchers must continue to use the instrument in research projects that are conceptually detailed, as well as follow strict research methods. If this is the case, we believe that the instrument will continue to demonstrate discriminant and predictive validity, and will be distinct from other emotional intelligence instruments, as well as yield rich and important findings regarding psychological outcomes and application.

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Assessing Emotional Intelligence Using the Emotional Quotient Inventory (EQ-i) and Related Instruments

Laura M. Wood, James D.A. Parker, and Kateryna V. Keefer

Since the emergence of the emotional intelligence (EI) construct two decades ago (Salovey & Mayer, 1990) a variety of theoretical models and measures have appeared. Conceptual models of EI can typically be organized into one of two complementary types: ability models or trait models (Petrides & Furnham, 2001). The former approach views EI as a set of cognitive-emotional abilities best measured by maximum performance tests or problems (e.g., how to resolve a conflict with a spouse) that require understanding and/or use of emotions. The latter approach employs self-report or observer ratings to assess EI, since EI is viewed as a constellation of emotion-related self-perceptions and dispositions.

One of the more widely known trait models was developed by Bar-On (1997, 2000, 2006), who defined EI as "an array of non-cognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures" (Bar-On, 1997, p. 14). As a form of general intelligence distinct from cognitive intelligence, EI reflects an individual's potential for adaptive, intelligent behaviour that promotes personal success, happiness, and general well-being. The EI construct also represents an acquired repertoire of psychological skills and resources necessary for dealing with daily challenges and stressors. In line with this operational definition, the structure of the Bar-On model is mutifactorial and theoretically eclectic; it not only encompasses the core emotion-processing abilities conventionally ascribed to EI (Salovey & Mayer, 1990), but also includes several conative variables that have been historically identified as determinants of effective functioning. The 15 conceptual components are grouped into five theoretical clusters: intrapersonal, interpersonal, stress management, adaptability, and general mood.

The intrapersonal cluster is the most diversified facet of the model, covering five different abilities and dispositions pertaining to oneself and one's emotions. Its defining component is *emotional self-awareness*, the fundamental ability to

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recognise, label, and understand one's emotional states and to know what caused the feelings. A mainstay of every existing formulation of EI, inclusion of this concept in the model is backed by a long history of research on the related constructs of alexithymia (Nemiah & Sifneos, 1970), psychological mindedness (Appelbaum, 1973), and levels of emotional awareness (Lane & Schwartz, 1987), among others. Another common feature of all major conceptualisations of EI is the ability to express oneself and one's feelings easily and in a constructive manner, which is covered in the Bar-On model under the *assertiveness* component. Indeed, the importance of this universal skill for survival and intelligent adaptation has been recognised since Darwin (1872/1965). The three other intrapersonal components, namely *self-regard*, *independence*, and *self-actualisation*, represent conative factors and dispositions that have long appeared in the literature as facilitators of emotionally intelligent behaviour (e.g., Bandura, 1977; Maslow, 1954, 1973; Wells & Marwell, 1976). Although not typically considered as constituent parts of EI, their inclusion in the model provides a valuable personal perspective regarding one's degree of self-confidence and self-esteem (self-regard), personal autonomy and self-reliance (independence), as well as goal-directedness and self-motivation (self-actualisation).

The interpersonal cluster for the Bar-On model encompasses abilities and dispositions pertaining to social interactions and emotions of others. With conceptual roots going back to Thorndike's (1920) social intelligence, the key components of this cluster include *empathy*, the ability to be aware of, understand, and appreciate the feelings of others, and *interpersonal relationship*, which taps the social skills involved in establishing and maintaining meaningful, emotionally close, mutually satisfying relationships. Integration of these social abilities into the EI framework is consistent with other contemporary models of EI, as well as with Saarni's (1999) developmental view of emotional competence as including both emotional and social skills, and Gardner's (1983) original notion of personal intelligence as having both intra- and interpersonal components. The Bar-On model, however, also includes a *social responsibility* factor, which provides information about one's pro-social (or antisocial) attitudes and is thought to be an important correlate of adaptive behaviour (Eisenberg, 1986).

The stress management and adaptability clusters cover abilities and dispositions that are directly involved in coping with upsetting situations, problems, and change. Conceptually, they correspond to Salovey and Mayer's (1990) higher-order abilities of emotion regulation and emotion utilisation. The two stress management components, *impulse control* and *stress tolerance*, represent the emotion-regulation aspects of controlling and managing strong or upsetting emotions, whereas the three adaptability components are associated with effective use of emotions in facilitating thinking and reasoning. For example, *reality testing* refers to the degree of attention and clarity in appraising one's immediate environment; *flexibility* describes the ease (or rigidity) with which one can adapt to unfamiliar or changing circumstances; and *problem solving* reflects

one's capacity for a methodical, task-oriented approach to generating and implementing solutions to various problems.

Finally, the general mood cluster, comprising *happiness* and *optimism*, reflects the degree of satisfaction with one's life and a generally positive outlook on the future. Although not a constituent part of EI, optimistic disposition is widely recognised as an important facilitator of successful coping, positive emotions, and well-being (Bandura, 1997; Seligman, 1990), hence its inclusion in the Bar-On model. It is worth noting that while each of the 15 components is relevant to one's potential for success in life, some researchers have questioned the appropriateness of the term "emotional intelligence" to describe this diverse collection of variables, a conceptual criticism often applied to trait models of EI (Neubauer & Freudenthaler, 2005). From a practical stand-point, however, the inclusiveness of Bar-On's approach has allowed for a more powerful empirical prediction of meaningful life outcomes (see below), making it particularly popular in applied settings.

Emotional Quotient Inventory

The multidimensional EI model proposed by Bar-On has guided the development of one of the most widely used self-report measures for the construct: the Bar-On Emotional Quotient Inventory (EQ-i; Bar-On, 1997). Designed for use with adults 17 years of age and older, it was the first measure of its kind to be published by a psychological test publisher and peer-reviewed by the Buros Institute of Mental Measurements (Plake & Impara, 2001). Its creation took place over a period of a decade and involved several scale-development stages (Bar-On, 1997). Following multiple rounds of item analysis and factor analysis, as well as theoretical considerations, the initial pool of 1,000 items was reduced to the final 133, with 7–9 items per each conceptual component of the model. The items are worded in the form of short self-statements rated on a 5-point Likert scale (1 = "very seldom true or not true of me" to 5 = "very often true of me or true of me"). The EQ-i assessment yields a total EQ score, five composite scale scores for each of the 5 broad clusters (intrapersonal, interpersonal, stress management, adaptability, and general mood), plus individual scores on 15 subscales corresponding to the conceptual components of the Bar-On model. Also built into the scale are several validity indicators, including an inconsistency index (assesses for randomness in responses), a positive impression scale (indicates excessively positive responding), and a negative impression scale (indicates excessively negative responding). In addition, there is an option of using a 125-item version of the instrument (EQ-i:125; Bar-On, 1997) that excludes the items from the negative impression scale. Because the statements that make up this scale sound overtly negative compared to the other items on the EQ-i (e.g., "I think I've lost my mind"), exclusion of these items gains more acceptance of the EQ-i in certain testing contexts (e.g., corporate settings).

A 51-item version of the EQ-i (EQ-i:Short; Bar-On, 2002) has also been developed for use when a more detailed assessment is not needed or not feasible because of time constraints. It was derived via a series of exploratory factor analyses with the EQ-i items from the first four conceptual clusters (intrapersonal, interpersonal, stress management, and adaptability). In an initial stage, 12–15 highest loading items for each of the four composite scales were identified, and then subjected to a combined factor analysis. Four factors were extracted and those items that did not load higher than .30 or loaded on more than one factor were removed. This type of analysis was repeated until all remaining items loaded uniquely on a single factor (35 items). The items from the general mood cluster were then put into a confirmatory factor analysis (CFA) and the 10 items with the highest parameter estimates were selected. These items were shown to have good fit in an additional CFA. A similar procedure was used to select 6 positive impression items, thus resulting in a final short form with 51 items. The EQ-i:Short assessment provides a total EI score, scores for the five composite scales (intrapersonal, interpersonal, stress management, adaptability, and general mood), as well as indicators of inconsistency and positive impression.

The EQ-i and its shortened forms have been translated into several dozen languages and normative data collected in approximately 15 countries, with nearly 4,000 adults in the North American normative database alone. Using these norms, and correcting for excessively positive or negative responding, the EQ-i raw scores can be converted into standard scores based on a mean of 100 and standard deviation of 15 (similar to IQ), to facilitate interpretation and comparison of individual results.

Reliability of the EQ-i and EQ-i:Short

Bar-On (1997), using data from 7 samples recruited in different countries, reports that the average internal reliability (alpha coefficients) for the 15 subscales on the EQ-i is .76, ranging from an average (across the 7 samples) of .69 for social responsibility to .86 for self-regard. Average test–retest after one month in a South African sample was .85 (ranging from .78 for social responsibility to .92 for self-regard); .75 (ranging from .55 for stress tolerance to .82 for flexibility) for four months in an additional South African sample. Bar-On (2002) reports that the EQ-i:Short also has adequate internal reliability with coefficients ranging from .76 to .93. Mean inter item correlations were also acceptable, ranging from .18 to .43.

Test–retest correlations (6 months) for the short form (composite and total EI scales) range from .57 to .80 (Bar-On, 2002). Parker, Saklofske, Wood, Eastabrook, and Taylor (2005) report 32 months test–retest correlations for the EQ-i:Short in a sample ($N = 238$) of undergraduate students tested at the start of first year and again at the end of their third year of study. Their study

found the EI scores to be quite stable over 32 months, although test–retest correlations were lower than previously reported using shorter time-periods. For Parker, Saklofske, Wood, et al. (2005), the correlation ranged from a low of .43 for adaptability to a high of .75 for stress management. It is interesting to note that these test–retest correlations are quite consistent with those reported for basic personality variables over similar time-periods (e.g., NEO-PI-R; Costa & McCrae, 1992).

Validity of the EQ-i and EQ-i:Short

Empirical tests of the factor structure underlying the EQ-i have produced solutions that are in line with Bar-On's conceptual definition of EI as a collection of interrelated competencies and dispositions. Factor analyses performed at the scale level have consistently found the 15 conceptual components to load on a single higher-order EI factor, a result replicated in samples of New Zealand transport employees (Petrides & Furnham, 2001), American college students (Brackett & Mayer, 2003), and Canadian military personnel (Livingstone & Day, 2005). This finding indicates that the inter-correlations among the EQ-i subscales are indeed attributable to a cohesive latent variable of EI, as purported. At the same time, the lack of empirical evidence for the five composite clusters suggests that this structural layer is redundant in terms of added theoretical or research merit. However, from a practitioner's perspective, grouping the individual components into few broader areas has certain practical utility, as it assists in conveying, interpreting, and working with the individual results (Bar-On, 1997).

To date, few published studies have examined the measurement structure of the EQ-i at the item level. Bar-On's (1997, 2000) initial factor-analytical work in the North American normative sample produced a 10-factor structure corresponding to the traditional components of EI (emotional self-awareness, assertiveness, self-regard, empathy, interpersonal relationship, impulse control, stress tolerance, reality testing, flexibility, and problem solving), with the remaining 5 components (independence, self-actualisation, social responsibility, happiness, and optimism) classified as additional correlates and facilitators of the EI construct. In line with this finding, the computation of the total EI score has been revised to include only the first four conceptual areas of the model, with the general mood score calculated separately (Bar-On, 2000). This scoring practice was also implemented in the short version of the EQ-i.

One other published study (Palmer, Manocha, Gignac, & Stough, 2003) examined the measurement structure of the EQ-i using an Australian sample of 377 participants. An exploratory factor analysis was performed with the items that make up the 15 subscales of the EQ-i. Unrotated, most items loaded on a single factor supporting a general EI dimension. However, contrary to Bar-On's (2000) reports, their scree test suggested that a 6-factor solution best

suited the data and an oblique 6-factor solution was subsequently found to best fit the data. The first factor was primarily made up of items measuring self-regard and happiness, which the authors labeled "emotional disposition". The second factor included items measuring interpersonal relationships, social responsibility and empathy and was labeled "interpersonal EQ". The third factor consisted of all items from the impulse control subscale, along with one item from reality testing, and was labeled "impulse control". Factor four included predominately problem solving items and was labeled "problem solving". The fifth factor consisted primarily of items from the self-awareness subscale and was labeled "self-awareness". The last factor included items measuring flexibility and independence and was labeled "character" by Palmer et al. (2003). Although the statistical results of this study call into question the existing scoring structure of the EQ-i, they should be interpreted with caution due to the small sample size relative to the number of parameters included in the analyses.

Bar-On (1997) presents a variety of additional material on the validity of the EQ-i. This included demonstrating that although there are some significant low-to-moderate correlations between scores on the subscales of the EQ-i and scores on a variety of measures of personality, including such measures as the Sixteen Personality Factor Questionnaire (16PF; Cattell, Eber, & Tatsouka, 1970), the Minnesota Multiphasic Personality Inventory (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), the majority of correlations were non-significant. Significant low to moderate negative correlations were found between subscales of the EQ-i and the Beck Depression Inventory (BDI; Beck & Steer, 1987) with a correlation of –.56 between total score on the EQ-i and total score on the BDI. Several subscales of the EQ-i (assertiveness, self-regard, self-actualization, independence, interpersonal relationships, flexibility, stress tolerance, and happiness) were also found to be positively related to overall life satisfaction, as measured by the Kirkcaldy Quality of Life scale (KQoL; Kirkcaldy, 1995). A variety of studies are also discussed in the manual (Bar-On, 1997) that establish a link between the EQ-i and a variety of workplace variables. For example, using the Sense of Competence Questionnaire (SCQ; Wagner & Morse, 1975), a strong association was found between overall sense of job competence and scores on the EQ-i (correlation of .51 between total scores on the two measures).

Livingstone and Day (2005) explored the convergent and divergent validity of the EQ-i in a sample of 211 Canadian military personnel aged 16–35 years. In addition to the EQ-i, participants completed MSCEIT (Mayer, Salovey, & Caruso, 2002) and measures of personality, cognitive ability, job and life satisfaction. The EQ-i had low to moderate correlations with scores from the MSCEIT, an ability-based measure of EI that assesses an individual's ability to perceive, understand, facilitate, and manage emotional information. Cognitive ability (as indicated by the Canadian Forces Aptitude Test) was for the most part unrelated to the EQ-i. The EQ-i had correlations with personality variables (assessed using the Personal Characteristics Inventory; Barrick & Mount, 2000)

ranging from .15 between stress management and extraversion to .66 between stress management and stability. The EQ-i also had significant moderate correlations with life satisfaction and significant but low correlations with job satisfaction.

In a study by Dawda and Hart (2000) 243 university students completed the EQ-i, the 20-item Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994), the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1991), and the Beck Depression Inventory (BDI; Beck & Steer, 1987), along with a variety of other measures. Dawda and Hart (2000) reported that the internal consistency of the EQ-i was good; the mean inter-item correlations were also adequate. They also found moderate correlations among composite scales of the EQ-i. Moderate negative correlations were also revealed between the EQ-i composite scales and the TAS-20, as well as the BDI. Some low to moderate correlations were found between the EQ-i composite scales and neuroticism (inversely related), extraversion, agreeableness, and conscientiousness factors of the NEO-FFI.

Similar to one of the objectives of the Dawda and Hart (2000) study, Parker, Taylor, and Bagby (2001) examined the relationship between emotional intelligence and alexithymia. Alexithymia is a construct closely related (inversely) to EI and involves difficulty identifying feelings and describing them to others, a limited imagination and an externally oriented way of thinking. In examining the relationship between alexithymia, as measured by the TAS-20 (Bagby et al., 1994), and emotional intelligence, as measured by the EQ-i, among 734 adults Parker et al. (2001) revealed that lower levels of EI were associated with higher levels of alexithymia; they were also able to show that the two constructs were independent.

Parker, Wood, Keefer, and Hogan (2008) have also examined the overlap between the EQ-i:Short and the five personality dimensions assessed by the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992) in a large sample of adults ($N = 615$). In a series of standard multiple regression analyses with the five NEO-FFI scales used to predict separate scales on the EQ-i:Short, Parker et al. (2008) found compelling evidence that these personality dimensions account only for relatively modest amounts of variability in EQ-i:Short scores: the adjusted R^2 was .19 for the interpersonal scale, .29 for intrapersonal, .16 for adaptability, and .28 for stress management.

Derksen, Kramer, and Katzo (2002) looked at the relationship between the EQ-i and a measure of general intelligence (both Dutch versions) in 873 adults representative of the Dutch population. Correlations between the two measures were very low with a similar pattern for men and women, results supported by Livingstone and Day (2005).

A study by Brackett and Mayer (2003), using 207 college students, examined the relationship between the EQ-i and the MSCEIT (Mayer et al., 2002), as well as with the self-report Assessing Emotions Scale (AES) developed by Schutte et al. (1998). The participants also completed measures of personality, psychological well-being, life satisfaction, and daily behaviours (e.g., smoking,

drinking, etc). Academic ability was indicated by high school rank and college GPA, and cognitive ability was inferred by verbal SAT scores. Results were similar to those reported in other studies. Brackett and Mayer (2003) revealed a correlation of .21 between the MSCEIT and the EQ-i and .43 between the AES and the EQ-i. The EQ-i was also shown to have some moderate correlations with personality, psychological well-being, and life satisfaction; no relationship with verbal SAT; and negative correlations with drug use (–.24), alcohol use (–.20) and social deviance (–.21). The EQ-i, however, was not correlated with high school rank or college first-semester GPA and, when controlling for personality and SAT, EQ-i remained significant for alcohol use only. Also, the EQ-i was shown to share much of its variance with the Big Five ($R = .75$). When an EFA was performed on all variables, including all subscales of the EI measures, the EQ-i (all subscales) formed its own factor, although it also included conscientiousness, neuroticism, and life satisfaction.

Wood, Parker, and Taylor (2005) recently presented data on a new measure of EI called the College Achievement Inventory (CAI). For this study, 698 undergraduate students completed both the CAI and the EQ-i:Short (Bar-On, 2002) during their first year of university. Conducting a second-order confirmatory factor analysis (CFA) the researchers were able to show a strong positive relationship (parameter estimate = .806) between the 4 emotional and social competency scales of the CAI (emotional understanding, psychological mindedness, attentiveness, and emotional self-control) and the 4 dimensions of the EQ-i:Short (intrapersonal, interpersonal, adaptability, and stress management). These results provide further support for the validity of the EQ-i:Short.

Despite some weaknesses, as some of the studies already cited and as noted in more detail in upcoming chapters in this book, the EQ-i has been shown to predict a variety of success and wellness variables. For example, Schutte, Malouff, Thorsteinsson, Bhullar, and Rooke (2007) performed a meta-analysis of the relationship between EI and health as assessed by several measures of emotional intelligence and revealed that, of all the trait EI measures included in the analysis, the EQ-i had the highest effect sizes with mental health and psychosomatic health. Linking the EQ-i to performance outcomes, Perlini and Halverson (2006) examined EI (as measured by the EQ-i) and success in the National Hockey League (NHL) using 79 players. The sample was found to score above the normative sample on the intrapersonal, stress management, and general mood scales of the EQ-i. Although years since the draft was the strongest predictor of performance in the NHL, intrapersonal abilities and general mood added significant variance to the prediction. Many other studies have shown the link between EI, as measured by the EQ-i, and workplace performance in a variety of settings.

As is described in detail in a separate chapter (see Parker, Saklofske, Wood, and Collin, this volume), there is a growing literature supporting the link between EI and academic achievement using the EQ-i:Short. Studies by Parker, Duffy, Wood, Bond, and Hogan (2005) and Parker, Summerfeldt, Hogan, and

Majeski (2004) on first year students have demonstrated that academically successful students scored higher on various EQ-i:Short scales compared to less successful students. These differences remained even after controlling for the effects of age, course load, and high school GPA. In a study on the relationship between EI and academic retention in a large sample of first year students, Parker, Hogan, Eastabrook, Oke, and Wood (2006) compared two groups of students: those individuals who withdrew from the university before their second year and a matched (on age, gender, ethnicity) sample of students who had persisted at the university. Students who persisted in their studies were found to score significantly higher than those who withdrew on most of the EQ-i:Short scales. These findings contrast with those from several other studies (e.g., Barchard, 2003; Brackett & Mayer, 2003) that, using a mixture of full-time and part-time students, students recently graduated from high-school, mature students, and students in different years of study, found weak or nonexistent relationships between EQ-i scores and academic achievement. It is important to note that possible reasons for this discrepancy is that part-time students often face different challenges from full-time students, as do students at different years of study (Gall, Evans, & Bellerose, 2000). Since EQ-i scores have been found to increase across the life-span (Bar-On, 1997), combining older and younger students is a potential confound.

Emotional Quotient Inventory: Youth Version

The Emotional Quotient Inventory: Youth Version (EQ-i:YV; Bar-On & Parker, 2000) is a self-report EI measure developed for use with children and adolescents aged 7–18 years. The measure, based on the same theoretical model that guided the development of the EQ-i, consists of 60 items distributed across 7 scales similar to the EQ-i:Short (interpersonal, intrapersonal, stress management, adaptability, general mood, positive impression, and an inconsistency index). The EQ-i:YV can be completed in 25–30 min and requires a fourth grade reading level.

The pilot version of the EQ-i:YV included 96 items (some items identical to those on the adult measure, some items simplified for younger ages, and new items written for the instrument). The pilot version was administered to 371 children and adolescents; based on an exploratory factor analysis (EFA) 48 items were retained from the original pool. An additional 33 items were developed and added to the pool (for a total of 81 items). The second pilot version of the EQ-i:YV was administered to a sample of 800 children and adolescents. Based on an EFA, 60 items were retained and produced a factor structure matching that of the short version of the adult measure: the four EI factors (interpersonal, intrapersonal, stress management, and adaptability), a general mood factor, and a positive impression factor. Confirmatory factor analysis (CFA) with an additional sample of 280 children and adolescents revealed that the structure

could be replicated. An inconsistency index was also developed for the youth version, which includes 10 pairs of highly correlated items (calculated by computing the absolute value of the difference in pairs and then adding them together).

A short form of the EQ-i:YV is also available (Bar-On & Parker, 2000). Known as the EQ-i:YV (S), the short form contains 30 items distributed across 5 scales (interpersonal, intrapersonal, stress management, adaptability, and positive impression) and takes approximately 10–15 min to complete. The EQ-i:YV (S) was designed for use in situations where time is limited, when an individual may not be able to complete the longer version (e.g., due to reading difficulties), or when multiple administrations are likely to be performed. Using the large normative database for the EQ-i:YV, a CFA was performed to identify 6 items per scale (interpersonal, intrapersonal, stress management, and adaptability) that had the highest loadings. These 24 items together with the 6-item positive impression scale make up the 30-item EQ-i:YV (S).

Reliability and Validity of the EQ-i:YV

The normative database reported in the manual for the EQ-i:YV (Bar-On & Parker, 2000) consists of 9,172 children and adolescents. Bar-On and Parker (2000) report satisfactory internal reliability for both the long and short versions, ranging from .65 to .90 for the EQ-i:YV and .65 to .87 for the EQ-i:YV (S). Inter-item correlations for the measures are also satisfactory, ranging from .14 to .55 for the EQ-i:YV and .15 to .55 for the EQ-i:YV (S). The manual also reports adequate test–retest correlations (3 weeks) ranging from .77 (for general mood) to .89 (for total EI) for the long form and from .81 (for interpersonal) to .88 (for stress management) for the short form.

Few studies have examined the psychometric properties of the EQ-i:YV. However, one study, by Parker, Saklofske, Shaughnessy, et al. (2005), tested the four-factor structure (intrapersonal, interpersonal, adaptability, and stress management) of the EQ-i:YV among 384 Aboriginal children and adolescents using confirmatory factor analysis. The four-factor structure was found to have adequate fit to the data (parameter estimates and fit indices were satisfactory) and therefore supported the generalizability of the measure with Aboriginal children and adolescents. This study also examined the factorial validity of the EQ-i:YV in a non-Aboriginal sample of 384 youth, revealing an adequate fit with this sample as well.

As with work using the EQ-i, there is a growing literature supporting the link between EI and academic achievement using the EQ-i:YV. Parker, Creque, et al. (2004) examined the relationship between EI (measured with EQ-i:YV) and academic achievement (end-of-year GPA) in a sample of high school students. Based on GPA levels, students were categorized into one of three groups: “successful”, “middle”, and “less successful”. It was found that the

successful group scored significantly higher than the other two groups on the adaptability, interpersonal, and stress management dimensions. More recently, Eastabrook, Duncan, and Eldridge (2005) examined the relationship between EI and academic achievement among a sample of 72 elementary school children. End-of-year GPA was used to identify "below average", "average", and "above average" groups of children. The above average students scored significantly higher than the average and below average groups on the interpersonal, adaptability, and total EI scales. A discriminant function analysis using the four EI scales (intrapersonal, interpersonal, stress management, and adaptability) found that EI dimensions were highly accurate (84.2% correct classification rate) at differentiating the high-achieving group from the rest of the students.

Emotional Quotient Inventory: Observer Forms

EQ-i:YV Parent/Teacher Forms

Although the nature of emotions is inherently subjective, quantification of one's own emotional experiences and processes on a self-report questionnaire requires a certain level of insight and analysis not always present in childhood and early adolescence (Obradović, van Dulmen, Yates, Carlson, & Egeland, 2006). The use of complementary parent and teacher ratings, in addition to self-reports, allows for a more accurate estimation of the general level of emotional functioning exhibited by the child, and therefore constitutes an important tool for researchers and practitioners who work with children and youth (e.g., Conners, 1997; Lachar, 2004). In light of this consideration, a short 38-item observer form matching the EQ-i:YV (EQ-i:YV-O; Parker, in preparation) has been developed for completion by a child's parent and/or teacher. Respondents are asked to rate, on a 4-point Likert scale, how they perceive their child/student to think, feel or act in most situations with respect to 6 statements on each of the intrapersonal, interpersonal, stress management, and adaptability domains of EI. The measure also provides a composite total EI score and a 14-item general mood scale.

Although the validation material for the EQ-i:YV-O is still in preparation, several preliminary findings have already been published. For example, Schwean, Saklofske, Widdifield-Konkin, Parker, and Kloosterman (2006) used the EQ-i:YV self and observer forms to assess EI of 169 gifted students attending grades 4 through 8. Students completed the self-report EQ-i:YV and had both a parent and a teacher complete the matching observer forms. Correlations between self-report and parent reported EI for gifted students were moderate, ranging from .29 for adaptability to .39 for stress management scales. Correlations between teacher and self-report ratings were low, ranging from .16 for intrapersonal, adaptability, and total to .29 for stress management scales. Finally, interrater correlations (parent-teacher) were moderate, ranging

from .21 for intrapersonal to .42 for total EI. Keefer, Wood, and Parker (in preparation) observed a comparable degree of association between self- and parent-reported EQ-i:YV scores in a larger ($N = 755$) and more representative sample of community-based children and adolescents (aged 6–19 years), with correlations ranging from .35 for intrapersonal to .48 for stress management and total EI. Their analyses also revealed a significant age effect, in that the EQ-i:YV responses of younger children (under 10–12 years) were characterised by greater positive responding and less congruence between self and parent reports compared to older children and adolescents.

Such psychometric profile is consistent with the developmental view of EI, which purports that younger children are not yet fully cognizant of their emotional experiences to articulate them accurately on a test, and instead tend to rely on social expectations as a benchmark for self-appraisal (Saarni, 1999; Zeidner, Matthews, Roberst, & MacCann, 2003). The low-to-moderate degree of overlap between self and teacher ratings relative to parent reports is also a common finding in the child personality literature (Barbaranelli, Fida, Paciello, Di Giunta, & Caprara, 2008). Not only are parents likely to know their children better, but there may also be halo or central tendency effects in teacher evaluations, as teachers usually have to rate all children in their class whereas parents rate only one child. At the same time, the general lack of very strong correlations suggests that children's self-reports contain unique portions of information about themselves not accessible from observer evaluations. Therefore, a multi-informant assessment that utilises both the self and observer EQ-i:YV forms is a useful strategy for assessing EI in youth, particularly at younger ages.

The EQ-360

Complementary to the adult version of the EQ-i is the Bar-On Emotional Quotient – 360 (EQ-360; Bar-On & Hadley, 2003). Developed for use primarily in organizational settings, this multi-rater tool provides a "360 degree" perspective of an individual's EI via a personalised feedback report, giving the individual a greater understanding of his/her strengths and weaknesses on each of the conceptual components of the Bar-On model. The EQ-360 consists of 88 items that ask observers to rate a particular individual on a 5-point Likert response scale (1 = "very seldom or not true" to 5 = "very often true"). The instrument allows for six groups of raters: managers, peers, subordinates, clients, family/friends, other or mixed. The test authors recommend that, when providing individual feedback, each group should include as many raters as possible, with a minimum of 3, to ensure anonymity of the raters. Feedback reports provide scores for the total EI, the 5 composite scales, the 15 subscales, item responses, and comparisons between all rater groups and self-report scores. The rater form also has an option to add open-ended questions (e.g., "When

challenges arise in the workplace, how does this individual respond?"). All scores are standardized using the normative database of 1,900 ratings of 745 individuals from a variety of job sectors world-wide.

The initial version of the EQ-360 (Bar-On & Hadley, 1997) consisted of only 46 items. The rater form also included descriptions of each dimension prior to the items for that dimension (the items were not randomized but grouped by dimension). This version of the measure had several psychometric limitations and was subsequently revised. New items were created to closely match those from the EQ-i, scale descriptions were removed from the form, and items were arranged in a random order. Pilot work with the new form produced better psychometric results. For example, internal reliability coefficients for the scales and subscales (based on the normative database) ranged from .77 for assertiveness to .98 for total EI. Inter-correlations between subscales and composite scales revealed, for the most part, moderate-to-high correlations. Significant low-to-moderate correlations were also found between rater (all rater types combined) and self-report scores for all 15 components of the EQ-i. These correlations ranged from .21 for emotional self-awareness to .51 for impulse control. Interestingly, when looking only at ratings from family and friends compared with self-report ratings, the correlations were higher ranging from .33 for emotional self-awareness to .78 for optimism.

Gallant (2005) examined the correlations between average observer ratings on the EQ-360 (1,259 ratings in total) and self-report EQ-i scores among a group of 212 graduates of the FBI National Academy. Correlations for the 5 scales and 15 subscales of the EQ-i were significant and of a low-to-moderate magnitude (.13 for problem solving to .50 for interpersonal relationships). Unfortunately, no other research with the EQ-360 is provided in the manual or appears to have been published, as the uses of this instrument are applied rather than academic.

Future Directions

A variety of new forms and report options, like the multi-rater report for the EQ-360, are either in development or have recently become available for the EQ-i and EQ-i:Short. Such reports include the newly developed business report (which has a focus on job performance and includes workplace relevant development strategies) and leadership report (identifies strengths and weaknesses as they relate to leadership styles). A special report for the EQ-i:Short, focusing on post-secondary students, called the EQ-i:Short Post Secondary is also currently available. This report is based on normative data from 5,713 post-secondary students aged 17–21 (rather than using norms from the general population). The individual feedback report presents strengths and areas for improvement based on the 5 broad scales measured by the EQ-i:Short, but also includes a predictive index which identifies the likelihood of success in the post-secondary

environment. This special version of the EQ-i:Short is currently being updated and a similar version of the full EQ-i (to be called the EQ-i Post Secondary) is also in development. Preliminary findings, presented recently, provide evidence for the utility of the predictive indexes that will be included on these special post-secondary versions of the EQ-i and EQ-i:Short (Wood & Sitarenios, 2007).

Along with the parent/teacher form for the EQ-i:YV (described above), other new forms are in development. One particular issue that continues to be of considerable concern to educators is bullying and victimization. Bullying has, unfortunately, become a common occurrence in elementary and secondary school environments (Veenstra et al., 2005). Recent research has shown that bullies and victims often possess poor levels of emotional and social competency (Kloosterman, Wood, Reker, & Parker, 2008). The EQ-i:YV can be used to identify students at risk for participating in bully behaviours, as well as children and adolescents at greater risk for being victimized. Two special scales are currently under development using items from the EQ-i:YV to assess the potential to be bullies and/or victims.

Another particularly important issue that has been linked with EI is the successful transition from one particular educational environment to another (e.g., elementary school to middle school; middle school to high school). Many children and adolescents have difficulty making these types of transitions, particularly those individuals with poor emotional and social competencies (Qualter, Whiteley, Hutchinson, & Pope, 2007). A number of "transition indexes" are currently being developed for the EQ-i:YV. The goal of these new variables is to help predict students who may have particular difficulty with transitions (e.g., elementary school to high school).

Although the new developments in EQ-i-related products are another indication of the growing interest in the EI assessment, it is important to emphasise that a considerable amount of research remains to be done with these instruments. Although the test manuals associated with the various EQ-i-related measures provide basic psychometric information, limited independent work has been published. Results examining the factor structure of the EQ-i have been particularly conflicting. Several different factor structures have been shown; however, researchers have included the general mood subscales in their analyses, and it has recently been suggested that mood is not part of the EI model but rather a qualifier for the measure. Therefore the factor structure using only the four factor model needs to be examined, as was done in the development of the EQ-i:Short. The factor structure for the short form also needs to be replicated in independent samples. Other psychometric properties need to be examined with the short version as well since most of the studies have been performed with the full EQ-i. Although the factor structure of the EQ-i:YV was replicated in two samples of youth, no other psychometric properties of the measure have been examined outside the manual.

Of particular concern, and of much debate, is whether the EQ-i is just measuring personality. For example, MacCann, Matthews, Zeidner, and Roberts (2003) suggest that self-report measures of EI are measuring nothing

more than personality. Palmer et al. (2003) suggested that research utilizing the EQ-i needs to show that it can be discriminated from personality and show that the EQ-i has incremental validity above and beyond basic personality in predicting success and well-being.

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Psychometric Properties of the Trait Emotional Intelligence Questionnaire (TEIQue)

K.V. Petrides

Abstract This chapter presents an introduction to the theory and psychometric properties of the Trait Emotional Intelligence Questionnaire (TEIQue). We discuss the necessity of conceptualizing the increasing number of faux intelligences as personality traits, rather than as cognitive abilities, and give a detailed description of the TEIQue as the operationalization vehicle for trait emotional intelligence (*trait EI* or *trait emotional self-efficacy*). The inventory shows adequate reliability and temporal stability at the global, factor (4), and facet (15) levels. It has a clear and replicable factor structure comprising four distinct, but interrelated, dimensions: Emotionality, Self-control, Sociability, and Well-being. Self-other TEIQue correlations are substantial and similar to those observed for the Big Five. Preliminary data are presented for the new adolescent form of the TEIQue (TEIQue-AFF), which also shows satisfactory psychometric characteristics.

This chapter focuses predominantly on the psychometric properties of the full form of the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2001; Petrides & Furnham, 2003). Due to lack of space, we do not discuss the short, child, and 360° forms or any translations, although we present some descriptive data on the new adolescent form (TEIQue-AFF). More importantly, we only briefly discuss in this chapter the theory of trait emotional intelligence (trait EI or trait emotional self-efficacy), which underpins those instruments and distinguishes them from the large number of other measures currently available. Although there are concrete psychometric advantages of the TEIQue over the

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plethora of self-report EI questionnaires, the most significant is the theory that supports it. The fundamentals of trait EI theory were developed in Petrides (2001; see also Petrides & Furnham, 2001) and the latest summary is given in Petrides, Furnham, and Mavroveli (2007). Without an understanding of the underlying theory, it is difficult to appreciate the strengths and potential uses of the various TEIQue forms. We therefore invite readers to consider the theory carefully and independently of measurement instruments.

A Flood of Faux Intelligences

Although emotional "intelligence" is one of the most popular faux intelligences to have penetrated scientific psychology, the tendency to class almost any type of behaviour as an "intelligence" is old and well-documented (Eysenck, 1998). In fact, the number of faux intelligences continues to increase (there are well over a dozen; Furnham, 2005). Other salient instances include social "intelligence," personal "intelligence," and practical "intelligence" (see Gottfredson, 2003; Jensen, 1998; Waterhouse, 2006).

A common characteristic of the faux intelligences is that they are not amenable to IQ-type measurement. In other words, while the various theorists try hard to convince us that they have discovered new and interesting intelligences that had previously been overlooked by differential psychologists, none of them has managed to develop items that can be scored according to truly objective criteria and that can cover the sampling domains of these intelligences in their entirety.

The MSCEIT, which is commercially marketed as an ability test of emotional "intelligence," embodies many of the psychometric problems in the field. This test relies on awkward scoring procedures that had previously been used in unsuccessful social "intelligence" tests (see Legree, 1995). These procedures yield scores that are psychologically invalid, which is why it is counterproductive to subject them to factor analyses, correlate them with other variables, and enter them into regression equations. The concept of emotional "intelligence" as a new cognitive ability is succinctly criticized in Brody (2004), while more detailed expositions of the flaws of the underlying scoring methods ("consensus," "target," and "expert") are given in MacCann, Roberts, Matthews, and Zeidner (2004; see also O'Sullivan & Ekman, 2005).

Readers who do not wish to consider the relevant arguments in detail need only ask themselves whether we can apply maximum-performance scoring procedures to the realm of emotions. Are there really "correct" and "incorrect" ways of feeling, in the same way there are correct and incorrect, say, verbal analogies? Are "experts" better placed to tell us how a typically developed adult feels than the adult herself? Are people who cannot guess what some musician might be feeling when delivering a piece of music emotionally dim?

Assessing Faux Intelligences Through Self-Report

An especially baffling phenomenon is the explosion of self-report questionnaires being hawked to practitioners and researchers as measures of abilities, skills, intelligences, and competences. The prime, but by no means unique, example is the Bar-On EQ-i (Bar-On, 1997), which is based on the psychometrically invalid notion that intelligence can somehow be measured through self-report questions (e.g., "I excel at spatial rotations"). In the field of cognitive ability (which has the crucial advantage, relative to the faux intelligences, of veridical scoring procedures) the correlations between actual and self-estimated IQ scores are about +0.30 (Furnham & Rawles, 1999; Paulhus, Lysy, & Yik, 1998). Could psychological theory ever be derived from such misconceptions as pervading the EQ-i? The answer is no, which is why users of such questionnaires need recourse to trait EI theory for meaningful interpretations that go beyond the "EQ is good for you" accounts currently prevailing in the literature.

From our perspective, self-report questionnaires of emotional "intelligence" are best understood as partial measures of trait EI that share, or can be made to share, large amounts of variance with the TEIQue. In fact, this is the very reason why trait EI theory can supply a context for the interpretation of the results from these questionnaires. Indeed, it is only through the perspective of trait EI theory that these results can be linked to mainstream differential psychology research. However, relying on trait EI theory to interpret results from various EI questionnaires can be problematic because it increases the likelihood of confounding the theory with the promotional documentation accompanying these measures. Such is the infiltration of pop-psychology in academic settings that even applications of the TEIQue are sometimes interpreted as if the instrument assessed some kind of ability or competence, which defeats the purpose of employing it in the first place.

The main reason why we recommend the TEIQue for use in research and applied settings is that it provides a gateway to trait EI theory. The instrument is predicated on a sampling domain that aims to capture the affective aspects of personality, in the form of self-perceptions, which gives rise to a particular factor structure and, more important, a particular way or distributing and interpreting variance. The key benefits of trait EI theory, and of the TEIQue as its operationalization vehicle, are to be found in conceptual content and explanatory power, rather than in predictive and incremental utility (although see Freudenthaler, Neubauer, Gabler, & Scherl, 2008).

Towards a Trait Intelligences Framework

Part of the allure of the faux intelligences is that they re-introduce important personality variables as cognitive abilities (Furnham, 2006), which results in concepts that are intuitively appealing (Waterhouse, 2006). Everyone thinks they know what social, or emotional, or creative "intelligence" is; however, one

important function of empirical research is to dispel intuitive ideas and homespun theories. A crucial observation in this respect is that both academic and lay descriptions of the faux intelligences are replete with references to personality traits. Thorndike (1920) discusses sociability as a key to social "intelligence," Gardner (1983) discusses emotionality as a key to the personal "intelligences," and Salovey and Mayer (1990) and Goleman (1995) discuss predominantly personality traits (empathy, flexibility, emotion control, etc.) as the content domain of emotional "intelligence."

The theory of trait emotional intelligence demonstrates how the various "EI" models, where they are meaningful, mainly refer to established personality traits (Petrides, Furnham et al., 2007). It can be extended to cover other faux intelligences, including, in the first instance, intrapersonal, interpersonal, and social. Focusing on personality traits relating to emotions yields emotional "intelligence." Focusing on traits relating to social behaviour yields social "intelligence," etc. Through this strategy, the faux intelligences can be integrated into existing personality taxonomies, which is where they belong conceptually.

In addition to linking the faux intelligences to mainstream differential psychology, the trait intelligences framework offers predictive and, especially, explanatory advantages. Carving up personality variance across specific content domains helps contextualize it, thus increasing its explanatory power. Instead of trying to explain findings based on five broad and orthogonal personality dimensions, one relies on domain-specific, content-coherent constructs (see Petrides & Furnham, 2003).

The *trait intelligences* label emphasizes the aim of integrating the faux intelligences into mainstream personality hierarchies, while the alternative, and in some respects preferable, label of *trait self-efficacies* emphasizes the aim of integrating the social-cognitive (Bandura, 2001) and self-concept literatures (Marsh, Trautwein, Ludtke, Koller, & Baumert, 2006) into the said hierarchies. Hitherto, our research has focused predominantly on the former aim, even though the integration of the latter two literatures is possibly of greater interest due to their scientific origins and wider scope (Pervin, 1999).

The Trait Emotional Intelligence Questionnaire (TEIQue)

The TEIQue is predicated on trait EI theory, which conceptualises emotional intelligence as a personality trait, located at the lower levels of personality hierarchies (Petrides, Pita, & Kokkinaki, 2007).

Steps in the Construction of the TEIQue

Development of an early version of the TEIQue began towards the end of 1998 as part of the author's doctoral dissertation (Petrides, 2001). Items were written

to cover each of the 15 facets in the sampling domain and were counterbalanced within facets. As a basic psychometric requirement, each item was assigned to a single facet only. The latest version of the long form of the TEIQue comprises 153 items, yielding scores on 15 facets, four factors, and global trait EI. Hitherto, it has been translated into over fifteen languages.

The TEIQue is based on a combination of the construct-oriented and inductive approaches to scale construction (Hough & Paullin, 1994). The instrument was designed to be factor analysed at the facet level in order to avoid the problems associated with item-level factor analysis (Bernstein & Teng, 1989). Its higher-order structure is explicitly hypothesized as oblique, in line with conceptions of multifaceted constructs. Consequently, factor overlap as well as cross-loadings are to be expected and provide the justification for aggregating factor scores into global trait EI.

According to the hierarchical structure of the TEIQue, the facets are narrower than the factors, which, in turn, are narrower than global trait EI. If a researcher is specifically interested in constructs that have been included as facets in the sampling domain of trait EI, then it is advisable to use dedicated instruments to assess them, since such instruments can provide more in-depth coverage than the TEIQue.

Sampling Domain

The sampling domain of trait EI (Table 1) was derived through a content analysis of early EI models and cognate constructs, including alexithymia, affective communication, emotional expression, and empathy. The rationale

Table 1 The adult sampling domain of trait emotional intelligence

Facets	High scorers view themselves as...
Adaptability	...flexible and willing to adapt to new conditions
Assertiveness	...forthright, frank, and willing to stand up for their rights
Emotion expression	...capable of communicating their feelings to others
Emotion management (others)	...capable of influencing other people's feelings
Emotion perception (self and others)	...clear about their own and other people's feelings
Emotion regulation	...capable of controlling their emotions
Impulsiveness (low)	...reflective and less likely to give in to their urges
Relationships	...capable of maintaining fulfilling personal relationships
Self-esteem	...successful and self-confident
Self-motivation	...driven and unlikely to give up in the face of adversity
Social awareness	...accomplished networkers with superior social skills
Stress management	...capable of withstanding pressure and regulating stress
Trait empathy	...capable of taking someone else's perspective
Trait happiness	...cheerful and satisfied with their lives
Trait optimism	...confident and likely to "look on the bright side" of life

was to include core elements common to more than a single model, but exclude peripheral elements appearing in only one specific conceptualization.

This is analogous to procedures used in classical psychometric scale development, whereby the commonalities (shared core) of the various items composing a scale are carried over into a total score, with their random or unique components (noise) being cancelled out in the process. The systematic nature of this method is to be contrasted with the procedures through which other models are derived, whereby the inclusion or exclusion of facets is typically the outcome of unstated or arbitrary choices and post-hoc rationalizations.

Relationship to Other Measures

Although their authors are adamant that they assess abilities, skills, and competences (see Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005), we view self-report questionnaires of emotional "intelligence" as measures of trait EI. We must emphasize, however, that EI-related questionnaires are measures of trait EI only insofar as their results are interpreted through the perspective of trait EI theory. It is not useful to employ the TEIQue or the trait EI label, if the research design and interpretation of the findings are couched in "EQ is good for you" language. Instead, findings should be evaluated in the same context as for any other personality trait, which is why familiarity with the basics of differential psychology is essential for understanding trait EI theory.

In light of the proliferation of self-report questionnaires of emotional "intelligence" (Roberts, Schulze, Zeidner, & Matthews, 2005), we should briefly address the issue of convergence. Trait EI theory predicts at least moderate convergence between the various questionnaires, irrespective of the model on which they claim to be based. Research findings have supported this position (Warwick & Nettelbeck, 2004). Nevertheless, the degree of convergence will be a function of the coverage of the construct's sampling domain, with greater deviations from the facets in Table 1 leading to lower correlations. Many questionnaires under the "EQ" banner (particularly those that are short or based on a single model only) provide rather partial coverage of that domain and may not be relied upon for comprehensive assessment.

Sample Description

Unless otherwise stated, most of the analyses reported below are based on the current normative sample of the TEIQue, which comprises 1721 individuals (912 female, 764 male, 61 unreported). The mean age of the sample is 29.65 years (SD = 11.94 years; range 15.7–77 years). Most participants are of White UK origin (58%), followed by White European (19.2%), Indian (6.6%), African and Caribbean (5.7%), and East Asian (5.1%; 5.4% "other"; foreign

language adaptations are based on separate norms that have not been included in this sample). With respect to education, 14% had junior high-school certificates ("GCSE: or "O level"), 30.8% had high-school diplomas, 29.5% had undergraduate degrees, 18.9% had postgraduate degrees (including 3.3% MBA and 1.4% PhD), and 6.8% chose the "other" option.

Reliabilities

The internal consistencies of the 20 TEIQue variables (15 facets, 4 factors, global trait EI score) are all satisfactory for both males and females, as can be seen in Table 2. Of particular interest to many users is the robustness of the alphas, which remain strong (especially at the factor level and, without exception, at the global level) even in small sample research ($N < 50$). Although a systematic quantitative study would be necessary to evaluate the effects of sample size variation on the internal consistencies of the TEIQue variables, our experience of scoring over seven dozen datasets from many countries suggests

Table 2 TEIQue means, standard deviations, and internal consistencies broken down across gender

	Females ($N = 907$)			Males ($N = 759$)			
	Mean	SD	α	Mean	SD	α	*t*
Adaptability	4.56	0.84	0.74	4.73	0.85	0.73	2.10
Assertiveness	4.72	0.93	0.76	5.05	0.88	0.73	10.51**
Emotion expression	4.87	1.23	0.89	4.58	1.19	0.87	4.82**
Emotion management	4.75	0.79	0.68	4.99	0.83	0.72	6.10**
Emotion perception	4.89	0.78	0.70	4.77	0.85	0.75	3.09*
Emotion regulation	4.13	0.87	0.79	4.66	0.85	0.78	12.46**
Impulsiveness (low)	4.47	0.93	0.75	4.60	0.92	0.74	2.81
Relationships	5.60	0.75	0.68	5.32	0.82	0.69	7.15**
Stress management	4.30	1.00	0.80	4.82	0.89	0.76	11.21**
Self-esteem	4.77	0.89	0.81	5.09	0.86	0.78	7.32**
Self-motivation	4.70	0.81	0.71	4.77	0.82	0.70	1.83
Social awareness	4.93	0.87	0.80	5.08	0.91	0.83	3.55**
Trait empathy	5.22	0.74	0.67	4.99	0.80	0.70	5.94**
Trait happiness	5.57	1.01	0.87	5.50	1.03	0.85	1.26
Trait optimism	5.25	0.98	0.81	5.25	0.96	0.78	0.12
Emotionality	5.13	0.68	0.75	4.92	0.73	0.80	6.88**
Self-control	4.26	0.76	0.78	4.69	0.74	0.78	10.43**
Sociability	4.77	0.72	0.79	5.04	0.76	0.82	5.35**
Well-being	5.19	0.83	0.83	5.28	0.83	0.84	1.72
Global trait EI	4.82	0.57	0.89	4.95	0.61	0.92	2.78**

Note. *$p < 0.05$, **$p < 0.01$.

that users of the inventory can expect reliable measurement in a wide range of contexts.

With respect to temporal stability, we present preliminary data from 58 university students (mean age = 19.14 years; SD = 1.17 years). In this sample, the attenuated temporal stabilities were 0.59 for *Emotionality*, 0.74 for *Self-control*, 0.71 for *Sociability*, 0.86 for *Well-being*, and 0.78 for global trait EI. Whilst a more ambitious study is required in order to model both rank-order and mean-level change in the trait (Roberts, Walton, & Viechtbauer, 2006), the foregoing values accord well with the stabilities of broad personality dimensions (ranging between 0.6 and 0.8; Terracciano, McCrae, & Costa, 2006a) and support our conceptualization of emotional "intelligence" as a personality trait.

Factor Structure and Interpretation

A principal axis factor analysis was applied to the 15 TEIQue facets. Based on the Scree plot and Kaiser criterion (eigenvalues for the first six factors were 6.47, 1.59, 1.29, 1.00, 0.769, 0.634), four factors were extracted and rotated to simple structure via the Promax algorithm with the Kappa parameter set to 4. The four factors collectively explained 69% of the variance in the 15 facets. All facets were well-represented in trait EI factor space, with an average communality of 0.59. The best represented facets were "happiness," ($h^2 = 0.83$) "social awareness," ($h^2 = 0.77$), and "emotion regulation" ($h^2 = 0.69$), while the least well represented facets were "self-motivation," ($h^2 = 0.44$) "adaptability," ($h^2 = 0.45$), and "impulsivity" ($h^2 = 0.45$). The former three can be thought of as most characteristic of trait EI, and the latter three as least characteristic, albeit still part of its sampling domain.

Table 3 shows the resulting factor pattern matrix, which should be compared to the factor scoring key of the inventory (see Fig. 1). The scoring key was based on a series of medium-size sample studies with versions 1.00 and 1.50 of the questionnaire, and its convergence with the matrix in Table 3 serves to underscore the robustness of the factor structure of the TEIQue. Thus, all facets have high loadings only on their keyed factors, with the exception of "self-esteem," which loads on both *Well-being* and *Sociability* and which we prefer to allocate in the former factor in order to broaden its content. "Adaptability" and "self-motivation" both have relatively low loadings on the *Self-control* factor, although in the scoring key they feed directly into the global trait EI score without going through the factors. This factor structure has been approximated or confirmed in datasets from over a dozen countries (e.g., Freudenthaler et al., 2008; Mikolajczak, Luminet, Leroy, & Roy, 2007).

The four TEIQue factors were intercorrelated (average $R_{ff} = 0.42$; see Table 4), as would be expected due to the hierarchical structure of trait EI. In line with the conceptualization of the construct, individuals who perceive

Table 3 Factor pattern matrix for the 15 TEIQue facets

	Emotionality	Self-control	Sociability	Well-being
Emotion perception	0.680			
Trait empathy	0.638			
Emotion expression	0.597			
Relationships	0.595			
Emotion regulation		0.859		
Stress management		0.726		
Impulsiveness (low)		0.618		
Adaptability		0.418		
Self-motivation		0.380		
Assertiveness			0.724	
Emotion management			0.694	
Social awareness			0.654	
Self-esteem			0.419	0.350
Trait happiness				0.923
Trait optimism				0.741

Note. All factors except *Emotionality* have been reflected. Loadings below |0.30| have been suppressed.

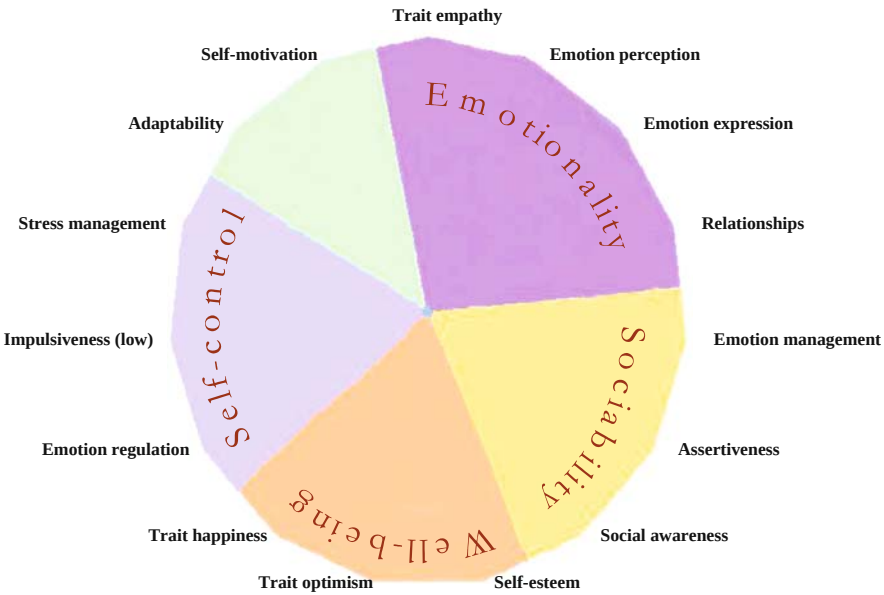

Fig. 1 The 15 facets of the TEIQue positioned with reference to their corresponding factor. Note that the facets "adaptability" and "self-motivation" are not keyed to any factor, but feed directly into the global trait EI score. A brief description of the facets is given in Table 1 and a more detailed description of the factors is given in the text

Table 4 TEIQue factor intercorrelations

Factor	Emotionality	Self-control	Sociability	Well-being
Emotionality	–			
Self-control	0.356	–		
Sociability	0.395	0.345	–	
Well-being	0.449	0.495	0.447	–

themselves as emotionally capable (*Emotionality*), tend to also believe they are socially capable (*Sociability*), have more willpower (*Self-control*), and are better adapted overall (*Well-being*). Note that the self-perception paradigm underlies the facets and factors of trait EI, thus connecting seemingly unrelated concepts (e.g., "emotion perception" and "optimism") and helping to sidestep inconsistencies in models that advocate emotional "intelligence" as a cognitive ability (e.g., the claim that emotionally "intelligent" people can be simultaneously more sensitive to and more controlling of their emotions).

In order to quantify the degree of convergence between the present factor solution and the a priori scoring key, we derived factor scores through two different methods: first, via the statistical regression method (Harman, 1976) and, second, via the a priori scoring key (Fig. 1). The zero-order correlations between these two sets of factor scores were 0.98 for *Emotionality*, 0.97 for *Self-control*, 0.98 for *Sociability*, and 0.97 for *Well-being*. These values are sufficiently high to recommend that the TEIQue be scored according to the a priori key, not least to prevent undue influence from sample-specific variation (especially in small or unrepresentative samples). Below, we present a brief description of the four TEIQue factors. In the interest of clarity, we do not constantly reiterate in these paragraphs that the descriptions concern self-perceptions, i.e., how respondents view their own selves.

Emotionality: Individuals with high scores on this factor are in touch with their own and other people's feelings. They can perceive and express emotions and use these qualities to develop and sustain close relationships with important others. Individuals with low scores on this factor find it difficult to recognize their internal emotional states and to express their feelings to others, which may lead to less rewarding personal relationships.

Self-control: High scorers have a healthy degree of control over their urges and desires. In addition to controlling impulses, they are good at regulating external pressures and stress. They are neither repressed nor overly expressive. In contrast, low scorers are prone to impulsive behavior and may find it difficult to manage stress.

Sociability: This factor differs from the *Emotionality* factor above in that it emphasizes social relationships and social influence. The focus is on the individual as an agent in social contexts, rather than on personal relationships with family and close friends. Individuals with high scores on the sociability factor are better at social interaction. They are good listeners and can communicate clearly and confidently with people from diverse backgrounds. Those with low

scores believe they are unable to affect others' emotions and are less likely to be good negotiators and networkers. They are unsure what to do or say in social situations and, as a result, they often appear shy and reserved.

Well-being: High scores on this factor reflect a generalized sense of well-being, extending from past achievements to future expectations. Overall, individuals with high scores feel positive, happy, and fulfilled. In contrast, individuals with low scores tend to have low self-regard and to be disappointed about their life as it is at present.

Gender Differences in Trait EI

Table 2 has the means and standard deviations for the 15 facets, 4 factors, and global trait EI score, broken down across gender. All scores have been rescaled to vary between 1 and 7, with a theoretical average of 3.5. Several points are worth mentioning in relation to gender differences. First, the popular psychology perception that "IQ is male and EQ is female" is not borne out by the data. In fact, males score higher than females on global trait EI, even though the difference may be a function of the constitution of the sample and has a relatively small effect size ($d = 0.22$). Second, the proximity of male and female scores at the global level masks considerable discrepancies in the factors and, especially, the facets. For example, males score higher on "emotion regulation" ($d = 0.61$) and "stress management" ($d = 0.55$) and lower on "relationships" ($d = 0.36$) and "empathy" ($d = 0.30$), all of which accords well with existing findings (Costa, Terracciano, & McCrae, 2001). Third, the standard deviations are in all cases comparable, indicating similar dispersions in the male and female responses. On the whole, these findings provide another illustration of how trait EI differs from models basing their hypotheses on unrefined popularizations of psychological theory and concepts.

Self-Other Ratings of Trait EI

Asking if trait EI self-perceptions are "accurate" is, strictly speaking, a red herring that overlooks a basic tenet of trait EI theory, viz., that most aspects of emotional "intelligence" are not amenable to objective scoring methods. How can we say whether someone's "emotion perception" score is accurate or not when that person is the only one with full access to the information that is required to make this judgment? As mentioned, the faux intelligences are very different from cognitive abilities, where "insight" studies are feasible due to the existence of veridical scoring criteria.

It is, nevertheless, meaningful to ask if self-ratings of trait EI correlate with observer (other-) ratings and interpret any evidence of convergence as an

indication of accuracy. The value of this exercise is primarily theoretical, relating to the question of whether trait EI does indeed possess the properties of a personality trait. We have often emphasized that self-perceptions affect people's behaviour and mental health irrespective of their accuracy (Gana, Alaphilippe, & Bailly, 2004; Taylor & Brown, 1988). Consequently, the conceptual validity of trait EI as a construct of self-perceptions does not depend on the presence of significant correlations between self- and other-ratings.

Trait EI theory does not view other-ratings as supplementary indicators of trait EI, but rather as measures of *rated* trait EI. In some respects, this follows Hogan's (1983) distinction between personality as identity and as reputation. A crucial difference, however, is that we accord at least as much value to the former as to the latter. The self-other correlations in Table 5 (based on a sample of 153 Greek high-school students) are very similar to those obtained for the Big Five personality dimensions (ranging from 0.30 for Agreeableness to 0.45 for Extraversion; Connolly, Kavanagh, & Viswesvaran, 2007), which constitutes evidence of convergence between self- and other-perceptions of emotional abilities. It is vital not to lose sight of the fact that this convergence concerns perceptions, not actual abilities (or competencies or skills) as we so often read in misguided discussions in the literature.

Table 5 Self-other correlations (zero-order and disattenuated) for facet, factor, and global trait EI scores

	Self-other *r*	Disattenuated *r*
Adaptability	0.50**	0.72**
Assertiveness	0.47**	0.69**
Emotion expression	0.45**	0.56**
Emotion management (others)	0.37**	0.56**
Emotion perception (self and others)	0.35**	0.47**
Emotion regulation	0.40**	0.51**
Impulsiveness (low)	0.52**	0.72**
Relationships	0.38**	0.60**
Self-esteem	0.46**	0.58**
Self-motivation	0.29**	0.57**
Social awareness	0.36**	0.47**
Stress management	0.37**	0.55**
Trait empathy	0.36**	0.55**
Trait happiness	0.38**	0.47**
Trait optimism	0.46**	0.58**
Emotionality	0.42**	0.62**
Self-control	0.46**	0.69**
Sociability	0.47**	0.61**
Well-being	0.52**	0.64**
Global trait EI	0.48**	0.56**

Note. $N = 153$. Greek high-school students, mean age = 17.5 years, SD = 0.81 years, *$p < 0.05$, **$p < 0.01$.

The mechanism underpinning convergence is currently unknown. It could involve specific, one-to-one agreement at the facet level of trait EI or general agreement at the global level, whereby a rater's overall impression of a target's emotional abilities influences their ratings on all 15 facets of the construct (halo effect). While there seem to be some discrepancies in the facet correlations in Table 5 (ranging from lows of 0.29 and 0.35 for "self-motivation" and "emotion perception" to highs of 0.52 and 0.50 for "low impulsiveness" and "adaptability"), these are not sufficiently strong to indicate that convergence is moderated by trait EI facet. Further research is required on this question both for replicating these findings and for investigating additional variables that are known to affect the convergence of self-other ratings of personality, such as context and length of acquaintance (Kurtz & Sherker, 2003).

Other Versions and Translations

So far in this chapter, we have focused exclusively on the full form of the TEIQue, which shows desirable psychometric properties. This form is currently available in over a dozen languages, including Dutch, Croatian, French (Mikolajczak et al., 2007), German (Freudenthaler et al., 2008), Greek (Petrides, Pita et al., 2007), Polish, Portuguese, and Spanish. In addition to the full form, there are other TEIQue instruments, which we list below, along with brief descriptions.

TEIQue-SF: This 30-item form includes two items from each of the 15 facets of the TEIQue. Items were selected primarily on the basis of their correlations with the corresponding total facet scores, which ensured broad coverage of the sampling domain of the construct. The –SF can be used in research designs with limited experimental time or wherein trait EI is a peripheral variable. Although it is possible to derive from it scores on the four trait EI factors, in addition to the global score, these tend to have lower internal consistencies (around 0.69) than in the full form of the inventory. The –SF does not yield scores on the 15 trait EI facets.

TEIQue 360° and 360°-SF: These forms are used for collecting observer ratings and are available for both the full- and the short-forms of the TEIQue. They are especially useful for constructing rated trait EI profiles. For relevant data, see Table 5 and the "self-other" section in this chapter.

TEIQue-AFF: The –AFF is modeled on the full form of the TEIQue and is intended to yield scores on the same 15 facets and 4 factors. The main target audience is adolescents between 13 and 17 years. A series of studies are currently underway to explore the psychometric properties of this form and in Table 6 we present basic descriptive statistics from a sample of 1842 adolescents aged between 14 and 16 years. As can be seen, the internal consistencies of the adolescent sample are somewhat lower than those of the adult sample.

Table 6 TEIQue-AFF means, standard deviations, and internal consistencies ($N = 1842$)

	Mean	SD	α
Adaptability	4.17	0.75	0.56
Assertiveness	4.62	0.93	0.70
Emotion expression	4.45	1.05	0.79
Emotion management	4.67	0.84	0.66
Emotion perception	4.57	0.79	0.66
Emotion regulation	3.94	0.85	0.72
Impulsiveness (low)	3.94	0.94	0.71
Relationships	5.17	0.84	0.65
Stress management	4.17	0.96	0.74
Self-esteem	4.49	1.05	0.82
Self-motivation	4.32	0.84	0.66
Social awareness	4.66	0.83	0.74
Trait empathy	4.63	0.85	0.68
Trait happiness	5.23	1.20	0.87
Trait optimism	4.94	1.03	0.77
Emotionality	4.71	0.67	0.74
Self-control	4.01	0.75	0.76
Sociability	4.65	0.73	0.80
Well-being	4.89	0.96	0.85
Global trait EI	4.53	0.58	0.89

Nevertheless, with the possible exception of "adaptability" ($\alpha = 0.56$), all alphas were satisfactory, especially at the factor and global level. The means were also generally lower in the adolescent sample, especially for "low impulsiveness," "self-motivation," and "empathy". These early findings may well have important theoretical and developmental implications that should be explored in greater depth with the adult and adolescent forms of the TEIQue.

TEIQue-ASF: This is a simplified version, in terms of wording and syntactic complexity, of the adolescent full form of the TEIQue. The –ASF comprises 30 short statements, two for each of the 15 facets in Table 1, designed to measure global trait EI. In addition to the global score, it is possible to derive scores on the four trait EI factors, although these tend to have considerably lower internal consistencies than in the adolescent full form. The main target audience is adolescents between 13 and 17 years, however, the –ASF has been successfully used with children as young as 11 years.

TEIQue-CF: The main aim of the –CF is to assess the emotion-related facets of child personality. Rather than a simple adaptation of the adult form, it is based on a sampling domain that has been specifically developed for children aged between 8 and 12 years. It comprises 75 items that are responded to on a 5-point scale and measure nine distinct facets (see Mavroveli, Petrides, Shove, & Whitehead, 2008).

Conclusion

The TEIQue has been designed to provide comprehensive coverage of the sampling domain of trait EI (i.e., of the emotion-related aspects of personality). By comprehensive, we explicitly do not mean exhaustive, but rather that all emotion-related personality traits would be expected to share a considerable amount of variance with the TEIQue (see O'Connor, 2002).

As mentioned above and discussed in more detail elsewhere (Petrides, Pita et al., 2007), a focus on domain-specific aspects of personality will be conducive to theoretically-driven research that emphasizes replication and explanation (as distinct from mere prediction; Scriven, 1959). This goal is not best served by studies that blithely regress criteria on five broad, conceptually unrelated variables (Big Five). Thinking in terms of domain-specific dimensions (trait emotional self-efficacy, trait social self-efficacy, trait metacognitive self-efficacy, etc.) can also help reduce our over-reliance on thesaurus-driven "explanations" of personality effects (e.g., conscientious employees perform better on the job because they are more reliable, meticulous, and dutiful; Mischel, 1968).

We are also keen to encourage a broadening of the dominant perspective of causal primacy in differential psychology, which views personality traits as source variables affecting behaviour, to encompass notions of traits as outcome variables. Such a shift would be consistent with theories emphasizing personality dynamics (Mischel & Shoda, 1995), with evidence of powerful individual differences in the stability of traits (Terracciano, McCrae, & Costa, 2006b), and with the need to consider cognitive and situational influences on personality (Diener, 1996). Personality questionnaires, then, should not be viewed as proxy indices of vague underlying causal influences, but as important variables in their own right.

Emotions are but a single, albeit fundamental, domain of personality, and it will be necessary to extend trait EI theory to encompass other important domains (e.g., social, personal, and metacognitive). The realization of this aim holds promise for the integration of self-concept, self-efficacy, and faux intelligence models into the mainstream taxonomies of personality.

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The Genos Emotional Intelligence Inventory: A Measure Designed Specifically for Workplace Applications

Benjamin R. Palmer, Con Stough, Richard Harmer, and Gilles Gignac

The Genos Emotional Intelligence Inventory or Genos EI, is a 70-item self- and multi-rater assessment. It was designed specifically for use in the workplace as a learning and development aid for human resource (HR) professionals and occupational psychologists involved in the identification, selection and development of employees. Genos EI does not measure emotional intelligence (EI) per-se'; rather, it measures how often people demonstrate 70 emotionally intelligent workplace behaviors that represent the effective demonstration of emotional intelligence in the workplace. Despite the popularity of EI as an employee selection and learning and development medium, few EI inventories have been designed specifically for use in the workplace. Indeed this approach to the assessment of EI is somewhat different from the approaches provided by leading authors in the area.

Genos EI was originally conceptualized by Ben Palmer and Con Stough at Swinburne University. It was published as the Swinburne University Emotional Intelligence Test (SUIET; Palmer & Stough, 2001), and has appeared in numerous research papers as such. Since this time it has been revised and is now being widely used both in research and commercial settings as Genos EI. In this chapter we commence by describing our rationale for designing an emotional intelligence (EI) inventory for workplace applications. This rationale came from the findings of industry focus groups conducted with HR professionals, asking them to define an "ideal" EI inventory. We then outline the model and inventory itself, its similarities and differences with other leading EI inventories, and recent research findings based on self- and rater-report workplace samples. We conclude by setting some directions for future research with the inventory, and publish a short form version that can be freely used in workplace research.

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Our Rationale

Our work in the area of emotional intelligence has been focused on two main objectives: firstly, to conceptualize a common definition and taxonomic model of EI; and secondly, to construct an inventory specifically for use in workplace applications, in particular employee learning and development (L&D). The impetus for our first objective came from the plethora of different models and measures of EI available and the confusion this has brought the area regarding the nature and boundaries of the construct (Pfeiffer, 2001). We have argued elsewhere that a common definition and taxonomic model would not distract from the value various approaches provide (Palmer, Gignac, Ekermans, & Stough, 2008). Rather, a taxonomic model serves to provide a common language for EI and the basis for comprehensive measures that assess the primary facets of the construct much like the comprehensive taxonomy of personality traits, the widely known Five Factor Model (FFM; Digman, 1990; Costa & McCrae, 1992). Comprehensive measures of EI that cover the different operationalisations of the construct have been argued to not currently exist (Petrides & Furnham, 2001).

The impetus for our second objective came from a series of focus groups we conducted during 2003 and 2004 with HR professionals and business leaders involved in employee development. In these focus groups we asked participants to define an "ideal" EI inventory for the purpose of employee development. An analysis of the information captured in these focus groups revealed that an ideal EI inventory would be one that:

- measured a simple rather than complex model
- was able to be completed in 15 min
- had high "workplace face validity" (i.e., the items were clearly related to workplace activities), and
- generated scores that were meaningfully related to organizational and role specific outcomes (e.g., attrition, job performance, and leadership effectiveness).

These focus groups also revealed important information relating to how the "end-user" of the EI inventory (e.g., the line manager within a division of an organisation) preferred assessment results to be presented to him or her. The focus groups revealed that an ideal EI inventory's feedback report would present to an individual his or her assessment results:

- in the context of workplace performance and outcomes, and
- in combination with a series of targeted and individually focused EI-development options that were relevant to applying emotional intelligence in the workplace.

It was our view that few EI inventories available at the time of conducting these focus groups met any of these more practical criteria satisfactorily.

The introductory chapter of this book provides some guidelines on how to evaluate the utility of various EI inventories from a psychometric viewpoint. Utilizing a psychometrically robust measure of EI in any context (i.e., in the workplace or elsewhere) is important; however, the findings of these focus groups highlight the more practical criteria practitioners often employ in evaluating and selecting inventories for applied use. Obviously both should be used in combination, and both have been used as a guide in developing and validating the Genos EI inventory.

Positioning the Genos Approach to Assessing EI in the Workplace

Authors in the area of EI often distinguish between: (a) ability measures designed to assess individual differences in emotional abilities (e.g., Mayer, Salovey, & Caruso, 2000); (b) self-and-rater report mixed measures designed to assess an array of emotional and social individual difference constructs such as emotionally based competencies, personality traits, and motivational attributes (e.g., Bar-On, 1997); (c) self-report trait measures designed to assess emotion-laden traits and dispositions (e.g., Petrides & Furnham, 2001); and (d) self-and-rater report competency measures (e.g., Sala, 2002) designed to measure individual differences in learned capabilities or skills based on emotional abilities – for example, the skill of demonstrating self-awareness based on one's ability and/or capability to perceive emotions within oneself. All of these aforementioned approaches have their own merits and, as outlined in the various chapters of this book, there is mounting evidence for the psychometric reliability and validity of each.

Despite this mounting evidence of psychometric reliability and validity the issue of practical utility has not been adequately addressed. As previously mentioned, few if any of the leading assessments meet the more practical criteria defined by HR professionals. For example, it could be argued that the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) lacks "workplace face validity" and takes too long to complete (approximately 30 min). Similarly, it could be argued that the Bar-On Emotional Quotient Inventory (Bar-On EQ-i) takes too long to complete (133 items), and the model of EI it assesses is too complex. Mixing together an array of 15 varied individual difference constructs makes the model esoteric, hard for practitioners to definitively recall in client debrief sessions and debrief in a timely manner. Trait-based measures such as the Trait Emotional Intelligence Questionnaire (TEIQue) developed by Petrides and Furnham (2001) may be considered too long at 153 items, and trait-based assessments lack workplace face validity in that they are more concerned with individual preferences and styles rather than what people actually do in the workplace. For example one might find it "easy to express how one feels", but be left wondering about the skill or frequency with which it might be done. In

addition, trait based measures of EI do not particularly lend themselves to multi-rater assessment formats, because a large number of the items concern internal attitudes, thoughts, and preferences, rather than what individuals' demonstrably display to others. On this basis, it may be reasonably contended that observers or "raters" would be able to more accurately rate demonstrable behaviors, in comparison to internal attitudes, thoughts and preferences.

One leading assessment of EI that was designed specially for the workplace and meets some of the HR practitioner criteria is the Emotional Competency Inventory (ECI) developed by the Hay Group in partnership with Goleman and Boyatsis (Sala, 2002). The ECI takes approximately 15 min to complete, has high workplace face validity measuring competencies such as Organizational Awareness, Teamwork and Collaboration, and reports present individual's results in the context of workplace performance and outcomes (Sala, 2002). However, similar to the Bar-On EQ-I, the model the ECI measures is too complex and esoteric. A total of 17 variables, ranging from Inspirational Leadership to Transparency to Achievement Orientation, are assessed. Further, it could be said that the inventory's results reports have not been designed with the "end-user" in mind. ECI reports make use of "Clusters and Algorithms" and "Target Levels" to describe the individual's EI assessment results. Finally, no targeted and individually focused EI-development options are contained within an individual's report. Nonetheless, unlike trait-based measures, the ECI items comprise demonstrable behaviors, and the inventory is available in a multi-rater format.

Many commentators have asserted the superiority of ability-based EI inventories (such as the MSCEIT), because they do not rely upon the insight of the respondent and are not susceptible to socially desirable responding (Mayer et al., 2000). However, we have argued elsewhere that with the exception of measuring an individual's ability to perceive emotions in others, existing ability inventories (specifically the MSCEIT) are more an index of individual differences in emotional knowledge (Palmer, 2007). Emotional knowledge may be culturally and sub-culturally specific. Furthermore, scores on ability based measures of EI in the workplace do not necessarily equate to performance outcomes that may ultimately be more important in employee development. Put another way, some individuals may have a high level of emotional knowledge but not have the capability or necessary experience in applying that knowledge in everyday life. For example, a manager's knowledge and theory on how to motivate subordinates may not actually result in that same manager having the competency or skill to do so effectively.

To illustrate this point further, assessment centre research completed by Tatton (2005), found a clear disconnect between individuals' emotional knowledge and how they applied that knowledge in role-play based simulations. In this research, Tatton identified five distinct categories for the demonstration of emotional knowledge, namely:

1. **The Emotionally Intelligent**, individuals with high levels of emotional knowledge and who demonstrated effective use of that knowledge in the role play.
2. **The Emotionally Intuitive**, individuals with low levels of emotional knowledge yet applied that knowledge effectively in the role play (e.g., demonstrated sensitivity to interpersonal cues and positive interpersonal behaviours).
3. **The Emotionally Negligent**, individuals with high levels of emotional knowledge yet could not apply that knowledge effectively in the role play (e.g., missed others' emotional cues). Interestingly, Tatton reported that upon reviewing their performance the "emotionally negligent" individual was able to discuss what he or she should have done or what would have been a better approach in the role play.
4. **The Emotionally Manipulative**, individuals with high levels of emotional knowledge who chose to use this knowledge in a more nefarious intent during the role play (e.g., lowering others' self-esteem to enhance their own position or dismissing others' feelings so as not to validate them).
5. **The Emotionally Unintelligent**, individuals with low levels of emotional knowledge and who failed to demonstrate effective use of that knowledge in the role play (e.g., missed others' emotional cues, etc).

For these and other reasons we have recently argued that self-and-rater report behavioral measures of EI offer the greatest utility in workplace applications (Palmer, 2007), especially as it relates to desired workplace performance outcomes. Of course, this claim needs to be validated by empirical research.

By definition such inventories should index individual differences in how often people typically demonstrate emotionally intelligent workplace behavior as rated by self and others. Stated alternatively, they should be designed to assess "typical performance" rather than "maximal performance", which has been identified as one of the important advantages associated with a self-report measure of EI (Gignac, Palmer, Manocha, & Stough, 2005).

Cronbach (1960) initially classified psychometric tests into maximal versus typical performance. Cronbach (1960) viewed tests of intellectual intelligence to be measures of maximal performance, while personality inventories were considered to be measures of typical performance. As argued above, the demonstration of emotionally intelligent behavior may best be conceptualized within the context of typical performance rather than maximal performance. Further, given that common performance appraisal measures are typical performance in nature (e.g., supervisor ratings, annual sales, etc.), it is argued here that a typical performance measure of EI may also be particularly valuable in the workplace context.

With the identification of a theoretical framework (i.e., typical performance), it was next necessary to identify theoretically and empirically the number and nature of EI dimensions the typical performance EI inventory should comprise.

The Genos EI Model of Emotional Intelligence

The Genos model of EI is based largely on a factor analytic study aimed at determining a taxonomic model for the construct (Palmer, 2003). It is also based on factor analyses by Gignac (2005) of the SUEIT (Palmer & Stough, 2001), an EI inventory designed to measure the original five-factor taxonomic model of EI identified by Palmer (2003). The Genos model of emotional intelligence comprises a general factor (Overall or Total EI), as well as seven oblique factors outlined in Table 1.

Table 1 The Genos model of emotional intelligence

Factor name	Description
1. Emotional Self-Awareness	The skill of perceiving and understanding your own emotions
2. Emotional Expression	The skill of effectively expressing your own emotions
3. Emotional Awareness of Others	The skill of perceiving and understanding others' emotions
4. Emotional Reasoning	The skill of using emotional information in decision-making
5. Emotional Self-Management	The skill of managing your own emotions
6. Emotional Management of Others	The skill of positively influencing the emotions of others
7. Emotional Self-Control	The skill of effectively controlling your own strong emotions

The Genos EI Inventory (Genos EI)

Genos EI was designed specifically for workplace applications according to the "ideal" inventory criteria determined from industry focus groups (as previously described). There are three unique features of Genos EI worthy of note. First, the taxonomic 7-factor model it assesses is simple in comparison to some of the larger models in the area and each model's related inventory. We posit that this feature makes the Genos model of EI more straightforward to debrief, easier for participants to recall whilst undertaking their daily work, and easier to link to other organizational competency models (e.g., leadership, sales, or customer service). Second, it has high "workplace face validity" comprising items that represent emotionally intelligent workplace behaviors aligned to the seven factors of our model. Finally, it is not a measure of EI, per se, but a measure of typical rather than maximal performance, specifically measuring individual differences in how often people demonstrate emotionally intelligent workplace behaviors. We posit that these features help participants undertaking Genos EI to: (1) understand the "why" of what they are being asked to complete, which in turn creates greater participant buy-in not only for completing the assessment but also the broader development-oriented program it may be embedded

within; and (2) appreciate the potential value of the information provided by the results of the inventory.

Both self- and multi-rater formats comprise a total of 70 items taking respondents approximately 12–15 min to complete. Each of the seven factors of our model is measured by 10 homogeneous emotionally intelligent workplace behaviors (i.e., items). Table 2 provides example items pertaining to the factors of our model presented in "rater" format.

Participants (and their raters) are asked to indicate on an anchored rating scale from 1 to 5, how often the behavior in question is demonstrated (where 1 = Almost Never; 2 = Rarely; 3 = Sometimes; 4 = Often; and 5 = Almost Always). The items in Genos EI also concern a range of different positive and negative emotions. Positive emotions include: satisfaction, enthusiasm, optimism, excitement, engagement, motivation, and feeling valued by colleagues. Negative emotions include: anxious, anger, stressed, annoyed, frustrated, disappointed, upset and impatient.

Research with Genos EI has shown that how often the behaviors in the inventory are demonstrated meaningfully correlates with various workplace performance indices (Gignac, 2008a). As such (and consistent with the "ideal" inventory criteria), participants' results are presented in the context of workplace performance outcomes in an individually focused feedback report (referred to as a Genos EI Development Report).

Genos EI is deployed online via a secure assessment platform that also automates report generation. In the participant's Development Report, overall subscale scores are provided along with items in the assessment the participant

Table 2 Example items from Genos EI

Factor	Example items
1. Emotional Self-Awareness	• Is aware when he/she is feeling negative at work
	• Is aware of how his/her feelings influence the way he/she responds to colleagues
2. Emotional Expression	• Expresses how he/she feels at the appropriate time
	• Expresses his/her feelings effectively when someone upsets him/her at work
3. Emotional Awareness of Others	• Demonstrates an understanding of others' feelings at work
	• Understands the things that make people feel valued at work
4. Emotional Reasoning	• Asks others how they feel about different solutions when problem solving at work
	• Demonstrates to colleagues that he/she has considered others' feelings in decision he/she makes at work
5. Emotional Self-Management	• Ruminates about things that anger him/her at work*
	• Responds to events that frustrate him/her at work effectively
6. Emotional Management of Others	• Creates a positive working environment for others
	• Motivates others toward work related goals
7. Emotional Self-Control	• When under stress, he/she becomes impulsive*
	• Demonstrates excitement at work appropriately

* Negatively keyed items.

was rated by others as demonstrating more and less often. These are presented as "strengths" and "opportunities for development" respectively, along with the business case and potential performance outcomes that could be achieved if the behaviors were to be demonstrated more often. Further, the participant's Development Report presents a series of EI-development suggestions tailored to his or her specific assessment results (a corresponding development suggestion for each of the 70-items that make up Genos EI has been developed), which are provided to the participant based on the responses provided by his or her actual "raters". This feature provides participants with context-specific feedback from others into how to demonstrate emotionally intelligent behaviors more appropriately in the workplace.

Reliability and Validity[1]

An accumulation of research on the seven-factor model of EI that underpins the Genos inventory has been completed to-date. In this section of the chapter, a review of the reliability, concurrent validity, discriminant validity, and predictive validity associated with the Genos EI inventory is provided.

The internal consistency reliability of the Genos EI self-report inventory has been examined with large workplace samples across a variety of nationalities. Gignac (2008a) reported mean subscale reliabilities (α) ranging from .71 to .85 across five nationalities (American, Australian, Asian, Indian, and South African). The mean Genos EI total score internal consistency reliability (α) was estimated at .96. The test–retest reliability associated with the Genos EI inventory scores has also been examined. Specifically, Gignac (2008a) found test–retest correlations of .83 and .72 based on two-month and six-month time intervals for Genos EI total scores respectively. Based on this finding it may be suggested that Genos EI inventory scores are associated with acceptable levels of internal consistency reliability and test–retest stability.

The factorial validity of the Genos EI inventory has been comprehensively examined in a recently completed investigation (Gignac, submitted). Based on a series of competing confirmatory factor analytic (CFA) models, the seven-factor model of EI implied by the Genos EI inventory was supported within a sample of 4775 self-reports and a sample of 6848 rater-reports. Within the self-report data, the seven-factor model (direct hierarchical model) was associated with CFI = .948, RMSEA = .066, SRMR = .037, and TLI = .932, which was considered an acceptably well-fitting model based on Hu and Bentler's (1999) close-fit guidelines. In contrast to the seven-factor model, neither a general factor model nor a five-factor model of EI was found to be associated with acceptable levels of model close-fit. The Genos EI seven-factor model

[1] The vast majority of the research discussed in this section consists of a review of the Genos EI Inventory Technical Manual (Gignac, 2008a).

was also confirmed based on the rater-report data (i.e., CFI = .962, RMSEA = .066, SRMR = .027, and TLI = .950). To our knowledge, Gignac represents the first investigation to support the factorial validity of an EI inventory based on both self-report data and rater-report data.

The concurrent validity associated with Genos EI inventory scores has been established through a series of empirical investigations that have correlated Genos EI with the SUEIT (the predecessor of Genos EI), the Trait Meta-Mood Scale (TMMS), organizational commitment, and transformational leadership (amongst others; see Gignac, 2008a, for full review). A brief review of this research is provided next.

One of the most common, but arguably least impressive, approaches to establishing the concurrent validity of an inventory is to correlate the scores of that inventory with that of another previously established inventory. To this effect, the Genos EI seven-factor model of EI has been correlated with the SUEIT and the Trait Meta-Mood Scale (TMMS). Specifically, based on a sample of 169 adult respondents who completed both the SUEIT and the Genos EI inventory, a latent variable correlation of .93 was found between a SUEIT global factor and a Genos EI global factor. Thus, 86.5% of the reliable variance within the SUEIT and Genos EI was shared. Such a large amount of shared variance would support the contention that the previous validity research relevant to the SUEIT would also apply to Genos EI. Based on another sample of 163 adult respondents, a latent variable correlation of .68 was found between a global Genos EI factor and a global TMMS factor. Thus, 46.2% of the reliable variance associated with Genos EI and the TMMS was shared, suggesting a respectable amount of convergence.

The Genos EI factor model has been correlated with a number of workplace relevant individual difference variables. For example, Genos Total EI has been found to correlate at .56 with transformational leadership as measured by the Multifactor Leadership Questionnaire (MLQ; Avolio, Bass, & Jung, 1995) based on a sample of 163 female managers. Thus, higher Genos EI scores are associated with higher levels of transformational leadership. The numerically largest Genos EI subscale correlation with transformational leadership was associated with Emotional Management of Others ($r = .51$), as might be expected. The smallest subscale correlation was associated with Emotional Reasoning ($r = .27$). Based on a multiple regression analysis where transformational leadership was regressed onto the seven Genos EI subscales, an R^2 of .339% was estimated. Thus, 33.9% of the variance in transformational leadership could be accounted for by a seven subscale regression equation. Only two of the seven Genos EI subscales were found to be statistically significant contributors to the regression equation: Emotional Management of Others $\beta = .26$ and Emotional Self-Control $\beta = .17$. Thus, it was overwhelmingly the emotional management elements of Genos EI that predicted transformational leadership uniquely.

In a further examination of the association between Genos EI and transformational leadership, transformational leadership composite variable was

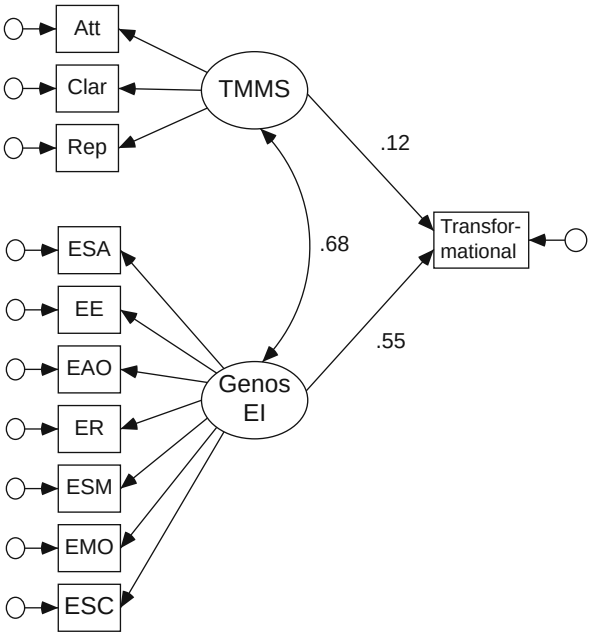

Fig. 1 Transformational leadership regressed onto the TMMS and the Genos EI inventory (completely standardized solution)

regressed onto both Genos EI and TMMS latent variables. Such an analysis was considered to help address the question as to whether Genos EI could predict transformational leadership more strongly than the TMMS within a multiple regression context. As can be seen in Fig. 1, the Genos EI global latent variable was associated with a standardized regression weight of .55 ($p<.05$), which can be contrasted by the TMMS regression weight of .12 ($p=.34$).

Genos EI has also been examined within the context of predictive validity and job performance. In one particular investigation (Gignac, 2008a) based on a re-analysis of research first reported by Palmer and Jennings (2007), Genos EI scores were correlated with:

- pharmaceutical sales professionals (reps) job performance (average monthly revenue)
- the number of days reps spent out on sales calls (days on territory)
- the number of short sales calls (short calls) reps made to their customer base (measured in time), and
- the number of long sales calls (long calls) reps made to their customer base (also measured in time)

It was hypothesized that both Genos EI scores and the long-calls would be correlated positively with performance (i.e., sales revenue) in a sample of pharmaceutical sales representatives. The hypotheses were supported, with an

observed correlation of .47 between Genos EI total scores and sales revenue, as well as a correlation of .35 between number of long-calls and sales revenue. Based on a hierarchical multiple regression, it was found that Genos EI total scores exhibited a statistically significant unique effect ($\beta = .31$) on sales revenue, independently of the effects of long-calls. Thus, it was not simply through an effect of long-calls that Genos EI was associated with sales (i.e., an indirect effect); rather, there was a non-negligible direct effect of Genos EI on sales.

Genos EI scores have also been evaluated within the context of discriminant validity. In particular, the factorial integrity of the global Genos EI factor was examined in two adult samples ($N = 206$ and $N = 106$) by simultaneously controlling for shared variance with the five personality dimensions within the Five Factor Model (FFM) of personality. The mean global EI factor loadings were found to decrease from .61 to .39 and .79 to .67 in first and second samples, respectively. Thus, as there was still a non-negligible amount of factorial validity associated with the Genos EI global factor, it may be suggested that the Genos EI scores are associated with some unique validity independently of the FFM.

Genos EI scores were also found to be only moderately correlated with socially desirable responding ($r = -.03$ to .32) and very weakly correlated with a transactional leadership style ($r = .06$). Further discriminant validity details can be found in Gignac (2008a).

In summary, the reliability and validity associated with the Genos EI inventory scores may be said to be respectable. Clearly, further validity research is required. For example, further predictive validity research should be performed to further substantiate Genos EI scores as a predictor of job performance. The issue of incremental predictive validity should also be addressed, although Gignac, Jang, and Bates (2009) have suggested that EI may be a valuable construct, even if it were found to be statistically redundant with well-known measures of personality, as comprehensive measures of personality are excessively expansive and lack theoretically coherence (see also Gignac, 2006; Gignac, Jang, & Bates, 2007).

Genos EI: Concise and Short Forms

In addition to the full 70-item version of the Genos EI inventory, two abbreviated versions have recently been developed based on the statistical and psychometric analyses reported in Gignac (2008b). The two abbreviated versions include a 31-item Concise version and a 14-item Short version.

The Genos EI Concise version includes a total EI score and the same seven subscales that comprise the 70-item full version. However, the reliabilities associated with the Concise subscale scores tend to be lower than the corresponding full version (see Table 3). Thus, the Genos EI Concise version should only be used for research purposes or possibly educational/developmental

Table 3 Number of items that make up the three versions of Genos EI (Long, Concise, Short) and corresponding reliabilities, means, standard deviations and correlations with the long version

	Number of items			Cronbach's alpha			Mean (SD)			*r* with long form	
Subscale	Long	Concise	Short	Long	Concise	Short	Long	Concise	Short	Concise	Short
ESA	10	4	2	.83	.75	.56	41.94 (4.56)	16.60 (4.79)	8.46 (1.45)	.90	.83
EE	10	5	2	.81	.72	.59	39.53 (4.85)	18.89 (8.59)	7.73 (1.45)	.93	.82
EAO	10	4	2	.87	.74	.63	40.22 (4.79)	16.01 (4.68)	7.72 (1.22)	.92	.82
ER	10	5	2	.74	.72	.53	39.29 (4.44)	20.16 (6.65)	8.36 (1.18)	.89	.76
ESM	10	5	2	.79	.74	.60	38.36 (4.72)	18.65 (7.94)	7.72 (1.36)	.92	.82
EMO	10	4	2	.86	.74	.54	40.29 (4.89)	15.80 (5.23)	7.92 (1.25)	.92	.84
ESC	10	4	2	.78	.71	.53	39.51 (4.80)	15.75 (5.89)	7.97 (1.38)	.87	.79
Total EI	70	31	14	.96	.93	.87	279.13 (27.76)	121.86 (13.84)	55.88 (6.67)	.97	.94

Note. $N = 4775$; ESA = Emotional Self-Awareness; EE = Emotional Expression; EAO = Emotional Awareness of Others; ER = Emotional Reasoning; ESM = Emotional Self-Management; EMO = Emotional Management of Others; ESC = Emotional Self-Control.

purposes. Although the subscale reliabilities tend to be lower within the Concise version, they are nonetheless above .70, as can be seen in Table 3. It can also be observed in Table 3 that the subscales tend to be based on 4–5 items, which in large part explains why the reliabilities are relatively lower. Details relevant to obtaining research access to the Genos EI Concise version can be found at www.genos.com.au/research

In contrast to the full and concise versions of Genos EI, the Genos EI Short version allows only for the calculation of a total EI score. Technically, there are two items from each of the seven subscales (hence the 14-item scale) within the Short version; however, the reliabilities associated with the seven "subscales" are so low as to be unacceptable even for research purposes (see Table 3). The Short total EI score, by contrast, was found to be associated with an internal consistency reliability of $\alpha = .87$. Further, the correlation between the Total EI Short version and Total EI Long version was estimated at $r = .94$. Thus, any Total EI effect identified within the Long version would be expected to be observed with the Short version. Consequently, researchers interested in including a workplace contextualized self-report measure of EI in their research are encouraged to use the Genos EI Short version if: (1) there are serious testing time constraints within the investigation, or (2) EI is only of secondary interest to the investigation.

The items and scoring information associated with the Genos EI Short version are presented in Table 4. Researchers are encouraged to use the inventory as often as they like, free of charge. However, commercial use of the inventory is strictly forbidden. A more professional looking version of the

Table 4 Genos EI: Self-rated short form items (research only)

1	I appropriately communicate decisions to stakeholders.
2	I fail to recognize how my feelings drive my behavior at work. (R)
3	When upset at work, I still think clearly.
4	I fail to handle stressful situations at work effectively. (R)
5	I understand the things that make people feel optimistic at work.
6	I fail to keep calm in difficult situations at work. (R)
7	I am effective in helping others feel positive at work.
8	I find it difficult to identify the things that motivate people at work. (R)
9	I consider the way others may react to decisions when communicating them.
10	I have trouble finding the right words to express how I feel at work. (R)
11	When I get frustrated with something at work I discuss my frustration appropriately.
12	I don't know what to do or say when colleagues get upset at work. (R)
13	I am aware of my mood state at work.
14	I effectively deal with things that annoy me at work.

Note. (R) = items that are negatively keyed and must be reverse coded prior to calculating the Total EI score; the inventory is scored on a 5-point Likert scale: 1 = Almost Never, 2 = Seldom, 3 = Sometimes, 4 = Usually, 5 = Almost Always; the Genos EI Short version has been generated for research purposes only. Any commercial application use of the Genos EI Short version is strictly forbidden.

Genos EI Short version questionnaire can be obtained free of charge from www.genos.com.au/research

Directions for Future Research

Although a substantial amount of convergent validity related research has been conducted with psychometric measures of EI, the overwhelming majority of the research appears to have focused upon the concurrent validity type, and, to a lesser extent, predictive validity. Typical concurrent validity research, such as correlating self-report EI scores with self-report leadership, well-being, or personality scores, for example, does play a role in the evaluation of the validity of a construct. In contrast, traditional predictive validity research, which typically involves correlating self-report EI scores with academic or job performance, for example, may be viewed more impressively. However, there may be beneficial scope to expanding the conceptualization of performance within the context of emotional intelligence research. That is, rather than measuring performance in a strict outcome oriented manner (e.g., sales, academic marks, output), a potentially more insightful method would involve measuring performance from a more process oriented approach.

For example, Pulakos, Arad, Donovan, and Plamondon's (2000) taxonomy of adaptive performance includes dimensions relevant to dealing with unpredictable situations, demonstrating cultural adaptability, and learning new tasks and procedures successfully, amongst others. These types of performance

indicators may be argued to be important in understanding and evaluating an individual's value to an organization, in addition to the more traditional indicators such as revenue generation, cases completed, etc. Further, EI would likely be meaningfully correlated with such non-traditionally conceived components of performance. Future EI research should explore this area.

In addition to expanding the conceptualization of performance within predictive validity EI studies, some emphasis should be placed upon assessing EI using a multi-measurement approach, rather than simply measuring EI with a single inventory. This recommendation should be viewed within the context of multitrait-multimethod (MTMM) validity research (Campbell & Fiske, 1959). That is, EI can conceivably be measured via self-report, rater-report, structured interviews, role-playing, and task-based tests. Scores derived from such an array of methods would provide a true assessment of EI, assuming the scores correlate with each other positively and sufficiently strongly. A MTMM approach to the assessment of EI would be expected to go a long way to potentially validating the construct validity and utility of EI. Admittedly, comprehensive MTMM investigations tend to be resource intensive. However, to-date, there is very little (if any) research that has even combined self-report EI with rater-report EI in convergent validity EI studies. Such a deficit in the literature should be attended to in the future.

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The Assessing Emotions Scale

Nicola S. Schutte, John M. Malouff, and Navjot Bhullar

Theoretical Rationale

The Assessing Emotions Scale, in some literature called the Emotional Intelligence Scale, the Self-Report Emotional Intelligence Test, or the Schutte Emotional Intelligence Scale, is based on Salovey and Mayer's (1990) original model of emotional intelligence. This model proposed that emotional intelligence consists of appraisal of emotion in the self and others, expression of emotion, regulation of emotion in the self and others, and utilization of emotion in solving problems. Subsumed under these branches are functions such as verbal and nonverbal appraisal and expression of emotion and using emotions to motivate as part of the utilisation of emotions. Mayer, Salovey, and Caruso (2004) have since refined their 1990 model, but the basic aspects of emotional intelligence proposed in the newer model remain similar to those of the 1990 model.

The Assessing Emotions Scale attempts to assess characteristic, or trait, emotional intelligence. In their 1990 model, Salovey and Mayer described emotional intelligence as a mix of what might be considered abilities and traits. More recently, Mayer and Salovey (Mayer et al., 2004; Mayer, Salovey, Caruso, & Sitarenios, 2003) have argued for a pure ability conceptualization of emotional intelligence. Such an ability conceptualization is associated with a measurement approach that focuses on latent abilities assessed through performance tasks.

Other theorists and researchers (Neubauer & Freudenthaler, 2005; Petrides & Furnham, 2001, 2003) have argued that emotional intelligence can be usefully conceptualised as typical (or trait) functioning. A trait approach to assessing emotional intelligence draws on self or other reports to gather information regarding the display of emotional intelligence characteristics in daily life. Even though some literature presents ability and trait conceptualisations of emotional intelligence as mutually exclusive alternatives (e.g., Mayer, Salovey, & Caruso,

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2000), we believe that both are important and complementary dimensions of adaptive emotional functioning.

Description of the Measure and Scoring Instructions

The Assessing Emotions Scale is a 33-item self-report inventory focusing on typical emotional intelligence. Respondents rate themselves on the items using a five-point scale. Respondents require on average five minutes to complete the scale. Table 1 shows the items composing the measures and instructions to respondents. Total scale scores are calculated by reverse coding items 5, 28 and 33, and then summing all items. Scores can range from 33 to 165, with higher scores indicating more characteristic emotional intelligence.

Table 1 The assessing emotions scale

Directions: Each of the following items asks you about your emotions or reactions associated with emotions. After deciding whether a statement is generally true for you, use the 5-point scale to respond to the statement. Please circle the "1" if you strongly disagree that this is like you, the "2" if you somewhat disagree that this is like you, "3" if you neither agree nor disagree that this is like you, the "4" if you somewhat agree that this is like you, and the "5" if you strongly agree that this is like you.

There are no right or wrong answers. Please give the response that best describes you.

1 = strongly disagree
2 = somewhat disagree
3 = neither agree nor disagree
4 = somewhat agree
5 = strongly agree

1.	I know when to speak about my personal problems to others.	1	2	3	4	5
2.	When I am faced with obstacles, I remember times I faced similar obstacles and overcame them.	1	2	3	4	5
3.	I expect that I will do well on most things I try.	1	2	3	4	5
4.	Other people find it easy to confide in me.	1	2	3	4	5
5.	I find it hard to understand the non-verbal messages of other people.	1	2	3	4	5
6.	Some of the major events of my life have led me to re-evaluate what is important and not important.	1	2	3	4	5
7.	When my mood changes, I see new possibilities.	1	2	3	4	5
8.	Emotions are one of the things that make my life worth living.	1	2	3	4	5
9.	I am aware of my emotions as I experience them.	1	2	3	4	5
10.	I expect good things to happen.	1	2	3	4	5
11.	I like to share my emotions with others.	1	2	3	4	5
12.	When I experience a positive emotion, I know how to make it last.	1	2	3	4	5
13.	I arrange events others enjoy.	1	2	3	4	5
14.	I seek out activities that make me happy.	1	2	3	4	5
15.	I am aware of the non-verbal messages I send to others.	1	2	3	4	5

Table 1 (continued)

16.	I present myself in a way that makes a good impression on others.	1	2	3	4	5
17.	When I am in a positive mood, solving problems is easy for me.	1	2	3	4	5
18.	By looking at their facial expressions, I recognize the emotions people are experiencing.	1	2	3	4	5
19.	I know why my emotions change.	1	2	3	4	5
20.	When I am in a positive mood, I am able to come up with new ideas.	1	2	3	4	5
21.	I have control over my emotions.	1	2	3	4	5
22.	I easily recognize my emotions as I experience them.	1	2	3	4	5
23.	I motivate myself by imagining a good outcome to tasks I take on.	1	2	3	4	5
24.	I compliment others when they have done something well.	1	2	3	4	5
25.	I am aware of the non-verbal messages other people send.	1	2	3	4	5
26.	When another person tells me about an important event in his or her life, I almost feel as though I experienced this event myself.	1	2	3	4	5
27.	When I feel a change in emotions, I tend to come up with new ideas.	1	2	3	4	5
28.	When I am faced with a challenge, I give up because I believe I will fail.	1	2	3	4	5
29.	I know what other people are feeling just by looking at them.	1	2	3	4	5
30.	I help other people feel better when they are down.	1	2	3	4	5
31.	I use good moods to help myself keep trying in the face of obstacles.	1	2	3	4	5
32.	I can tell how people are feeling by listening to the tone of their voice.	1	2	3	4	5
33.	It is difficult for me to understand why people feel the way they do.	1	2	3	4	5

A principal components analysis of a pool of items representing branches of the Salovey and Mayer (1990) emotional intelligence model identified a strong first factor (Schutte et al., 1998). This factor included items from all branches of the model. Based on these results, Schutte et al. (1998) recommended using total scores on the 33-item scale. Several other factor analytic studies focusing on the structure of the scale have also found a one factor solution (Brackett & Mayer, 2003) in some cases as having reasonable fit along with a fit for subfactors (Ciarrochi, Chan, & Bajgar, 2001) or as a higher order factor with associated subfactors (Gignac, Palmer, Manocha, & Stough, 2005), while other studies have suggested, based on identification of factors within the scale, focus on subfactors rather than a higher order factor (Petrides & Furnham, 2000; Saklofske, Austin, & Minski, 2003). The subscales based on this identification of factors will be discussed below.

The most widely used subscales derived from the 33-item Assessing Emotions Scale are those based on factors identified by Petrides and Furnham (2000), Ciarrochi et al. (2001), and Saklofske et al. (2003). These factor analytic studies suggested a four-factor solution for the 33 items. The four factors identified by Ciarrochi et al. were described as follows: perception of emotions, managing emotions in the self, social skills or managing others' emotions, and utilizing emotions. The items composing the subscales based on

these factors (Ciarrochi et al., 2001) are as follows: Perception of Emotion (items 5, 9, 15, 18, 19, 22, 25, 29, 32, 33), Managing Own Emotions (items 2, 3, 10, 12, 14, 21, 23, 28, 31), Managing Others' Emotions (items 1, 4, 11, 13, 16, 24, 26, 30), and Utilization of Emotion (items 6, 7, 8, 17, 20, 27). All 33 items are included in one of these four subscales. While subsequent factor analytic studies (Chapman & Hayslip, 2006; Saklofske et al., 2003) have provided support for the factors that form the basis for the subscales, there has been some variation in what items load on the factors. Further, using exploratory factor analysis, Austin, Saklofske, Huang, and McKenney (2004) found the 33-item scale items grouped into just three factors.

Sample Means and Standard Deviations

Means and standard deviations obtained on the Assessing Emotions Scale for various samples of participants provide information on central tendencies and distributions for different groups. Table 2 shows means and standard deviations on the total scale for various samples. In some cases the means reported in the research article or chapter were the average of all scale items rather than the sum of scale items. So that the means from different samples on the total scale score can easily be compared, the mean scores reported in Table 2 are converted to summed scores.

Table 2 Internal consistency, means and standard deviations for the assessing emotions scale

Author	Sample	Country of data collection	Scale alpha	Mean	SD
Abraham (2000)	79 customer service employees	United States	.89	*	**
Austin et al. (2004)	500 university students	Canada	.84	*	**
Bastian et al. (2005)	246 university students	Australia	.89	123.80	12.50
Brackett and Mayer (2003)	207 university students	United States	.93	123.42	14.52
Brown and Schutte (2006)	167 university students	Australia	.85	126.51	11.61
Carmeli (2003)	98 senior managers	Israel	.90	122.43	12.21
Carmeli and Josman (2006)	215 employees	Israel	.83	126.39	12.21
Charbonneau and Nicol (2002)	134 adolescents	Canada	.84	124.41	14.52
Ciarrochi, Chan, and Bajgar (2001)	131 adolescents	Australia	.84	120.45	13.86

Table 2 (continued)

Author	Sample	Country of data collection	Scale alpha	Mean	SD
Clyne and Blampied (2004)	11 women with binge eating disorder undergoing treatment	New Zealand	***	113.40 at pre, 122.50 at post	19.50 12.44
Depape, Hakim-Larson, Voelker, Page, and Jackson (2006)	125 university students	Canada	.85	127.78	12.38
Guastello and Guastello (2003)	566 university students	United States	.78	122.27	**
Guastello and Guastello (2003)	465 mothers of university students	United States	.86	122.41	**
Guastello and Guastello (2003)	401 fathers of university students	United States	.83	117.66	*
Liau et al. (2003)	203 adolescents	Malaysia	.76	132.08	11.14
Newcombe and Ashkanasy (2002)	537 university business students	Australia	.88	94.57****	13.60
Ogińska-Bulik (2005)	330 human service professionals	Poland	***	123.58	15.15
Pau and Croucher (2003)	223 university students	United States	.90	117.54	14.90
Riley and Schutte (2003)	141 community members and students	Australia	***	121.54	17.18
Saklofske et al. (2007)	258 female university students	Canada	***	123.96	14.40
Saklofske et al. (2007)	104 male university students	Canada	***	119.29	12.66
Saklofske et al. (2007)	362 university students	Canada	.90	*	**
Schutte and Malouff (2002)	49 university students in emotional intelligence training program	United States	***	126.88 at pre, 134.05 at post	14.39 15.49
Schutte and Malouff (2002)	103 university students in a control condition	United States	***	130.79 at pre, 131.35 at post	13.73 18.14

Table 2 (continued)

Author	Sample	Country of data collection	Scale alpha	Mean	SD
Schutte et al. (2002)	40 retail employees	United States	***	130.00	14.99
Schutte et al. (2002)	50 students and employees	United States	***	133.46	14.62
Schutte et al. (2002)	47 students and employees	United States	***	131.17	14.37
Schutte et al. (1998)	346 community members and university students	United States	.90	128.86	15.57
Schutte et al. (1998)	32 university students	United States	.87	*	**
Schutte, Malouff, et al. (2001)	24 university students	United States	***	126.88	12.18
Schutte, Malouff, et al. (2001)	37 teaching interns	United States	***	142.51	9.46
Schutte, Malouff, et al. (2001)	77 community members and university students	United States	***	132.84	12.37
Schutte, Malouff, et al. (2001)	38 employees and university students	United States	***	131.61	14.23
Schutte, Malouff, et al. (2001)	43 community members and university students	United States	***	131.56	15.67
Schutte, Malouff, et al. (2001)	37 married employees	United States	***	121.13	13.18
Scott, Ciarrochi, and Deane (2004)	276 university students	Australia	***	122.10	12.87
Sjöberg (2001)	226 prospective university students	Sweden	.79	*	**
Thingujam and Ram (2000)	165 male and female university students	India	.89	*	**
Thingujam and Ram (2000)	293 male university students	India	***	121.69	13.84
Thingujam and Ram (2000)	518 female university students	India	***	126.43	14.78
Totterdell and Holman (2003)	18 customer service employees	United Kingdom	.89	127.39	13.66
Van Rooy et al. (2005)	275 university students	United States	.87	129.46	14.21

Table 2 (continued)

Author	Sample	Country of data collection	Scale alpha	Mean	SD
Wing et al. (2006)	175 community members and university students	Australia	.88	*	**
Yurtsever (2003)	71 university students	Turkey	.95	*	**
Yurtsever (2003)	78 university students	Turkey	.94	*	**
Yurtsever (2003)	94 university lecturers	Turkey	.95	*	**
Zizzi, Deaner, and Hirschhorn (2003)	61 baseball players	United States	***	128.60	11.25

* Means not provided in article. ** SD not provided in article. *** Alpha not provided in article. **** Scale scores in this study were reported as a low score indicating high emotional intelligence. To allow comparison with other sample means, the sample mean was converted so that a high score indicates higher emotional intelligence.

Several studies have reported means and standard deviations on total scale scores separately for men and women. Generally these studies have found that women score somewhat higher on the measure than men. In some studies this difference has been statistically significant (e.g., Carmeli & Josman, 2006; Ciarrochi et al., 2001; Pau & Croucher, 2003; Van Rooy, Alonso, & Viswesvaran, 2005; Saklofske, Austin, Galloway, & Davidson, 2007; Schutte et al., 1998); in other studies the difference has not been statistically significant (e.g., Saklofske et al., 2003; Schutte, Malouff, et al., 2001; Wing, Schutte, & Byrne, 2006). Table 3 provides a selection of mean scores for males and females reported for different samples.

Ciarrochi et al. (2001) reported mean scores and standard deviations for a sample of adolescents on the four subscales they identified, and Ciarrochi, Deane, and Anderson (2002) reported mean scores and standard deviations for three of the subscales for a sample of university students. The values, expressed as the average for the items composing the scale, allowing for comparison between scales with differing numbers of items, were as follows for 131 Australian adolescents: Perception of Emotion ($M = 3.57$, SD = .58), Managing Own Emotions ($M = 3.71$, SD = .52), Managing Others' Emotions ($M = 3.63$, SD = .58), and Utilization of Emotion ($M = 3.69$, SD = .66); and for university students: Perception of Emotion ($M = 3.41$, SD = .64), Managing Own Emotions ($M = 3.35$, SD = .75), Managing Others' Emotions ($M = 3.43$, SD = .62). Because the internal consistency for the Utilization scale was low, it was not used in the Ciarrochi et al. (2002) study, and means were not reported for the scale.

Table 3 Means and standard deviations for males and females on the assessing emotions scale

Author	Sample	Male *N*	Male Mean	Male SD	Female *N*	Female Mean	Female SD
Charbonneau and Nicol (2002)	Canadian adolescents	72	121.77	15.81	62	127.38	13.53
Ciarrochi et al. (2001)	Australian adolescents	73	115.00	*	58	126.72	*
Pau and Croucher (2003)	British dental students	103	115.10	16.37	110	119.82	13.05
Saklofske et al. (2003)	Canadian university students	119	121.70	13.83	235	124.25	13.22
Saklofske et al. (2007)	Canadian university students	104	119.29	12.66	258	123.96	14.40
Schutte et al. (1998)	United States adults	111	124.78	16.52	218	130.94	15.09
Van Rooy et al. (2005)	United States university students	59	127.15	12.82	216	130.09	14.53

* SD not provided in article.

Translations of the Scale

The items for the original Assessing Emotions scale were in English (Schutte et al., 1998), and most studies utilising the scale have used the English language version of the scale. However, some studies have used translations of the scale. These include Carmeli (2003), who used a Hebrew version of the scale; Ogińska-Bulik (2005), who used a Polish version of the scale; Sjöberg (2001), who used a Swedish version of the scale; and Yurtsever (2003), who used a Turkish version of the scale.

Psychometric Properties

The Assessing Emotions Scale has been used in many studies of emotional intelligence and has been much written about, as indicated by over 200 publications listed in the PsycINFO database as citing the Schutte et al. (1998) article that first described the scale. Thus, psychometric information regarding the scale is available both from the initial article reporting on the development of the scale and a number of subsequent studies.

Internal Consistency

In the development sample of 346 participants, Schutte et al. (1998) found the internal consistency of the Assessing Emotions Scale, as measured by

Cronbach's alpha, to be .90. Numerous other studies have reported the internal consistency of the 33 item scale. Table 2 shows the internal consistency, measured through Cronbach's alpha, for diverse samples. The mean alpha across samples is .87.

Ciarrochi et al. (2001, 2002), drawing on responses from adolescents and university students respectively, reported internal consistency for subscales as follows: Perception of Emotion, .76, .80; Managing Own Emotions, .63, .78; Managing Others' Emotions, .66, .66; and Utilisation of Emotion, .55 (the alpha for this scale was not reported in Ciarrochi et al., 2002).

Test–Retest Reliability

Schutte et al. (1998) reported a two-week test–retest reliability of .78 for total scale scores.

Evidence of Validity

Convergent Validity. Several studies have obtained scores on the Assessing Emotions Scale and other measures of emotional functioning. The results of these studies provide some evidence regarding the validity of the Assessing Emotions Scale. Schutte et al. (1998) found that scores on the Assessing Emotions Scale were substantially related to greater attention to emotions, greater clarity of emotions, and less alexithymia (which involves lack of awareness of emotion and inability to express emotion). Brackett and Mayer (2003) found that scores on the Assessing Emotions Scale were correlated with scores on the EQ-i, another self-report measure of emotional intelligence that is based on a broader definition of emotional intelligence, and with the MSCEIT (a performance test of emotional intelligence). The relationship between Assessing Emotions Scale scores and the EQ-i was substantial, at $r = .43$, while the relationship between Assessing Emotions Scale scores and the MSCEIT, although statistically significant, was not strong at $r = .18$. Bastian, Burns, and Nettelbeck (2005) found that scores on the Assessing Emotions Scale were related to attention to emotions, clarity of emotions, and repair of emotions. Bastian et al. (2005) did not find Assessing Emotions Scale scores to be significantly related to scores on the MSCEIT.

Numerous studies have explored how scores on the Assessing Emotions Scale are associated with outcomes one might expect to be related to emotional intelligence. Such outcomes are found in various life realms including mental health, employment, and academic pursuits. Examples of early findings include that Assessing Emotions Scale scores related to more optimism, greater impulse control, lack of depressed affect (Schutte et al., 1998), more empathic perspective taking, greater self-monitoring in social situations, more closeness and

warmth in relationships, and greater marital satisfaction (Schutte, Malouff, et al., 2001). Further, scale scores predicted cooperation in a Prisoner's Dilemma situation (Schutte, Malouff, et al., 2001), persistence under frustrating circumstances (Schutte, Schuettpelz, & Malouff, 2001), adjustment to university in beginning students (Schutte & Malouff, 2002), first year university grades (Schutte et al., 1998), supervisor performance ratings in an undergraduate psychology internship (Malouff & Schutte, 1998), and better mood repair after a negative mood induction (Schutte, Malouff, Simunek, McKenley, & Hollander, 2002). A meta-analysis by Van Rooy and Viswesvaran (2004) summarised the results of analyses of such associations for 14 diverse samples of participants. Across samples, scores on the Assessing Emotions Scale correlated at .23 with outcomes in various realms.

Since the publication of this meta-analysis a number of other studies have examined relationships between scores on the Assessing Emotions Scale and outcomes in various realms. Examples of findings include that higher scores on the scale are associated with less debilitating fatigue (Brown & Schutte, 2006), better supervisor rated task performance and better organisational citizenship (Carmeli & Josman, 2006), less depression (Ogińska-Bulik, 2005), and greater life satisfaction (Wing et al., 2006).

Divergent Validity. Ideally, measures of emotional intelligence will contribute information about adaptive emotional functioning that is distinct from information provided by other recognised concepts, such as compliance with social norms or major personality constructs. Self-report measures of emotional intelligence in particular may be open to respondents giving what they perceive as socially desirable responses, resulting in self-report scales assessing how compliant with social norms a respondent is rather than the respondent's perception of his or her emotional functioning. Under conditions of confidential responding, such tendencies towards normative responding do not seem to influence scores on the Assessing Emotions Scale; Kirk, Schutte, and Hine (2008) found that scores on the Assessing Emotions Scale were not associated with scores on the Marlowe-Crowne Social Desirability Scale.

Several studies have examined the relationship between scores on the Assessing Emotions Scale and the Big Five Dimensions. Five dimensions – extraversion (surgency), agreeableness, conscientiousness, emotional stability (the low end of which has been termed neuroticism), and openness – seem to underlie many characteristic traits (Goldberg, 1993; John & Srivastava, 1999; McCrae & Costa, 1999). These Big Five dimensions have been repeatedly identified in factor analytic studies examining individual differences (John & Srivastava, 1999; McCrae & Costa, 1999).

Ideally, measures of other psychological constructs such as emotional intelligence are relatively distinct from these major dimensions of personality. Schutte et al. (1998), Brackett and Mayer (2003), and Bastian et al. (2005) respectively reported the following correlations between the Assessing Emotions Scale and each of the Big Five Dimensions: extraversion, .28, .32, .61; agreeableness, .26, .09, .23; conscientiousness, .21, .25, .32; emotional stability,

.28, .19, .37; and openness, .54, .43, .43. These correlations indicate that across studies, scores on the Assessing Emotions Scale are relatively distinct from scores on each of the Big Five Dimensions. Openness had the highest average association with the Assessing Emotions Scale, .47, indicating shared variance (*r* squared) of about 22%.

Practical Considerations

Use with Different Populations

The Assessing Emotions Scale has been used with respondents from a variety of populations. The development sample of participants consisted of adults of a range of ages (Schutte et al., 1998). Most subsequent studies have used the measure with adults. Ciarrochi et al. (2001) found that the scale had good psychometric properties when used with Australian adolescents, Charbonneau and Nicol (2002) used the scale with Canadian adolescents, and Liau, Liau, Teoh, and Liau (2003) used the scale with Malaysian adolescents. As the reading grade level of the scale is that typical of students in their fifth year of school (Schutte et al., 1998), as assessed by the Flesch-Kincaid reading level formula, it seems reasonable to use the scale with adolescents.

The Assessing Emotions Scale was first developed and validated as an English language scale (Schutte et al., 1998), and the majority of studies using the scale have focused on participants from English speaking countries. It seems that the scale has potential in translated versions. Findings from studies using translations of the scale to languages such as Hebrew and Polish show that these other language versions of the scale result in hypothesised findings, such as that Assessing Emotions Scale scores are related to better supervisor-rated work performance (Carmeli & Josman, 2006) and less perceived work stress (Ogińska-Bulik, 2005).

Purpose of Assessment

The purpose of the assessment should be kept in mind when deciding whether to use the Assessing Emotions Scale. Schutte et al. (1998) suggested that the scale might appropriately be used for research purposes and to assist individuals who are motivated to self-reflect on aspects of their emotional functioning in the context of issues such as career goals or experience of problems that may be related to emotional functioning. As the items on the scale are transparent and respondents may perceive some answers as more socially desirable than others, Schutte et al. (1998) suggested that the scale is not appropriate for use with individuals who have an incentive to present themselves in a socially desirable manner. Even though Kirk et al. (2008) found that Assessing Emotions Scale

scores were not related to social desirability responding, the participants in this study provided information under confidential conditions and had no incentive to provide responses they perceived as socially desirable. We recommend that the scale not be used in contexts, such as employment screening, in which respondents may be motivated to present themselves in a particular fashion. In situations in which respondents may be motivated to give what they perceive to be desirable answers, performance test measures of emotional intelligence, such as the MSCEIT (Mayer et al., 2003), or observer assessments of emotional intelligence may be more appropriate.

Measures of emotional intelligence are based on operationalisations of theoretical definitions of the construct. The particular purpose of an assessment may determine which definition and corresponding measure of emotional intelligence is most appropriate. The Assessing Emotions Scale is based on the definition put forth in the original Salovey and Mayer (1990) model. Other measures, such as the EQ-i (Bar-On, 2000), are based on broader definitions of emotional intelligence that include adaptive outcomes as well as adaptive emotional functioning. When the purpose of an assessment is to obtain a broad assessment of outcomes as well as functioning, such "mixed model" (Mayer et al., 2000) definitions may be more useful.

Further Development

Extensions of the Assessing Emotions Scale

Several groups of researchers have drawn on the Assessing Emotions Scale to develop alternative measures of emotional intelligence. For example, Austin et al. (2004) drew on the 33 items of the Assessing Emotions Scale to construct a 41-item scale with 21 reverse-keyed items. This 41-item scale includes reversed wording for nine of the originally positively worded 30 items of the Assessing Emotions Scale and eight new reverse-keyed items. The internal consistency for the 41-item scale was .85. Gignac et al. (2005) selected the 28 items of the 33 items that based on their qualitative analysis best fit the conceptual categories of Salovey and Mayer's (1990) model.

Assessing Additional Dimensions of Emotional Intelligence

Almost all present emotional intelligence scales assess emotional intelligence as either an ability (Mayer et al., 2004) or a trait (Bar-On, 2000; Petrides & Furnham, 2003; Tett, Fox, & Wang, 2005). There may be additional important dimensions of emotional intelligence. Such dimensions may include (1) self-efficacy for adaptive emotional functioning, (2) state or short-term adaptive emotional functioning, and (3) situationally inherent affordances of adaptive

emotional functioning. Some items of the Assessing Emotions Scale may contribute to development of measures of these additional dimensions.

Self-efficacy for emotional functioning is the perception or belief that one can achieve desired outcomes in the emotional realm. Petrides and Furnham (2003) posited that trait emotional intelligence could alternatively be termed "emotional-self-efficacy". As Petrides and Furnham (2003) themselves pointed out, trait emotional intelligence includes dispositions as well as self-perceptions related to emotional functioning; thus, self-perceptions of emotional functioning may include emotional self-efficacy, but there are other aspects of trait emotional intelligence not encompassed by emotional self-efficacy.

Kirk et al. (2008) found support for the notion that self-efficacy is a dimension of adaptive emotional functioning as defined by the four branch model of Mayer et al. (2004). In this research emotional self-efficacy emerged as a reliable and valid construct that had significant relationships with both trait emotional intelligence (measured by the Assessing Emotions Scale) and ability emotional intelligence (measured by the MSCEIT), but also accounted for separate variance from these emotional intelligence dimensions.

Many human characteristics that are generally conceived of as traits have state counterparts (e.g., Schutte, Malouff, Segrera, Wolf, & Rodgers, 2003). Emotional intelligence may manifest itself as a temporary or intermediate state (Wing et al., 2006) as well as a longer lasting trait. Just as there are state as well as trait versions of the Positive and Negative Affect Scales (Watson, Clark, & Tellegen, 1988) and the Trait-State Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), state assessments of emotional intelligence may be developed.

The interactionist approach to human functioning (e.g., Mishel, 1977) posits that most behaviour is the result of the interplay of individual traits and the influence of situations. Situations may have inherent qualities that elicit similar behaviours, thoughts and emotions in the majority of individuals who encounter these situations. Such situational influences, or affordances, may be a dimension of emotional intelligence. Recent research by Schutte et al. (2008) found that individuals could reliably identify the emotional affordance of many situations and that the effectiveness of the individuals in situations, as rated by an observer, was influenced both by the emotional affordance of situations as well as individuals' characteristic emotional intelligence.

Conclusion

The Assessing Emotions Scale, considered a trait measure of emotional intelligence, has been widely used in research, and various studies suggest that the scale has good reliability and reasonable evidence of validity. The Assessing Emotions Scale may be best used for research purposes and to assist individuals who are motivated to reflect on aspects of their emotional functioning. Future

developments in which the Assessing Emotions Scale can play a role might focus on expanding the conceptual domain of assessment of emotional intelligence to include self-efficacy for functions related to emotional intelligence, state aspects of emotional intelligence, and situational influences that enhance emotional intelligence.

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Part III
Applying EI Research

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The Importance and Training of Emotional Intelligence at Work

Adrian Furnham

Introduction

It is quite clear that the enormous success of the *emotional intelligence movement* in academia, business, and the lay imagination is that it clearly "struck a cord with most people". Most people know highly intelligent, well-educated, technically-sophisticated people whose lack of "people skills" means they are surprisingly ineffective both at work and in their private lives. They seemed to be both emotionally illiterate in that they could not "read the signals" nor could they manage their own and others' emotions. It is frequently observed that failed and derailed managers tend to have poor social skills and are weak at building bonds. They lack EQ.

Thus it was that Goleman's (1995) blockbuster book "chimed with the zeitgeist". It has many core messages, but one central one was that at work relationships building is more important than having technical skills. The idea was that in their effort to master many technical disciplines and qualifications many people neglected everyday social intercourse, which is where they could best learn to be emotionally intelligent: to read emotions and respond to them.

The application of the EI concept to work meant Goleman (1998) hurried out another book focused very much on that issue. He was not the only one to spot that niche in the market (Sternberg, 1997; Weisinger, 1998).

Popular books made simple but very important claims. Two will be examined in depth in this chapter. The first is that EI is a better predictor than IQ of success at work. It is argued both explicitly but also by inference that EI is perhaps the single best predictor of success at work. This is stronger than the idea that EI has merely incremental validity. It is perhaps this "article of faith" that has most encouraged the EI consultants and those who purchase their services. It will be argued that there is *absolutely no evidence* in support of this

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claim, and in fact all the data suggest it is IQ that is the single best individual difference predictor of work success. Whilst it maybe true that for a category of cognitively able, well-educated managers, EQ appears to be the factor that makes or breaks them, what is conveniently ignored is that they have already been highly selected to be bright. If it was argued that within groups of highly intellectually able managers their EQ was (among) the best predictors of success at work, that would be a much more empirically reasonable and sustainable proposition. There are as a result now many more measured critiques of EQ (Ashkanasy & Daus, 2005; Ciarrochi, Chan, & Caputi, 2000; Conte, 2005; Greenspan, 1989; Locke, 2005; MacCann, Matthews, Zeidner, & Roberts, 2004).

Matthews, Zeidner, and Roberts (2002) noted five years ago, "Currently, there are no published empirical studies showing that EI measures fully predicts job success above (and beyond) that predicted by ability and personality measures" (p. 478).

The second claim is that EI can (and should) be trained, no doubt to ensure success at work. Goleman (1995) did argue originally that technical training is comparatively easy compared to training EI but that it is both possible and highly desirable. Depending on how EI is conceived and understood this claim is partly true, though there seems to be a great dearth of papers that attempt to demonstrate this. In this chapter it is argued that for many people in business the EI movement has simply relabeled and repackaged "interpersonal" or "social skills" as EI. One interesting challenge to throw at EI practitioners is how their concept or training differs from classic social skills training taught for over 30 years. Further, if one examines that literature it is far from clear whether social skills training and, therefore, EI training is very successful.

In this sense EI is neither easily trainable nor crucial for success at work. This idea flies in the face of a great deal of popular writing and a huge still growing consultant industry.

Explaining the Popularity of the EI Concept

Goleman's (1995, 1998) two books on Emotional Intelligence have been phenomenally successful internationally. Furnham (2000) suggested, rather cynically, that authors who want their popular books to sell well should obey various rules. Furnham (2006) noted how this applied to Goleman's first and second book. They are:

- *Simplicity*: The book should have a simple message supported with plenty of memorable anecdotes, vignettes, and stories. Goleman's book is indeed an example of anecdotal evidence overwhelming science. It is woven together positive and happy ending story-telling by a science journalist.
- *Changeability*: It should underscore the point that human behaviour is *changeable*. The major problem for all managers is that it is very difficult to change people's attitudes and/or their work-related behaviours. This

explains why there are so many books on change management. Certainly a message of EI as opposed to IQ is that it can be substantially improved. Anyone can get better, be happier, and be a more successful manager. Because it is essential for a manager to influence others, a book that argues that the fundamental causes of behaviour are trainable is likely to be more attractive. This also helps the consulting business.

- *The individual as the unit of analysis and change*: The successful business book must be *psychological* in its focus on people and underplay organisational, economic, and political factors that self-evidently shape organisational success. EI is an individual, not a team, group, or organisational construct. Though there has been talk of EI cultures and the emotionally literate organisation, most of all training is focused on single individual.
- *Managerial control*: It must stress the techniques that increase and improve a *manager's* control. EI is thought to be generally "empowering". Managers with EI, it is claimed, are better and lead to greater productivity, satisfaction, team morale, etc. It helps them take charge of their lives in general.
- *List of steps and principles:* It should provide a road map or course structure to management or a simple guide to how to achieve success. Whilst this was not clear in the book it is certainly spelt out in later work. Goleman's (1998) second book is an obvious response to this need, though the original one did likewise.
- *Universality:* It is important that the book must suggest that its ideas have *universal application* and appeal. The idea is that the formula works everywhere for all groups and for all time. EQ is for all people and all time. It is fundamental for health, happiness, etc. The idea of culture differences is kept firmly out of sight. The fact that emotions are expressed differently in different cultures for different purposes is omitted.
- *Short-termism*: The book must claim or demonstrate some *short-term payoff* or *benefit* ("quick win"). The idea that one can manage better and more cost-efficiently has enormous appeal, but the immediacy of the benefits is typically exaggerated. A short training course will have an immediate and important payback.
- *Success stories*: Ideally the book should provide *lists of Happy Customers* and those who have successfully adopted the ideas. They are often the author's friends or clients. These are usually told on course studies.
- *Self-confirmation*: The book must *not be counter-intuitive*. Self-confirming approaches endorsing prior ideas and beliefs are essential. Thus, the book can't have radically new ideas if the readers already hold them. That is why so many repackage common sense and the things people already know. What is new is the terminology, not the ideas. Hence, the point that EQ seems a repackaging of social and interpersonal skills.
- *Unitary perspective*: Boss and employee, management and union have ultimately *shared goals and mutual benefits*. Husband and wife, doctor and patient – all benefit from the training. Everyone benefits from having a higher EQ: the managers themselves, their staff, customers and boss.

Goleman (1995, 1998) argued (usually without good, direct evidence) that at work understanding people is more important than technical skills, and he argues that technical training in the essential job knowledge of any career from accounting to zoology is easy compared to teaching EQ skills. That is, as an adult it is comparatively more straightforward to teach a person the technical aspects of the job than the soft skills. The idea seems to be that there is a *critical period* to acquire the bases of EI, which is probably during early to late adolescence. Young people, often males, may experience social anxiety, discomfort, and rejection while attempting to interact with and influence others. Hence they may over time find solace in computers and other activities with a high skills/low contact basis. Thus in early adulthood they appear to be technically very competent in certain areas (IT, engineering) but still rather undeveloped in people skills and more specifically emotional awareness and regulation. They may even be phobic about emotional issues and resistant to training. It is also assumed that people are less able to pick up EI "skills" as well as less willing to try. To acquire technical skills often requires considerable dedication, and opportunities to acquire social skills (EQ) are, therefore, reduced. Then the low EQ person chooses technology rather than people for fun, comfort, and a source of ideas because he or she does not understand emotions.

Thus failed and derailed managers tend to be rigid, with poor self-control, poor social skills and weak bond-building ability. Understanding and using emotions/feelings are at the heart of business and, indeed, being human. It is, says Goleman (1998), no accident that motive and emotion share the same Latin root meaning: to move – great work starts with great feeling. But the book seems to have an over-inclusive view of what EQ is. There are lists of facets and features, some derivative of each other and some quite unrelated to anything about emotion.

One consequence of the success of EI has been the "discovery" of other intelligences specific to the world of business. In a study of impatriate managers, Harvey, Novicevic, and Kiessling (2002) listed eight "managerial intelligences". They took as their starting point Sternberg's (1985) triarchic theory of intelligence, but split the three intelligences further. Thus *analytic* intelligence is split into cognitive and emotional intelligence; *practical* intelligence into political, sociocultural, organisational, and network intelligence; and *creative* intelligence into innovative and intuitive intelligence.

The authors argue that cognitive IQ is the "g" factor of general intelligence that measures problem-solving abilities. They categorise emotional intelligence within the analytic category because "emotional development and maturity are viewed as necessary to allow managers to effectively utilise their cognitive abilities. The importance of emotional intelligence increases with the level of authority in an organisation" (Harvey et al., 2002, p. 504).

The four practical intelligences are, inevitably, more controversial. *Political IQ* is defined as "the ability to gain resources through exercising political power in situations where ambiguity and accountability levels allow for a shaping (i.e. spin) of attitudes and images among those being influenced. A high political

IQ refers to having a sense about the social infrastructure and the individuals that occupy key positions that can be instrumental in exercising influence to change resource, allocation or direction of the decision making" (p. 506).

Sociocultural IQ is really cultural knowledge and ability to translate or integrate specific cues about culture. *Organisational intelligence* is knowledge of how things are done via policies, procedures, planning processes, and audits. It is, in effect, an understanding of the official formal rules of the organisation and the ability to get things done in a specific organisational context. *Network intelligence* is essentially about inter-organisational management, while organisational IQ is about intra-organisational IQ. *Management IQ* is based on the size, structure, and centrality of a person's personal relationships crossing organisations.

According to Harvey et al. (2002), the two creative intelligences are innovating and intuitive intelligences. *Innovative intelligence* is defined quite specifically as follows: "The ability to think in abstract terms, to develop business ideas and concepts that have not been conceptualised by others, constitutes business innovation. The embodiment of ideas/concepts into new processes, products, services and technologies is a valuable outcome of innovation" (p. 511). *Intuitive intelligence* seems harder to define, and the authors talk about its "subconscious origin", "tacit nature", "street smarts", "sixth sense" and "gut knowledge". The concept of intuitive intelligence does seem close to Sternberg's (1997) and Neisser's (1976) work on tacit knowledge and practical intelligence.

The authors provide a profile that allows somebody to score individuals on their eight intelligences. They do *not,* however, provide any data for their theory that supports the threefold classification. More importantly, they make little attempt to distinguish between abilities and traits or to consider whether it is possible to train or develop these intelligences. Interestingly, nearly all the measures they propose for each of the IQs, save cognitive intelligence, are measured by self-report tests of preference, rather than power-based ability tests. Nevertheless, people recognise these different abilities/skills and traits.

One of the advantages of Harvey et al.'s (2002) description of managerial intelligences is that they incorporate psychological and psychometric concepts into the language of business. The concept of business IQ, at least as outlined by Harvey et al. (2002), has not, as yet, attracted much attention. Certainly there remains little evidence of the separate, "unique" existence of these intelligences or indeed evidence that they predict anything.

However, Furnham (2005) asked working adults to rate themselves, their boss, and their boss's boss on these 8 intelligences. He found males rated their overall IQ as well as their cognitive, creative, and political intelligence as significantly higher than females. Females rated their boss's overall, emotional, and organisational IQ significantly higher than did male participants. Participants believed they had higher emotional, but lower political, organisational, and network intelligence than their boss. Regressions indicated that only one of the eight estimated business intelligences (cognitive intelligence) was related to overall (total, general) estimated intelligence in self, boss, or boss's boss.

Paradoxically, though people in business seem shy about using the concept of intelligence in terms of the traditional meaning of cognitive ability or, indeed, using an IQ test to measure managers, they embrace every new "discovery" of an intelligence. This may be the consequence of Goleman's idea to re-label social skills as an intelligence. Is emotional intelligence a new concept for an old idea? Defenders would no doubt struggle to distinguish it from older concepts. However, if one reads more popular books on this topic or attends EQ training courses it seems much harder to make those distinctions. What is clearly different, however, is how EQ is measured.

Academic Issues

Academic interest in EI has occurred exponentially since 2000. Many debated who first used the term or, indeed, when "it" was first investigated. The paper by Salovey and Mayer (1990) is generally acknowledged to be the first academic paper in the area.

Empirical papers and edited books on the topic have appeared in great numbers over the previous years (Murphy, 2006). Academic debates have centered around two related issues: how to define and thence measure emotional intelligence.

Petrides, Furnham, & Frederickson (2004) argue that a fundamental issue in the operationalisation of a construct concerns *the procedures by which it is measured*. There is a basic distinction between measures of *maximum* performance (e.g., IQ tests) and measures of *typical* response (e.g., personality questionnaires) with far-reaching implications for construct operationalisation. Self-report measurement leads to the operationalisation of the construct as a personality trait ("trait EI" or "emotional self-efficacy"), whereas potential maximum-performance measurement would lead to the operationalisation of the construct as a cognitive ability ("ability EI" or "cognitive-emotional ability"). It must be understood that trait EI and ability EI are two *different constructs* because the procedures used in their operational definitions are fundamentally different, even though their theoretical domains might overlap. The primary basis for discriminating between trait EI and ability EI is to be found in the type of measurement approach one chooses to employ and not in the elements of the sampling domains of the various conceptualisations. Many dispute the more fundamental point that EI could ever be actually measured by cognitive ability tests. That is, that EI concepts, like emotional regulation, can never be reliably and validly measured by an objective ability test because of the subjective nature of emotional experience (Table 1).

There now exists a large number of measures of EI, many of which are poorly constructed and validated. Perez, Petrides, and Furnham (2005), in an exhaustive review, found, described, and evaluated 5 ability EQ tests and 15 trait measures. Various factors have driven this effort to derive measures. However,

Table 1 Trait EI versus ability EI

	Trait EI	Ability EI
Measurement	Self-report	Performance-based
Conceptualisation	Personality trait	Cognitive ability
Expected relationship to g	Orthogonal (i.e., uncorrelated)	Moderate to strong correlations
Construct validity evidence[a]	Good discriminant and incremental validity vis a vis personality	Limited concurrent and predictive validity
	Good concurrent and predictive validity with many criteria	Lower than expected correlations with IQ measures
Example measures	EQ-i	MSCEIT
	SEIS	
	TEIQue	
Properties of measures[a]	Easy to administer	Difficult to administer
	Susceptible to faking	Resistant to faking
	Standard scoring procedures	Atypical scoring procedures
	Good psychometric properties	Weak psychometric properties

Note. g = general cognitive ability; EQ-I = Emotional Quotient Inventory (Bar-On, 1997); SEIS = Schutte Emotional Intelligence Scale (Schutte et al., 1998); TEIQue = Trait Emotional Intelligence (e.g., Petrides & Furnham, 2003); MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test (Mayer et al., 2002).

[a] Entries in these rows are generalisations and do not apply equally to all measures.

few have received sufficient evaluation to satisfy academic psychometricians. Further, of those that have, many have been found wanting.

Petrides, Furnham, & Frederickson (2004) argue that since trait EI encompasses behavioural tendencies and *self-perceived* abilities, as opposed to *actual* cognitive abilities, it belongs in the realm of personality. In contrast, ability EI, which encompasses actual abilities, belongs primarily in the domain of cognitive ability. While trait EI is hypothesised to be orthogonal to cognitive ability (Furnham & Petrides, 2003, 2004; Petrides, Fredrickson, & Furnham, 2004) ability EI should be related mainly to general intelligence (g), but also to specific personality dimensions that reflect basic individual differences in emotionality (especially Neuroticism).

A difficulty with the operationalisation of ability EI is that emotional experiences are *inherently subjective* and, consequently, lack the objectivity required to make them amenable to robust, valid, and reliable maximum performance measurement. There is no obvious way of applying truly veridical criteria in the objective scoring of items relating to the intrapersonal component of ability EI (e.g., "I am aware of my emotions as I experience them") simply because the application of such scoring procedures would require direct access to privileged information, such as inner feelings and private cognitions, that is available only to the individual who is being assessed. Attempts to get around this problem (e.g., Mayer, Salovey, & Caruso, 2002) are predicated on scoring procedures that had been tried in the past with limited success. In addition to conceptual

limitations, these procedures produce test scores with undesirable psychometric properties (Roberts, Zeidner, & Matthews, 2001).

Brody (2005) has delivered a cogent attack on the single ability measure of EQ: the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT). He objects to the scoring method because he notes the test measures emotional knowledge, not emotional management as claimed: "A person who has expert knowledge of emotions may or may not be expert in the actual ability that is allegedly assessed by the test" (p. 234). The test defines correct answers as those defined by experts but does not indicate the extent to which experts agree (i.e., their consensus). Second, he also doubts that there is sufficient evidence that EI might really be conceived of as a latent trait like that of intelligence: "Owing, in part, to the relatively brief history of research on this topic, it is not possible to document a homological network of laws and relations defining the conceptual and empirical relations that obtain between tests of EI and the latent trait of which they are alleged manifestations." (p. 234). Third, he argues from a characteristically careful analysis of all the supposed evidence available, that there remains deeply sceptical of the evidence for the predictive validity of the MSCEIT.

At the moment two "schools" exist that are mutually hostile: The *ability* vs *trait* school. They measure, write, and proselytise differently. Researchers from the "trait school" complain that their papers are regularly and "unconditionally" rejected by those from the "ability school" who refuse to accept EI is just another second-order trait. The ability school frequently write papers that systematically ignore the, now numerous, papers from the trait tradition. Even conference symposia tend to be homogenous. Mutual contempt is not unusual among researchers but not usually as early on in the development of a concept.

Since the start of the millennium there has been a veritable stream of empirical papers on EQ (Lopes, Salovey, & Straus, 2003; Petrides & Furnham, 2000a, 2000b, 2001, 2003). Some have focused very specifically on *EQ at work*. In a lengthy chapter in their excellent review Matthews et al. (2002) address the issues of EI in the workplace. They describe some of the claims of the business community about EI as extravagant, hyperbolic, and outrageous. They dismiss simple claims that, for instance, IQ gets you hired, EQ gets you promoted. Clearly the regulation of emotion in oneself and in others is important, as is empathising with and understanding others' emotions. In this sense many consultants see EI as a 2×2 self vs others: Understanding vs Regulating Emotions.

Matthews et al. (2002) do offer potential researchers some excellent guidelines for examining EI in occupational settings. These are:

- Clarify the use, purpose and relevance of EI for specific occupational settings under consideration.
- Provide a solid, theoretical rationale for the use of EI in organisational assessment.

- Do a systematic task analysis.
- Conduct a cost benefit analysis.
- Assemble normative data for specific occupational groups.
- Have a clear validation process.
- Be clear and careful in your choice of criteria measures.
- Integrate the different variables.

Studies in EQ at work are appearing on a piecemeal basis. Jordan, Ashkanasy, Hartel, and Hooper (2002) developed a workgroup EQ scale to test hypotheses about the relationship between EQ, team process effectiveness, and team goal focus. They did, indeed, find some evidence that low EQ teams did perform at lower levels than high EQ teams. Critics however would probably simply want to relabel EQ as social skills or emotional awareness.

Quebbeman and Rozell (2002) defined emotional intelligence in terms of self-awareness, self-regulation, motivation, empathy, and social skills. They tested a model that suggested that work experiences trigger responses that are mediated by EQ and Neuroticism to produce affective outcomes and thence behavioural outcomes. Similarly Petrides and Furnham (2006) looked at the relationship between EQ, job stress, control, and satisfaction as well as organisational commitment. EQ predicted perceived job control, which predicted job satisfaction and thence commitment. However they found significant sex differences in the whole process.

Quebbeman and Rozell (2002) propose a model that posits how emotional intelligence is related to work-place aggression. Despite not having any empirical evidence they feel able to conclude: "As shown by the model, individuals with higher emotional intelligence and high positive affect are more likely to react to perceived injustices with adaptive/constructive behaviours. Because these individuals are less likely to engage in aggression in the face of conflict, organisations should seek to hire and retain employees with high emotional intelligence and high positive affect. Incorporating emotional intelligence and positive dispositional affectivity into daily organisational life will include training for emotional intelligence, revising selection and placement practices, counselling, training for attributional style, encouraging constructive behaviours through the organisation's performance appraisal and reward structure, and incorporating organisational strategies to reduce triggering events" (p. 137).

Dulewicz and Higgs (2001) developed, and partly tested, a model that puts EQ at the centre of the predictors of job performance. They argue that cognitive ability and specified management competencies contribute to a person's EQ (self-awareness, interpersonal sensitivity, etc). EQ is modified by other factors called drivers (decisiveness) and constrainers (lack of emotional resilience) but directly predicts performance. They argue that they have evidence to suggest that EQ is directly related to leadership through specific leadership competencies like creating the case for change and engaging others, as well as implementing and sustaining change.

There will no doubt continue to be many more papers on the role of emotional intelligence at work even long after the "fad" has passed in the management consultancy world. Further it is likely that most papers will indeed show that EQ is a significant predictor and correlate of IQ. However, this is not to show that EQ and IQ are related. Most measurement devices still employ trait measures of emotional intelligence. Thus, what this enterprise is more about, is the demonstrably true assertion that personality traits (however labeled) predict work performance.

More recently Zeidner, Matthews, and Roberts (2004) provided a useful critical overview of the role of EQ in the workplace. Often business people prefer to talk about emotional competencies (rather than traits or abilities), which are essentially learned capabilities. In this sense, EQ is "the potential to become skilled at learning certain emotional responses" (p. 377). It, therefore, does not ensure that individuals will (as opposed to can) manifest competent behaviours at work. Thus, EQ is an index of potential. However, emotional competence does, it is argued, assist in learning (soft) interpersonal skills.

Zeidner et al. (2004) try to specify these emotional competencies. They include: emotional self-awareness, emotional self-regulation, social-emotional awareness, regulating emotions in others, understanding emotions, etc. If one is to include older related concepts like social skills or interpersonal competencies, then it is possible to find a literature dating back thirty years showing these skills predict occupational effectiveness and success. Further, there is convincing empirical literature that suggests these skills can be improved and learnt.

However Zeidner et al. (2004) squash the IQ vs EQ myth. They note (my italics), "*Several unsubstantiated claims* have appeared in the popular literature and the media about the significance of EI in the workplace. Thus, EI has been claimed to validly predict a variety of successful behaviours at work, at a level exceeding that of intelligence... Of note, however, Goleman is unable to cite empirical data supporting any causal link between EI and any of its supposed, positive effects" (p. 380).

The authors quite rightly point out that EQ measures must demonstrate criterion, discriminant, incremental, and predictive validity to be cost effective in business as well as scientifically sound. We know that general ability (IQ) predicts around 20–30% of the variance in (higher) job performance across all jobs andall criteria, but more for complex jobs.

They review studies, which provide positive, mixed and negative results. They offer critiques of the studies, which purport to show EQ linked to work success. Typical problems include: the psychometric properties of the EQ measure; not controlling for intelligence (cognitive ability) or personality factors; not having very robust measures of work-related behaviour; not being able to disentangle the direction of causality through using longitudinal studies; having too many impressionistic, anecdotal studies; and having too few studies published in peer review journals.

The authors are also interested in the explanation for the process. Thus *if* EQ does predict satisfaction, productivity, team work etc., the question is: What is the *process* or *mechanism* that accounts for this? It seems in the literature, there are various speculations to account for this:

- High EQ people are better at communicating their ideas, intentions and goals. They are more articulate, assertive, and sensitive.
- EQ is closely associated with teamwork social skills, which are very important at work.
- Business leaders, high in EQ, build supportive climates, which increase organisational commitment, which in turn leads to success.
- High EQ leaders are perceptive and know their own and their teams' strengths and weaknesses, which enable them to leverage the former and compensate for the latter.
- EQ is related to effective and efficient copying skills, which enable people to deal with demands, pressure, and stress better.
- High EQ leaders can accurately identify what followers feel and need, and can be more inspiring and supportive. They generate more excitement, enthusiasm, and optimism.
- High EQ managers, unlike their low EQ companions, are less prone to negative, defensive, and destructive coping and decision-making styles.

Zeidner et al. (2004) end with an evaluative summary and guidelines to do good research in the area: "Overall, this section of our review suggests that the current excitement surrounding the potential benefits from the use of EI in the workplace may be premature or even misplaced. Whereas EI appears related to performance and affective outcomes, the evidence for performance is very limited and often contradictory. Much of the predictive validity of questionnaire measures of EI may be a product of their overlap with standard personality factors. Furthermore, the literature is replete with unsubstantiated generalisations, with much of the existing evidence bearing on the role of EI in occupational success either anecdotal or impressionistic and/or based on unpublished or in-house research. Thus, a number of basic questions still loom large: Do emotionally intelligent employees produce greater profits for the organisation? Does EI enhance well-being at the workplace? Are the effects of training in EI likely to result in increases in job performance and/or work satisfaction?" (p. 380).

In order to provide both good theory and evidence to support the use of EQ in organisational settings, Zeidner et al. (2004) recommend the following:

- The measure of EQ used needs to have reliability and validity and be clearly differentiated from related constructs. "A science of EI requires specifying the definition, number, type, and range of primary emotional abilities within a formal psychometric model" (p. 390).
- Researchers need to match the test to the job and specify precisely the context and process by which it works. They recommend an emotional task analysis to understand how EQ works in different jobs.

- Researchers need good measures of the criterion job behaviour; they need to look at facets or components of EQ, and they need to measure other variables like IQ or personality traits.

And their final conclusion is this:

> Despite the important role attributed to a wide array of emotional competencies in the workplace, there is currently only a modicum of research supporting the meaningful role attributed to EI (and nested emotional competencies) in determining occupational success. Many of the popular claims presented in the literature regarding the role of EI in determining work success and well-being are rather misleading in that they seem to present scientific studies supporting their claims, while in fact failing to do so. In short, despite some rather fantastic claims to the contrary, the guiding principle appears presently as "caveat emptor" (p. 393).

As every year passes the number and quality of papers on EQ grows. Many of the naïve, even outlandish, claims of the small army of EQ consultants have been empirically challenged and found wanting. However there is now sufficient good and hard evidence to suggest that EQ indeed does relate to success at work (and in life). The question is what other factors are involved and how the process works. Equally important is the issue of whether EQ can be taught, trained and improved.

Training EI

Despite the popularity of EI (witnessed by a quick websearch) and the many claims that EI (which is so important in business) can be trained, there is surprisingly little disinterested, empirical evidence of how this is best done and whether it succeeds in raising scores/skills that endure over time and across situations.

Matthews et al. (2002) note the part of evidence for training programme efficacy. They note that much of the EI literature is essentially aimed at stress reduction. They believe there remains no evidence as to whether emotional skills can be effectively taught. A sceptic with a long memory looking at programmes aimed at teaching EQ may easily be forgiven for thinking it owes a lot to ideas derived from social skills training (SST).

In Great Britain. SST emerged out of applied occupational psychology (Welford, 1981). Social psychologists borrowed the concept of skill from researchers interested in such things as performance in the workplace, typing, and the operation of automated plants. Social behaviour was, thus, seen to be a skill. It could be decomposed into specific parts, it could be trained, shaped and improved. In pursuing this analogy between motor and social skills, Argyle (1978) simply borrowed a simple motor skills model and adapted it to his purposes: "I want to suggest that there is a useful analogy between motor skills like riding a bicycle, and social skills, like making friends, conducting conversations, and interviewing. In each case, the performer seeks certain goals, makes skilled

moves which are intended to further them, observes what effect he is having, and takes corrective action as a result of feedback" (p. 63).

One of the most popular forms of "psychological" therapy, practiced in a wide range of settings and with a wide variety of patients, is social skills training (SST). SST has been performed in schools, prisons, mental hospitals, and outpatient clinics with patients or clients including schizophrenics, neurotics, criminals and delinquents, alcoholics, and drug addicts as well as children and adolescents, professional groups, and mentally or physically impaired individuals (Furnham, 1990).

It is important to note that some observers complained that a unified, coherent, or consistent theory of the origin or process of social skills functioning does not exist; others that there were mutually competing or exclusive theories; still others that the theories that exist are weak or inadequate; and finally some argue that though there are adequate theories, practitioners ignore them.

Clearly there are different approaches to SST because they have grown out of different branches of practice from micro-teaching to psychopathology, each with a different theoretical, practical, indeed epistemological, base. Ellis and Whittington (1981) have suggested that there are four basic approaches to human learning that are reflected in the various SST programmes that exist:

(A) *Conditioning*: This is clearly the application of behaviourist theory and therapy to social behaviour, which might include verbal behaviour, gross motor behaviour, or the minutiae of nonverbal behaviour. Through operant of classical conditioning the trainer seeks to shape social behaviour to some socially desirable and accepted norm. "It should be noted at this point, however, that many of the necessary characteristics of the SST as a procedure for skill acquisition can be traced back to the conditioning paradigm. Thus, it is basic to SST that skills can be operationalised in terms of observable behaviour, that skills reduced to sub-skills are more easily acquired (and can be reconstituted by the trainee) and that reward (or at least association of appropriate response with pleasant consequences) is an important aspect of training" (p. 23). As one may expect, because motor behaviour is more observable than cognition, conditioning has been particularly successfully applied to nonverbal behaviour, such as eye gaze, gross body movements, smiling, and gestures.

(B) *Cybernetic*: The critical aspect of this feedback approach includes an emphasis on the planned control of behaviour and the modification of cognitive strategies or tactical plans in the light of environmental feedback or knowledge of the consequences of action. This model is strictly based on a cognitive view of learning that explains skills' acquisition and maintenance in terms of unobservable internal events that can, and must, be inferred from external events. This approach differs from the previous one because it admits (indeed, finds essential) internal events; it accepts negative (as well as positive) feedback as being useful and because feedback is thought to be intrinsically motivating. This approach is without doubt one of the most

popular in the area because it stresses both the importance of cognitive variables like goals, scripts, and plans and emphasizes the importance of feedback from others as a function of the behaviour itself.

(C) *Experimental*: This approach draws of such techniques as role play, psychodrama, T groups, and experimental groups and insists that in order to learn, people need to be exposed to an appropriate range of problem situations. People who are inadequate or unskilled are assumed to have not experienced enough, or any, of the situations that would allow them to learn. There is a strong idiographic streak in this approach that insists on wide individual differences and uniqueness, such that each person has to learn his or her particular solutions to everyday problems. Thus it is not assumed that any form of conditioning or feedback will help an individual, but rather that he or she has to "work out" the appropriate skills for him- or herself. The popularity of this approach, however, is not great.

(D) *Teleological*: "In the teleological paradigm it is assumed that analysis of, and subsequent commitment to, ends automatically generate effective means, and, furthermore, that explicit concern with means might inhibit creative and effective pursuit of ends. Thus a trainee would be encouraged to consider at length the purpose and patterns of effective interactions in his own technology of behaviour change to bring about improvement" (Ellis & Whittington, p. 26). The training that follows from this approach is, at one extreme, entirely theoretical in that trainer and trainee discuss possible behaviours in hypothetic situations. Again, the SST that follows from this approach is more armchair or couch-based than that found in the conditioning or cybernetic paradigm.

The methodology one uses to investigate or experiment with social skills is a function of the approach one takes. Hence, researchers following the conditioning or cybernetic paradigm are likely to use empirical methods while those following the experimental or teleological models are likely to find an analytic or paradigm more appropriate. Because of the diversity of approaches it is difficult to offer an all-encompassing critique of social skill theory. Nevertheless, some attempt will be made for four reasons: Firstly, the criticism highlights differences between the various approaches. Secondly, because theory is the foundation of methodology and therapy, it is hoped that increasing theoretical sophistication would lead to improvements in the research and practice of SST. Thirdly, by highlighting the major areas of concern, a more programmatic research pattern into a highly diversified area may be encouraged. Finally the criticisms may reveal the role of movement skills in SST more clearly.

A current challenge is to examine EQ training. Whilst the web boasts huge numbers of courses available there seems to be very few academic books or papers that even describe the best ways to train EQ and why. This would allow a reviewer to try to understand the paradigm within which the trainer was working. More importantly, perhaps, there seem few or no studies that have demonstrated

the efficacy of EQ training. There is an extensive literature on training social skills and problems associated with it.

Criticism included variations in the assessment and training method, the possibility of therapist effects, the neglect of taking into account individual differences, confounding effects of other programmes, and definition of the measure of change. Many saw as the Achilles heel the problem of generalisability of the training over time, situations, and skills. Those few studies that did long term evaluations of the efficacy of the training showed that rapidly acquired skills soon deteriorated. There were also many concerns with the cultural sensitivity of SST (Furnham, 1990).

The Components of Social Skill

One of the problems of the heterogeneity of definitions and traditions in SST was that each writer makes a different list of skills that constitute social skills. The same is very clearly true of EQ. Ellis and Whittington (1981) have referred to a "compendium of skills" when reviewing the lists of skills necessary in various training courses. These lists vary considerably in length, generality, etc. Compare the skills highlighted by Trower, Bryant, and Argyle (1978) (Observation, Listening, Speaking, Meshing, Expressing Attitudes, Social Routines, Tactics and Strategies, and Situation Training) with those of Hargie, Saunders, and Dickson (1981) (Nonverbal communication, Reinforcement, Questioning, Reflecting, Set Induction and Closure, Explanation, Listening, and Self-Disclosure). The types of items included appear to relate to the background of the writer – hence Trower's list has a clinical flavour and Hargie's an educational theme. The precise number of skills specified appears to be randomly determined. Even within some skills lists there are surprising incongruities.

Ellis and Whittington (1981), in an attempt to conceptualise the different dimensions along which skills appear to vary, have noted four:

(1) *Inference:* Low inference skills are easily observable and recordable whereas high inference skills such as sincerity require inference to be made from behaviour.
(2) *Molecularity:* Molecular skills such as mutual eye gaze are irreducible elements of interaction, whereas molar skills such as empathy or giving explanations are an amalgam of more molecular skills.
(3) *Specificality:* Situations-specific skills are relevant and appropriate only in a limited range of situations, whereas generic skills are relevant in very many situations.
(4) *Interactiveness*: Some interactive skills explicitly require the person to mesh his behaviour with that of others, whereas this may also be done implicitly.

Hence, there was little consensus on the list of skills, their prevalence, how they may be recognised, or how they relate one to another logically and

sequentially. As Romano and Bellack (1981) have pointed out, "There is little empirical support for the particular components typically assessed as indices of social skill. These diverse response elements have been selected for study on the basis of face validity and general examination of the literature on interpersonal communication rather than on objective analysis of the various molar skill categories. Therefore, they may not represent the behaviours that actually contribute to social competence... The need for a clearly defined and operationalised set of behavioural referents of social skill has been noted by a number of researchers. Not only is it vital that the behaviours comprising social skill be specified but their optimal combination and weighting across different situations must be determined as well" (p. 479).

Continuous ambiguity as to the definition or operationalisation of social skill means that SST subsumes a huge variety of techniques, ranging from behaviour therapy to non-directive counselling, which have been directed at widely different behaviours. The same is true for EQ today.

There exists still no agreed-upon definition of social skills. To some extent this should not cause concern as there also exists no agreed-upon definition of psychology itself. Yet the plethora of very different definitions, some very specific and others very general, some coming obviously from a behavioural tradition, others from a more psychotherapeutic tradition, mean that under the flag of social skills one finds a very heterogeneous flotilla. For Curran (1980), "The major problem which we must face squarely in the years to come is the definitional questions: What is social skill and how can we best delimit and measure its components?" (p. 348). This was said 25 years ago after 15 years of research. The problem exists today for those who still call their enterprise SST. One very interesting issue remains the extent to which this pattern will occur all over again for EQ, which seems at least to the casual outsider as very similar to SST in its training aims, ambitions, and ideas.

The Future of Organisational EI

We are people of the heart and the head, affect and cognition, emotion and ideas. The two closely interact. To the outsider, business looks like primarily a cognitive enterprise. Certainly an inspection of a business school MBA programme would suggest that the heart of management is, indeed, in the head.

The EI movement certainly chimed with people's everyday experience. Perhaps every generation discovers this. Fifty years ago people would talk of charm or insight or a personal touch. Twenty-five years ago it was called interpersonal or social skills. Now it is called EI. It has always meant two things: sensitivity to oneself and others, and flexibility in dealing with others.

The charming, socially skilled, emotionally literate manager understands emotions, where they come from, how they manifest themselves, their consequences. They are both self-aware and aware of others. This makes them literate but not necessarily skilled. They need to know how to deal with those emotions,

how to harness their force, and, where appropriate, and reduce their damaging consequences.

Between 1975 and 2000 there was a great social skills industry. Moreover there were theoretical developments and many serious attempts to investigate the claims of those who saw SST as the (partial) solution to a huge number of social problems from marital break-up to managerial stress. It took time to carefully test the claims of enthusiasts always eager to promise the earth.

Yet it seems at least in the world of business consulting, ideas and concepts need to be re-branded, relabeled and repackaged every generation. Thus it could be argued that EI is almost identical to social skills. If so it would be wise for researchers to consult that rich literature to save wasted time and energy.

The social skills literature showed it was possible to train social skills and that they did result in greater happiness, adjustment, and productivity. But there were many caveats, and nearly always the claims of many trainers seemed greatly exaggerated. Much depended on which skills were targeted, how they were taught, and how they were reinforced. The same no doubt applied to EI.

The work psychologist interested in the role of EI faces considerable problems of measurement as there remains little consensus on how to measure EI or, indeed, precisely what it is: a trait or an ability? Nor is there any agreement about the aetiology of EI. Despite this the following issues are important for researchers in the field.

1. *The dependent variable*: What is EI most related to at work? Task vs contextual performance? Positive variables like productivity and satisfaction, or negative variables like stress and counter-productive behaviours. These need to be carefully thought through and measured validly.
2. *Direct and indirect relationships*: Is EI a direct, moderator, or mediator variable. Inevitably there are multiple determinants of the work behaviour. The question remains as to how EI impacts along with other variables.
3. *Curvilinear relationships*: It is often assumed that EI, like many other abilities, is linearily related to work success: i.e., "the more the better". However, there is now considerable evidence for the optimal hypothesis, which is the idea that EI might be curvilinearly related to success at work.

This volume attests to the liveliness of the research interest and debate in EQ. There are, indeed, advances in this area, but those who forget history are, it is said, condemned to repeat it. Many managers at work are looking for "silver bullet", magic, quick, cheap solutions to their often intractable people problems. Being emotionally literate and skilled inevitably helps all sorts of problems at work. But we await careful, disinterested evidence both for how to train EQ as well as precisely how it operates in the workplace.

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Performance Based Measures and Practical Validity

John Reid

Much has been assumed about the advantages of being high in Emotional Intelligence (EI), but how does Emotional Intelligence manifest itself in the real world? Does it comprise good character and maturity (Goleman, 1995, 1998), superior intrapersonal and interpersonal skills (Gardner, 1999), or wisdom and the ability to manage others (Thorndike, 1920)? The term EI has been used to encompass a wide variety of constructs; for example, Constructive Thinking has been proposed as the foundation of EI (Epstein, 1998). And if it were possible to settle on a concrete definition of the real-world behavioural manifestations of EI, what vocations and roles would high EI be valuable for? This chapter attempts to shed some light on these important issues for the EI research community.

The popular interest in EI was sparked by Daniel Goleman in his seminal publication "Emotional Intelligence: Why it can matter more than IQ" (Goleman, 1995), with claims that EI could explain up to 80% of the "factors that determine life success" (p. 34). This publication heralded in a new era of recognition of the importance of emotional competencies in work and life success. Prior to this, the dominant theme was that cognitive ability, that is, General Mental Ability (GMA) or IQ was the dominant factor in determining success at work (e.g., Hunter & Hunter, 1984; Schmidt & Hunter, 1998) and in life (e.g., Herrnstein & Murray, 1994).

Compared with EI, the research on human cognitive abilities is mature; the construct of GMA (*g*) is well established as a reputable psychological construct with at least 100 years of research dating from Binet in 1900 to support it (e.g., Carroll, 1993; Mackintosh, 1998; Binet & Simon, 1911). EI on the other hand has less than 20 years of research behind it, and it has been hampered by a variety of operationalizations that fall under the broad categories of performance EI and self-report EI (e.g., Salovey & Mayer, 1990; Bar-On, 1997). It would appear that in the excitement of expounding the new EI concept, and for some, the lucrative opportunity to sell and administer EI tests,

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fundamental psychometric concepts like construct and convergent validity have been overlooked.

While GMA has always had the clearly defined criterion of academic ability – in the form of examination results to validate IQ tests and thus establish convergent validity, no such "gold standard" criterion exists for EI. Bar-On designed the EQ-i test as "a self-report measure of emotionally and socially competent behaviour" (Bar-On, 2000, p. 364) without providing a tangible criterion against which the test could be validated. Salovey and Mayer defined EI as the ability to "accurately perceive, use, understand and manage emotions" (Mayer, Salovey, & Caruso, 2002, p. 1), once again without providing a criterion against which MSCEIT or any other EI test could be validated. Without a clearly defined criterion of performance it is difficult to demonstrate convergent or construct validity for EI tests.

This has led to a situation where results from the two predominant EI tests, the MSCEIT (Mayer et al., 2002), and the EQ-i (Bar-On, 1997), appear to measure different things. This has been demonstrated in at least two studies where the correlation between the MSCEIT and the EQ-i was low ($r = 0.22$), representing a shared variance of less than 5% (Brackett & Mayer, 2003; Reid, 2007). Although no clear correlation cut-offs are suggested for convergent validity (e.g., Anastasi & Urbina, 1997), it would be appropriate to expect different tests of the same construct to have moderate-to-large correlation coefficients, that is, greater than 0.30. By comparison, IQ test results between WAIS-III and SB-IV demonstrate convergent validity with a high correlation ($r = 0.88$) (Wechsler, 1997). This represents a shared variance of 77%, thereby providing strong evidence that these two IQ tests are indeed measuring the same psychological construct. When we compare the miniscule 5% overlap between the two leading EI tests with the 77% overlap between reputable IQ tests it is clear that the EI construct has not yet been clearly defined.

The EQ-i and the MSCEIT are not the only tests to consider when establishing EI construct validity, as a brief but incomplete list of current EI tests demonstrates: the Assessing Emotions Scale (Schutte et al., 1998); the Emotional Intelligence Appraisal (EIA) (Bradberry & Greaves, 2004); the Trait Meta-Mood Scale (TMMS) (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995); the Emotional Competence Inventory (ECI) (Boyatzis, Goleman, & Rhee, 2000); the Genos EI assessment scale (Palmer & Stough, 2001); and the full and short-form versions of Trait Emotional Intelligence Questionnaire (TEIQue) (Petrides, Perez, & Furnham, 2003). These EI tests have different factorial structures ranging from 4 to 15 subfactors, and widely-varying item counts ranging from 28 (EIA), to 133 in the EQ-i.

In the absence of a "gold standard" criterion for EI tests, those who are interested in scientifically validating the EI construct are left in a position of having to empirically determine what this elusive construct actually measures (Davies, Stankov, & Roberts, 1998). Although Mayer et al. assert that EI meets traditional standards for an intelligence (Mayer, Caruso, & Salovey, 1999), this assertion is difficult to defend when we do not know what EI tests are actually

measuring, that is, there is no criterion-related validity. And looking further forward, is the EI construct a unitary construct such as general intelligence (*g*) (Carroll, 1993), or a loosely-related family of constructs (Ciarrochi & Godsell, 2006) such as the five-factor model (FFM) of personality (McCrae & John, 1992)? Bar-On (1997), for example, does not claim that EI as measured by the EQ-i meets the standards for a traditional intelligence, but simply describes his measure as a set of factors that are assumed to be positively related to emotional health (Bar-On, 1997). Since the EQ-i comprises 15 diverse subfactors, it is appropriate to question whether the subfactors share enough common variance to support a general EI factor.

Bar-On, who authored the EQ-i test comprising 15-factors, defines EI as "a self-report measure of emotionally and socially competent behaviour that provides an estimate of one's emotional and social intelligence" (Bar-On, 2000, p. 364). The 15 subfactors are summed to produce an overall EQ score. They may be weighted before summation, but we have no insight into the scoring algorithm as this is proprietary; tests must be sent to MHS (2006) for scoring. But the question arises regarding the validity of summing diverse EI factors, such as Empathy and Impulse control to produce a total score. It is possible that that these constructs are orthogonal, and it is therefore not appropriate to simply sum them.

This brief introduction sets the background to the author's research, where an attempt was made to first determine what EI tests measure by using a criterion, and second, to determine whether EI subfactors combine to form a unitary construct; that is, is it valid or useful to sum the subfactors to produce a global EI score? From this point on, this chapter will cover the criterion validity studies that were conducted using a wide variety of EI tests, including the MSCEIT and the EQ-i.

Study 1 – EI as It Relates to Maturity and Character

Goleman proposed that "There is an old-fashioned word for this growth in emotional intelligence: *maturity*" (1998, p. 7) and that, "emotional intelligence represents: *character*" (1995, p. 285). This study used these general definitions of EI proposed by Goleman to rate behavioural characteristics exhibited by participants in an interview, using a methodology similar to that employed by Ford and Tisak (1983).

In the search for a social intelligence (SI) factor, Ford and Tisak (1983) managed to isolate a "distinct social intelligence factor" (p. 196) – a unique outcome that had not been demonstrated since Thorndike had first proposed the existence of the Social Intelligence (SI) construct (Thorndike, 1920). Ford and Tisak administered a battery of social competency, personality and academic intelligence measures to participants, followed by a behavioural interview to assess each participant's SI. Factor analysis subsequently demonstrated a unique SI factor that was divergent from personality and academic scores.

This study followed the Ford and Tisak methodology and examined how maturity and good character, measured in an interview situation, related to a variety of EI scales and general tests. This maturity and good character score – the brief evaluation of behaviour (BEB) – was derived from a 5-minute videotaped interview of each participant rated by four independent judges. This became the criterion against which all putative tests of EI were evaluated. The rationale for the study was that if EI tests correlated positively with the behavioural observation of maturity and good character, it would provide confirmatory evidence for the unsubstantiated assertions offered by Goleman (1995, 1998). It would also furnish experimental evidence for the capability of EI tests to predict the behavioural outcome of maturity and good character. Moreover, the actual magnitude of the variance explained would indicate whether EI tests have sufficient predictive validity to be utilised in workplace selection or similar applications. To set a benchmark for what is sufficient predictive validity, Mayer et al. have proposed that constructs that explain an additional 5% of the variance beyond existing psychological constructs are worthy of further research (Mayer, Salovey, & Caruso, 2000).

One hundred and three first-year psychology students (75% female, mean age 22.5 years, SD=4.17), from the Department of Psychology, Macquarie University, took part in this study as part of their course requirements. The TMMS (Salovey et al., 1995), the AES (Schutte et al., 1998), the TEIQue-SF (Petrides & Furnham, 2004), an emotional competence assessment ECA (Reid, 2007), plus facial emotion recognition (Matsumoto et al., 2000) and vocal emotion (Scherer, Banse, & Walbott, 2001; Scherer, 2002) composed the putative EI tests in the battery. The ECA was based on the four-factor structure of the EIA (Bradberry & Greaves, 2004); developed at Macquarie University and normed on 800 students. Additional tests covering a range of personality and psychological domains were also administered to establish convergent and divergent validity with the EI tests; the criterion being derived from a videotaped brief evaluation of behaviour (BEB) of the participant. The BEB criterion of maturity and good character was rated in a 5-minute videotaped interview by four judges. All measures exhibited reasonable alpha reliability of 0.7 and above, and the videotape judges achieved a high interrater reliability of 0.90 for the BEB criterion.

The outstanding EI test was the Voices performance task (Scherer et al., 2001) explaining 10% of the variance in the BEB criterion, and continuing to explain 10% of the variance after controlling for personality and IQ. An attempt was made to replicate the predictive validity of the Voices task using the DANVA voices (Nowicki & Duke, 2001); however, low alpha reliability of the test and minimal correlation with the criterion rendered it unsuitable for the task. The other performance task, the facial emotion recognition task (Ekman, 2003), loaded on the IQ factor in factor analysis (FA) and SEM confirmatory FA studies (see also Roberts et al., 2006), and thus appeared to be part of general intelligence rather than an EI factor.

The other global EI measures were only able to explain less than 7% of the variance in the criterion. However, a hierarchical multiple linear regression (MLR) analysis using EI subfactors, personality, and IQ markers as predictors was able to explain 26% of the variance in the BEB criterion. After controlling for personality and IQ, the EI subfactors were able to account for a significant 13% of incremental variance.

None of these figures approach the potential 80% of variance that Goleman (1995) proposed that EI could explain, which could indicate one of two things. Perhaps *maturity* and *character* is just too difficult to measure, or perhaps it does not capture the essential essence of EI. The use of four judges who achieved an interrater reliability of 0.90 would suggest that a behavioural criterion was being reliably captured, but this appeared to be only loosely related to the domain that the EI tests (TMMS, AES or the TEIQue) were measuring.

Summary. The 13% of incremental variance contributed by EI subfactors surpasses Mayer's benchmark of an additional 5%, and substantiates the value of including EI tests in the battery. However, the fairly low correlations between global EI scores and the criterion tend to indicate either that maturity and character are vague constructs, too difficult to capture reliably, or that the EI tests utilised were measuring something different. Thus, the following studies were designed to focus on more tangible, real-world criteria.

Study 2 – EI as It Relates to Academic Achievement

It has been proposed that success in the first year of university requires skills that go beyond the academic skills used to select for entrance to university (e.g., Gardner, 1983, 1999; Mayer & Cobb, 2000; Schutte et al., 1998; Schulze & Roberts, 2005; Brackett & Mayer, 2003; Petrides, Frederickson, & Furnham, 2004) and these skills may help explain "why smart students fail" (Saklofske & Parker, 2005, p. 177). The problems that confront first-year students, as they attempt to complete their studies, go beyond academic intelligence capabilities and cover a wide range of issues such as loneliness, loss of the peer support group from high-school, relationship break-ups, and financial difficulties (see Thoits, 1991). The skills to identify, manage, and repair emotions, the basis of EI, would therefore appear to be major contributors to success and avoiding dropping out. The restricted range of IQ that arises from university selection procedures provides little variance for performance prediction using IQ alone, while other emotional-related and personality variables potentially provide more variance to predict success (see Goleman, 1995; Mackintosh, 1998).

This second study examined the predictive properties of EI and other general tests as predictors in an MLR analysis, using first-semester psychology 1 (PSY101) results as the criterion, to explore the hypothesis that EI had a significant and positive relationship with academic success. The methodology employed in this study was similar to that used in the previous study using 103 first-year students.

The global EI scores alone did not appear to be significant predictors of academic results; the TEIQue and the ECA had low and insignificant correlations with the PSY101 criterion, representing a variance explained of 3% and 1% respectively. However, by adding the EI subfactors from the TEIQue-SF and the ECA to the FFM personality and IQ baseline predictors, a significant 11% of incremental variance was explained by EI subfactors. This final model, explaining a total of 34% of variance in the PSY101 criterion, appeared to have some utility as a model to predict academic performance by using the EI subfactors in addition to personality and IQ.

Summary. EI subfactors were able to explain a significant 11% of incremental variance in an academic criterion over and above traditional measures of IQ and personality. It would be valuable and informative to explore this potential in more detail over a wider range of academic subjects.

Study 3 – EI as It Relates to Sales Performance

Emotional Competence, based on abilities from the EI domain of skills, is the key to "outstanding performance at work" (Goleman, 2001, p. 27). Emotional competencies are learned skills; however, they require a general ability in EI before they can be developed (Goleman, 1998, 2001). Within a particular job category such as sales, EI will be a stronger predictor of the "star salesperson" than IQ (Goleman, 2001, p. 24). IQ only explains up to 20% of the performance variation in job success, leaving other factors, specifically EI, to account for the remaining 80% of the variation in performance (Goleman, 1995, 1998). These claims appear compelling to organizations attempting to improve the productivity and performance of their staffs through Emotional Competence training and better selection procedures for new staff members.

When comparing the performance of the average employee with those performers in the top 15%, it was found that the top employees were up to 120% more productive than an average employee (Hunter, Schmidt, & Judiesch, 1990). Sales vocations fall into the high range, where top performers typically sell more than twice the value of average performers. This can lead to an outstanding return on investment for the company involved; in one example, a top performer sold 120% more than average performers and returned additional value equivalent to 88 times his current salary (Goleman, 2001).

This productivity increase was also reported in a study involving 44 companies such as AT&T, IBM, and PepsiCo, where it was found that salesmen in the top-performing 10% group sold more than twice that achieved by average performers (Goleman, 1998). The competencies embodied by the top performers were not IQ related, but were found to be soft interpersonal skills such as Initiative, Empathy and Influence. For want of a general definition of these soft skills, they are usually categorised as EI skills, especially by advocates for the concept (e.g., Goleman, 1998; Cherniss, 2004; Boyatzis et al., 2000; Bar-On, 1997).

The studies cited above only loosely associate the performance of the top sales performers with EI, because EI is broadly defined as "other characteristics" that are not related to IQ (Goleman, 1995, p. 34). Watkin (2000) asserts that EI, not IQ, is the best predictor of superior performance, superior leadership, and the key to emotionally intelligent organizations; yet he fails to supply rigorous definitions or empirical data to back up these assertions. Cherniss (2000, 2001) claims that Emotionally Intelligent managers have less employee turnover, develop staff in a superior manner, promote emotionally intelligent teamwork, and enable people to perform more effectively – again, without published empirical data to back up these claims.

Cherniss (2004) reported on a Hay/McBer study that a national insurance company found that representatives who were strong in at least 5 of 8 emotional competencies sold policies twice the value of the remaining representatives. This study was conducted in a closed environment, and no statistics or definitions of EI were provided to enable examination of this claim in detail. In summary, it appears that an array of claims have been made without a clear operational definition of EI, without peer-review or published statistical data to back up the claims (Matthews, Zeidner, & Roberts, 2002; Matthews, Roberts, & Zeidner, 2004).

This study, therefore, attempted to validate these claims using established EI tests, the Bar-On EQ-i and the TEIQue-SF, plus a variety of personality and IQ markers to determine if EI had a positive relationship with, and could potentially predict sales performance. The criterion of performance was derived from a ranked list of the Sales Representatives, ordered from the highest performer to the lowest performer. The ranking was not simply based on dollar volume of sales, due to the disparate opportunities in different regions, but rather, on consistent performance with respect to the potential of the sales territory. The ranking was transformed into a normal distribution using SPSS to enable parametric statistics to be performed.

Seventy one male technical Sales Representatives (mean age 37-years, SD=8.8) from a power transmission equipment company took part in this study. A total of 110 Sales Representatives were invited to participate, with the final participation rate of 71 staff (65%) lower than expected due to some remote access computer difficulties. Results indicated a low zero-order correlation of 0.10 and 0.06, respectively, between the EQ-i and TEIQue global scores and the sales performance criterion – global EI thus explaining less than 1% of the variance. The best predictors of sales performance were Extraversion and Age with zero-order correlations of 0.36 and 0.34 respectively; that is, explaining 13% and 12% of the variance respectively.

On the other hand, when the EI subfactors of the EQ-i and the TEIQue were treated as independent factors, like the FFM personality factors, MLR indicated that these subfactors could account for up to 38% of the variance in the sales performance criterion. Using hierarchical MLR, the FFM of personality accounted 16% of the variance, IQ accounted for 2% of incremental variance,

and the subfactors of the EQ-i accounted for an additional 22% of incremental variance amounting to 40% of variance explained overall.

These results clearly indicate that while the global EQ-i score only explained 1% of the variance in the sales performance criterion, the subfactors of EQ-i explained 38% of the variance; further, the EQ-i subfactors still explained 22% of the variance after controlling for personality and IQ. These results indicate that EI subfactors can be utilised to explain incremental variance beyond personality and IQ, by using the subfactors as independent entities like the FFM factors of personality.

To further test the hypothesis that combining independent EI subfactors to produce a global EI score diminishes the effectiveness of EI as a predictor, a similar exercise was conducted with the FFM of personality. McCrae asserts, "EI should be associated with low scores of neuroticism and high scores for extraversion, openness, agreeableness and conscientiousness" (McCrae, 2000, p. 266). As noted above, an MLR analysis found that the five separate factors of the FFM of personality accounted for 16% of the variance in the sales performance criterion. When the FFM factors of personality were summed as per McCrae's suggestion above to produce a global FFM score (i.e., global_FFM = E + O + A + C – N), this score explained less than 2% of the variance in the sales performance criterion. Of course, it is normal practice to keep the five factors separate and not sum them as above as they are independent, almost orthogonal constructs. This exercise demonstrates that by treating personality factors as separate entities, more variance can be explained. EI also explains more variance if the subfactors are treated as independent entities, notwithstanding factor analytic studies that attempt to group them, and the common practice of summing the subfactors to produce a global EI score.

Summary. EI as represented by the EQ-i subfactors demonstrated concurrent validity with a sales performance criterion, accounting for 22% of the variance after controlling for personality and IQ. On the other hand, the global EQ-i score accounted for less than 1% of the variance, demonstrating that subfactors lose their predictive power when they are simply added together. Thus, a selected mix of weighted EI subfactors appeared to be more useful than global EI in establishing concurrent validity in a sales performance environment.

Study 4 – EI as It Relates to Call Centre Performance

In a study of 121 companies it was found that two-thirds of the abilities required for effective performance were emotional competencies (Goleman, 1998). In another study of medium-complexity job roles such as sales clerks, a performer in the top 1% was found to be 12 times more productive than an employee in the bottom 1% (Cherniss, 2004). Since two thirds of the abilities predicting superior performance are said to be emotional competencies, EI potentially has a major role to play in predicting employee productivity. Even in areas such as computer programming, where emotional competencies seem to have no place, it was

found that teamwork and collaboration abilities enable the top 10% of computer programmers produce three times the output of average performers (Goleman, 1998). For engineers involved in scientific research, EI qualities were four times more important than intelligence in predicting success and prestige (Goleman, 1998).

In an insurance environment, sales agents who scored high in emotional competencies such as self-confidence, empathy, and initiative typically sold policies twice the amount of the average policy (Goleman, 1998). In a cosmetics company, sales trainees who were chosen on the basis of their emotional competence were twice as likely to finish their training as employees not selected according to EI skills.

Although many of the claims made by Goleman (1998) and Cherniss (2004) loosely subsume anything that it is not IQ under the banner of EI, if the claims for the advantages accruing to emotional competencies can only be partially achieved, they are compelling and worthy of further examination. It was in the light of these statements that the following study was undertaken.

The sample chosen for this study consisted of 149 telephone claims consultants (83% female, mean age 33.5-years, SD = 9.8) from a major insurance company. The consultants are involved in negotiating new, and settling existing, insurance claims under conditions where the customer is often in an emotional state at the time of the call. The ability to communicate clearly and manage the customer's emotional state in these difficult circumstances would appear to be an ideal test of EI abilities; that is, to effectively manage emotions in both self and the customer. The characteristics required for the position include customer focus, communications ability, relationship building, influence and resilience. These skills closely map on to the EI domain, specifically interpersonal and intrapersonal skills (e.g., Bar-On, 1997; Goleman, 1995, 1998).

Three Emotional Intelligence (EI) tests, the MSCEIT, the EQ-i, and the TEIQue-SF, plus a variety of personality, general intelligence, and miscellaneous tests that were expected to correlate with employee performance were administered to the telephone consultants in a web-based survey. In addition, a report containing an overall performance indicator (PI) was provided by the managers for each employee. The performance indicator was used as the criterion of performance while the individual test scores from the telephone consultants were used as predictors in the analyses.

The zero-order correlations between the performance indicator (PI) criterion and the global scores for the MSCEIT, the EQ-i, and the TEIQue were –0.13, 0.10 and 0.10 respectively. The MSCEIT global EI score demonstrated a negative relationship, where higher performers (in terms of higher PIs) obtained lower scores on the MSCEIT. This result is contrary to the claim that EI predicts outstanding job performance (Goleman, 1998). The EQ-i and the TEIQue both exhibited a positive relationship with the PI criterion but, as also shown in study 3, the small correlation represented a variance explained by each EI test of less than 1%. By comparison, the variance in the PI criterion explained by a verbal IQ marker was 8%.

Using hierarchical MLR to determine the contributions of the three main psychological constructs, the FFM of personality explained 5% of the variance in the PI criterion, IQ accounted for an additional 6%, and the EQ-i factors explained a further 20% of variance, bringing the total up to 31%. The finding, that the EI factors explained the most variance even after controlling for personality and IQ, indicates the potential utility of EI in predicting employee performance. The MSCEIT subfactors were not explored further due to the concern that the MSCEIT global EI factor had a negative relationship with the performance indicator PI; the conclusion reached was that the MSCEIT had doubtful utility for further use in this application.

Summary. EI as represented by the EQ-i subfactors demonstrated concurrent validity with performance indicator criterion, accounting for 20% of the variance after controlling for personality and IQ. The global EQ-i score accounted for 1% of the variance and the MSCEIT had a negative relationship with the performance indicator criterion. These results demonstrate a very similar pattern to study 3, demonstrating once again, that EI subfactors lose their predictive power when they are simply added together to produce a global EI score. The EI subfactors appear to be more useful for establishing concurrent validity in a telephone sales-consultant performance environment.

Bringing It All Together

It is clear from Table 1 that the global EI scores, with the exception of the Voices task, explained less than 7% of the variance in the criterion of performance. With regard to global EI scores, tests with fewer diverse subfactors such as the TMMS (3) appeared to perform better than tests with a large number of

Table 1 Below summarises the EI validation findings from the four studies above

Criterion of performance	EI test	Variance explained by	
		Global EI score	EI subfactors[a]
1. Behaviour exhibiting maturity and good character	TEIQue-SF	5%	11%
	TMMS	7%	8%
	ECA	2%	1%
	AES	1%	1%[c]
	Voices[b]	10%	10%[c]
2. First-semester academic performance	TEIQue-SF	3%	11%
	ECA	1%	1%
3. Sales representative performance	EQ-i	1%	22%
	TEIQue-SF	1%	18%
4. Telephone consultant performance	EQ-i	1%	20%
	MSCEIT	1%[d]	19%

[a] Variance explained by EI subfactors after controlling for personality (FFM) and IQ.
[b] The Voices task is the only performance EI task that produced a noteworthy result.
[c] These constructs are unifactorial; that is, they are assumed to have no subfactors.
[d] The MSCEIT Total EIQ score was negatively correlated with the performance criterion.

subfactors, for example, the EQ-i (15). When the subfactors for the EI tests were used as independent predictors in a regression analysis, they explained significantly more variance – up to 20 times more variance than the global EI score could explain (examples 3 and 4). This result demonstrates that EI subfactors can add significant variance beyond IQ and personality when attempting to establish concurrent validity with a criterion measure. Mayer et al. (2000) set the bar at 5% incremental variance for new constructs; thus, the ability of EI subfactors to explain up to 20% of additional variance makes EI a worthy candidate for inclusion in test batteries when measuring human performance.

We have seen that EI operationalizations differ, as evidenced by the MSCEIT and EQ-i global scores only sharing 5% of common variance (Brackett & Mayer, 2003; Reid, 2007). The EI subfactors also measure different underlying constructs; thus, adding these subscales together appears to be analogous to adding apples and oranges. It has also been demonstrated that by artificially creating a single global FFM personality score, much of the predictive power of the five independent factors is lost. Clearly, the results above demonstrate that the summing of subfactors to produce a global EI score fundamentally reduces the effectiveness of EI as a predictor.

Conclusion

This research began with the intention of confirming the predictive properties of global EI scores, especially since Goleman indicated that EI could explain up to 80% of the variance of success in work and life criteria. The four studies conducted in this research, using widely recognised EI tests, found that global EI scores explained insignificant amounts of variance; typically less than 5%. The four studies found no evidence to support the assertion that a single, global EI factor was significantly related to work and life success.

With global EI scores explaining so little variance in real-world criteria, the question posed in the first paragraph, regarding how EI manifests itself in the real world, has no simple answer; these studies have found no evidence that the global EI score has construct validity, and thus, no single criterion to which it can be related. However, by using the EI subfactors and MLR analysis, a profile for a specific criterion can be produced. These profiles were found to contain different weights of EI subfactors for different job roles. In this regard, Bar-on et al. indicate that EI is entering an "EQ profiling" phase – developing specific models that will predict vocational performance and thus "improving human effectiveness and organizational productivity" (Bar-On, Handley, & Fund, 2006, p. 17).

Overall, this research did find that a mix of EI subfactors such as Self-control, Independence, and FFM personality factors such as Extraversion could explain up to 50% of the variance in a success criterion. This approaches the Goleman claim of explaining up to 80% of the variance, and certainly surpasses the 20%

of variance that IQ typically explains. But, some EI subfactors were negatively related to superior performance, thus refuting the claim that EI subfactors are all positively related to success and performance. EI subfactors appear to behave in a similar manner to other multifactorial inventories such as the MPQ, MMPI, 16-PF, and FFM personality theory. Thus, EI batteries can explain additional variance in a performance criterion by using EI subfactors as a multifactorial inventory, but the single, global EI score was found to have virtually no predictive validity.

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The Application of Emotional Intelligence in Industrial and Organizational Psychology

Peter J. Jordan, Jane P. Murray, and Sandra A. Lawrence

Business seems to be enamoured by the construct of emotional intelligence. The emotional intelligence framework has enabled managers to understand the contribution of emotions in creating desirable qualities in business such as enthusiasm, motivation, and affective commitment (loyalty), and how these can be enhanced in the workplace by influencing employees' affective abilities (Caruso & Salovey, 2004; Cherniss, 2001; Cherniss & Adler, 2000). At its most basic level, the emotional intelligence framework has provided business with a basis for implementing competencies that identify skills that enable employees to deal with emotions in the workplace. While enthusiasm for the potential of emotional intelligence is shared by many in the business community (Goleman, 2000, 2004), there are those working in and with business who have some level of psychological training and cannot understand the attraction (see Murphy, 2006). Some of this can be linked to the varying conceptualizations of emotional intelligence (see Mayer, Salovey, & Caruso, 2000), while other criticisms emerge from the way in which emotional intelligence is measured (Conte, 2005; Landy, 2005; Locke, 2005).

In this article, we briefly outline the basis of this debate as it has largely been carried out under the rubric of industrial and organizational psychology. We also explain why, despite this controversy, emotional intelligence is so attractive to business. Using this groundwork, we then move on to examine the Organizational Psychology domain and research evidence that links emotional intelligence to the specific employee behaviors and interactions of stress and coping, leadership and conflict management. We then explore research evidence linking emotional intelligence to the Industrial Psychology domain and the specific factors of training and development, and recruitment and selection. We conclude our review with an assessment of research that is of concern to both the Industrial and Organizational Psychology domains: the links between emotional intelligence and individual and group performance. In finalising this

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chapter, we draw attention to future research directions for emotional intelligence research in industrial and organizational psychology, which, if pursued, will have wide-reaching implications for business more generally.

History of Emotional Intelligence in Business

It is now over 10 years since Daniel Goleman (1995) first popularized the concept of emotional intelligence and over 15 years since the construct was first proposed by Peter Salovey and Jack Mayer (1990). The emotional intelligence construct since that time has been the subject of intense interest from broad sections of the community. Indeed, these areas are represented in this book and include the relationship between emotional intelligence and education (Parker, Saklofske, et al., Chapter 11); clinical psychology and counselling (Ciarrochi et al., Chapter 12); health (Austin & Saklofske, Chapter 13); sports (Downey & Clements, Chapter 14); and business. The area in which the greatest growth in popularity has occurred, and indeed the arena of the greatest controversy over its incremental validity over existing psychometric measures, is in the area of business. Jordan, Ashkanasy, and Ashton-James (2006) argue that the intense interest in emotional intelligence applications in business is the result of two factors: (1) the desire of businesses to find new ways of gaining performance improvements, and (2) the desire of managers to be able to predict behavior in the workplace.

There can be no doubt that no single recent psychometric construct has resulted in so much controversy over such a short period. Indeed, vigorous debates around this construct have emerged in organizational behavior (OB) (see Ashkanasy & Daus, 2005; Daus & Ashkanasy, 2005; Landy, 2005) and in industrial and organizational (I/O) psychology (see Jordan et al., 2006; Murphy, 2006). The debate over the efficacy of emotional intelligence as a construct has produced entire books devoted to this controversy (e.g., Matthews, Zeidner, & Roberts, 2002; Murphy, 2006). Similar interest has been generated by the efficacy of instruments to measure emotional intelligence.

The significant debate over the measurement of emotional intelligence in industrial and organizational psychology has occurred for several reasons. First, the field of I/O psychology has been dominated by extensively trained and well-qualified individuals, all of whom have a stake in the measurement of psychological constructs. This is really their bread and butter. Consequently, when new measures or new constructs are offered to the field, they are heavily scrutinised and assessed against strict criteria. Primarily there are 3 questions that need to be answered to convince I/O psychologists of the need for a new measure: (1) Does it have face validity?; (2) Are their other measures that are already measuring this construct?; (3) How sound are the psychometric (validity and reliability) properties of the new instrument? The failure to adequately address any one of these questions automatically raises suspicion in the I/O Psychology community.

To be fair to the critics of emotional intelligence – early measures of emotional intelligence failed to answer most of these questions in a rigorous and consistent way. Some of this failure can be attributed to the relatively recent development of the concept and the time required to conduct a set of rigorous validation studies. Other explanations are linked to the commercial focus of some of the instruments. The rationale given for this generally is that the instrument is a commercial product and subject to commercial sensitivities that restrict open peer review and rigorous psychometric testing. The good news is that these early deficiencies in the measurement of emotional intelligence are being overcome as indicated in the earlier chapters of this book.

This being said, there have been problems. Prominent critics of emotional intelligence who have significant profiles in industrial and organizational psychology (e.g., Landy, 2005; Locke, 2005) have focused, in particular, on the shortcomings of the more popular models of emotional intelligence and some of the more extravagant claims regarding the performance benefits of emotional intelligence made by advocates such as Goleman (1995). These debates are now moving away from focusing on the sensational aspects of emotional intelligence towards a consideration of more rigorous methodical approaches to examining the construct. Drawing on work done outlining the process of construct development by Karl Weick (1989), we argue that emotional intelligence is still in the early stages of construct development. Weick (1989) argues that the early success of any construct is determined by the development of relatively comprehensive, believable relationships that apply the most parsimonious solution. In the next section, we examine the constructs of emotional intelligence that have been most widely used in business settings.

Definitions of Emotional Intelligence in the Workplace

As the conceptual definitions of emotional intelligence and the measurement of emotional intelligence are being reviewed extensively by other respected researchers in this book, we will briefly outline some broadly used definitions in the business community and point to the commonalities that exist between them – commonalities that are used by businesses to justify their enthusiasm for the construct.

Authors have recently provided a clear distinction between the various models of emotional intelligence. Mayer et al. (2000) make a distinction between ability models of emotional intelligence that are based on the link between emotion and cognition, and mixed models of emotional intelligence, which they argue include aspects of personality as well as intelligence. Jordan (2007) makes a similar distinction between what he refers to as core emotional intelligence abilities (i.e., those abilities in line with Mayer & Salovey, 1997; Mayer et al., 2000) and the 20 or so competencies that researchers such as Goleman (1995), Bar-On (1999), and others, see as linked to emotional intelligence.

In developing a method for categorizing measurement methods in emotional intelligence, Ashkanasy and Daus (2005) develop a persuasive argument that emotional intelligence research can be divided into 3 basic research streams, with Stream 1 using research that conforms to the Mayer and Salovey (1997) ability model of emotional intelligence measured using the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT: Mayer, Salovey, Caruso, & Sitarenios, 2002). Stream 2 incorporates research based on the Mayer and Salovey (1997) ability model of emotional intelligence but uses self- or peer report to measure the construct (e.g., Trait Meta Mood Scale (TMMS): Salovey, Mayer, Goldman, Turvey, & Palfai, 1995; Workgroup Emotional Intelligence Profile (WEIP): Jordan, Ashkanasy, Härtel, & Hooper, 2002; Swinburne University Emotional Intelligence Test (SUEIT): Palmer & Stough, 2001; Self-Report Emotional Intelligence Test (SREIT): Schutte et al., 1998; Wong & Law Emotional Intelligence Scale (WLEIS): Wong & Law, 2002). In the final stream, Stream 3, Ashkanasy and Daus (2005) include conceptualizations and measures of emotional intelligence that Mayer and Salovey would refer to as mixed models of emotional intelligence, as they include emotional intelligence factors and some general personality variables (e.g., Emotional Quotient Inventory (EQi): Bar-On, 1999; Emotional Competence Inventory 360 (ECI: 360): Boyatzis, Goleman, & Rhee, 2000). We acknowledge that there have been a broad number of differing interpretations of emotional intelligence used in business and in discussing research findings linked to emotional intelligence. We will endeavour to clearly identify the basis of these assertions.

The Selling of Emotional Intelligence

In assessing the success of emotional intelligence in predicting performance and other work behaviors, one final issue we need to address is the context within which emotional intelligence is used. We note here that for sellers to exist there need to be buyers. The business community have been very eager buyers of emotional intelligence products as they see the prima facie importance of emotions in business. The dramatic growth of the number of emotional intelligence measures can be linked to this demand. Emotional intelligence measures have become a commercial product, and we wish to make a distinction between products sold as emotional intelligence and the emotional intelligence construct as it is viewed from a research perspective.

In business, extended and inclusive definitions of emotional intelligence act as a selling point. Consultants tend to pack in as much as they can in order to give their clients value for money. In other words, in a business environment, inclusivity predominates over exclusivity. This is encouraged by managers who tend to look for the ”magic bullet” or a panacea for the problems faced in organizations. In writing this article, we are not interested in sales pitches or

products. Rather, we are interested in revealing if emotional intelligence measures can demonstrate incremental validity over existing psychological variables. We are also interested in the extent to which these measures can predict workplace behavior.

Emotional Intelligence and Industrial/Organizational Psychology

In line with Landy and Conte (2007), we argue that Industrial and Organizational Psychology consists of two distinct but overlapping domains. Industrial Psychology covers areas such as the assessment of individual differences, and staffing decisions including training and development, and selection and recruitment (Landy & Conte, 2007). On the other hand, Organizational Psychology includes topics such as dealing with stress, motivating workers, dealing with equity issues, leadership issues and dealing with attitudes in the workplace (Landy & Conte, 2007). While Landy and Conte (2007) argue that performance is an Industrial Psychology issue, they make this decision based on dealing with performance as a measurement and appraisal issue. We consider that performance really is of concern for both Industrial and Organizational Psychology as performance occurs as a combination of individual differences (Industrial Psychology), motivation (Organizational Psychology), appraisal systems (Industrial Psychology), and work behavior (Organizational Psychology), and occurs at either the individual level (Industrial Psychology) or the team level (Organizational Psychology).

In outlining the evidence linking emotional intelligence to elements of these domains, therefore, we have organized them according to the domain to which they belong. Initially, we consider findings on the links between emotional intelligence and three key organizational behavior variables (stress and coping, leadership, conflict management), areas of research that fit within the domain of Organizational Psychology. Next, in considering the research evidence in relation to Industrial Psychology, we focus on those aspects of the workplace that particularly relate to issues around personnel staffing: training and development, and recruitment and selection. A central focus in both domains is how to improve work performance. Therefore, we finalise our review by examining the link between emotional intelligence and work performance at the individual and group levels.

The relatively recent development of emotional intelligence means that it has not been possible for researchers at this point in time to tease out the full contribution of emotional intelligence to all of these topics in the workplace. Thus, where there is a lack of direct evidence of the link between emotional intelligence and the areas of interest in a work context, we examine indicative research that supports these connections. This may take the form of research conducted in a non-work environment using student samples.

Emotional Intelligence and Organizational Psychology

There are many studies that significantly link emotional intelligence to individual affective and cognitive organizational variables such as increases in psychological well-being (Salovey, Stroud, Woolery, & Epel, 2002; Slaski & Cartwright, 2002), affective commitment (Carmeli, 2003), and job satisfaction (Wong & Law, 2002). In considering the research evidence in relation to Organizational Psychology, we would like to focus on those aspects of the workplace that, in particular, relate to individual organizational behaviors, namely, stress and coping, leadership, and conflict management.

Emotional Intelligence and Stress and Coping

There has been extensive literature suggesting that emotional intelligence can be linked to work stress reduction in student samples (Lyons & Schneider, 2005). In I/O Psychology, researchers have theorised that emotional intelligence can moderate the perceived stress associated radical organizational change (Huy, 1999) and job insecurity (Jordan, Ashkanasy, & Härtel, 2002), and improve the coping process (Salovey, Bedell, Detweiler, & Mayer, 1999). Empirical research is now emerging to support these assertions.

In our review of the literature, we found studies exploring the links between emotional intelligence and variables related to stress and coping with student samples. For instance, Salovey et al. (2002) found a link between higher emotional intelligence (based on the Trait Meta Mood Scale) and lower levels of perceived social anxiety, symptom reporting, and physiological stress reactions based on measures of blood pressure and salivary cortisol secretion (Salovey et al., 2002).

In a comprehensive study of a student population utilising both ability based measures of emotional intelligence (based on the MSCEIT) and self report measures (the TMMS and the SEIT), Bastian, Burns, and Nettelbeck (2005) found no relationship between the MSCEIT and coping ability but did find a relationship between emotional intelligence (using both the TMMS and the SEIT) and the ability to cope. These researchers note that the self-report measures of emotional intelligence were able to provide incremental predictive validity of emotional intelligence over measures of personality and intelligence.

Moving to studies conducted in a work context, Slaski and Cartwright (2002) examined a cohort of managers and found that managers with higher emotional intelligence (based on the EQi) had lower levels of perceived stress. Slaski and Cartwright (2002) sought to corroborate their findings using other measures and found a negative correlation between emotional intelligence and the General Health Questionnaire (GHQ28), a negative correlation between emotional intelligence and a measure of distress in the workplace and a positive correlation between emotional intelligence and a better quality of working life.

In summary, the evidence relating to stress and coping shows that emotional intelligence can be linked to lower levels of both perceived and experienced stress. The findings of the studies in this section also indicate better physiological outcomes for individuals with higher emotional intelligence with less stress induced chemicals being produced by the body and better reported health. A caveat to these findings, however, is that there is little empirical evidence of these relationships in the workplace. Clearly, further research is required here to develop a substantive conclusion about these relationships.

Emotional Intelligence and Leadership

The association of emotional intelligence and effective leadership qualities was first suggested by Goleman (1998) in his book examining the impact of emotional intelligence in the workplace. Other researchers also specifically identify emotional intelligence as contributing to effective leadership (George, 2000), transformational leadership (Ashkanasy & Tse, 2000; Megerian & Sosik, 1996) and emergent leadership (Wolff, Pescosolido, & Druskat, 2002). Humphrey (2002) argues for a strong link between emotions and leadership. He indicates that specific aspects of leadership are enhanced by the emotional skills involved in emotional intelligence. A number of workplace studies confirm this assertion.

Rubin, Munz, and Bommer (2005), in a field study involving 145 managers, found that emotion recognition ability and positive affect predicted transformational leadership ability. In another field study, Lopes, Salovey, Côté, and Beers (2005) report that emotional intelligence (measured using the MSCEIT) was a predictor of both peer and supervisor estimates of leadership potential, even after controlling for personality and demographic influences. Other research is emerging showing clear evidence of a link between emotional intelligence and the behavior of leaders and followers (e.g., Sivanathan & Fekken, 2002).

Using the SUEIT, Gardner and Stough (2002) found a strong relationship between emotional intelligence and transformational leadership behaviors. This research was extended by Downey, Papageorgiou, and Stough (2006), who found a link between high emotional intelligence and both transformational leadership qualities and intuition in a sample of 176 female managers. The link between emotional intelligence and transformational leadership qualities has been clearly replicated across a number of studies. In a study overcoming any criticism of common method bias in self-report surveys, Barbuto and Burbach (2006) examined both self ratings and subordinate ratings of transformational leadership qualities and found a significant, but weaker, relationship between emotional intelligence and transformational leadership when assessed by subordinates.

In summary, we have shown in this section that there is a link between emotional intelligence and leadership behavior, and particularly, between

emotional intelligence and transformational leadership. Significantly, this has been shown in multiple studies using both self-report and ability-based measures of emotional intelligence and using peer ratings of leaders' behaviors.

Emotional Intelligence and Conflict Management

There are only a few studies examining the link between emotional intelligence and conflict. The majority of studies in this area have been conducted using student samples. Using student samples allows researchers to control for and generate a consistent experience of conflict that may not be available in the workplace.

Jordan and Troth (2002) found a link between higher emotional intelligence (using the WEIP) and the preferred conflict resolution strategy of collaboration. In this study, the authors report that the primary emotional intelligence skill that predicted a preference for collaboration was the ability to manage one's own emotions. They argue that in developing collaborative partnerships, individuals with high emotional intelligence need to focus on managing their own emotions and modelling good behavior to encourage the relationship that can lead to collaboration.

In a negotiation simulation, Foo, Elfenbein, Tan, and Aik (2004) found that individuals with high emotional intelligence (based on the WLEIS) enjoyed the negotiation experience more but ended up with lower, final task performance from the negotiation. Foo et al. (2004) argue that the high emotional intelligence individuals were more trusting and communicative during the negotiation in order to build up a relationship. This left those individuals open to exploitation in a competitive situation. This is a very important finding as this is the first research we found that reveals a disadvantage to individuals having high emotional intelligence.

In summary, there is a lack of evidence linking emotional intelligence to better outcomes of workplace conflict. The research that has been completed has been primarily done using student samples, but the findings of these studies support theoretical models of the link between emotional intelligence and better conflict resolution. More research is required in workplace settings to further understand the links between emotional intelligence and different types of workplace conflict.

Emotional Intelligence and Industrial Psychology

Emotional Intelligence and Training and Development

One of the fundamental questions posed within Industrial Psychology is whether emotional intelligence is capable of being affected by training. One argument is that if emotional intelligence is indeed intelligence, it should not

change due to training, as intelligence is a constant and fluid in nature (Cooper & Sawaf, 1997). Other researchers argue that, given that emotional intelligence is a type of crystallized intelligence, it is capable of bring trained (Clarke, 2006; Mayer & Salovey, 1997). Clearly if the field of emotional intelligence is to continue to develop, empirical research to determine the definitive answer to this question must be undertaken and reported in the Industrial Psychology literature.

As mentioned earlier within this chapter, there are a wide variety of emotional intelligence instruments commercially available to businesses. In addition to the wide variety of measurement tools, commercial ventures also offer a range of emotional intelligence training and development packages to businesses. While the actual outcomes of these types of training may not be widely available due to commercial in-confidence considerations, anecdotal evidence supports the success of these programs.

In addition to these commercial training packages, many books have also been written in recent years by academics and practitioners that discuss how emotional intelligence can be increased through training. Well known authors have produced books (within the 3 streams discussed previously) on training to increase emotional intelligence (see Caruso & Salovey, 2004; Cherniss & Adler, 2000; Cherniss & Goleman, 2001; Hughes, Patterson, & Terrell, 2005). Additionally, there have been several publications that provide a suite of emotional intelligence activities and games that can be utilised within a training environment. An example of this work can be seen in the work of Jones (2002) and Lynn (2000, 2002, 2005, 2007) who have produced publications that contain numerous activities designed to improve workplace emotional intelligence. Empirical evidence of the effectiveness of these programs is still required (Clarke, 2006).

In our review of the current literature, we found several studies that have examined the relationship between emotional intelligence and training using student samples. For instance, Moriarty and Buckley (2003) conducted a study using a student sample with an experimental group of 82 participants who were involved in emotion-focused experiential training, and a control group of participants ($n = 80$) who received no experiential learning activities over a twelve-week period. Using the self and peer report versions of the WEIP, the authors found that for experimental group participants, self-reported emotional intelligence scores significantly increased from pre- to post-training. The data collected from the peer reports also confirmed these results. The control group participants, however, reported no change in emotional intelligence over the same twelve-week period.

Moving to studies that examine the training and development of emotional intelligence within the workplace, Slaski and Cartwright (2002, 2003) studied 120 retail managers from one retail chain. The managers were divided into a control group of 60 and a training group of 60 who were provided with an intervention that was framed upon Cherniss and Adler's (2000) framework for training emotional intelligence. Results indicated that the emotional

intelligence scores of the training group (based on the EQi) increased significantly from pre- to post-training. In terms of performance, however, there were no significant increases in performance between the training and control groups. The researchers attribute this result to the organizational measure of performance used, which focused more on cognitive competencies, rather than emotional competencies (Slaski & Cartwright, 2003).

Extending on the work conducted by Jordan, Ashkanasy, Härtel, & Hooper (2002), Murray, Jordan, and Ashkanasy (2006) conducted a three-year research project to explore two main questions. First, is it possible to increase emotional intelligence through training? Second, if this is possible, what specific interventions lead to increased emotional intelligence? The study was conducted using a quasi-experimental design in a large public sector organization within Australia. Study participants were allocated to either a normative group (560 participants, no training) or one of two experimental groups, who either received interpersonal skills training program (108 participants) or an emotional intelligence training intervention (285 participants), the latter constructed under the Mayer and Salovey (1997) emotional intelligence framework.

Emotional intelligence was measured pre- and post-training using the self-report WEIP measure of emotional intelligence (Jordan, Ashkanasy, Härtel, & Hooper, 2002). The results of this study demonstrated no change in emotional intelligence for the normative group (who received no training) and the group of participants that received the interpersonal skills training program. However, the data collected from the emotional intelligence intervention group showed a significant increase in emotional intelligence from pre- to post-training. Clearly, the results of the Murray et al. (2006) study demonstrate that emotional intelligence can be increased through training.

In summary, while there is evidence to show emotional intelligence training can make a difference, in line with Murray et al. (2006) we argue that the effectiveness of emotional intelligence training programs can only be assessed using rigorous empirical testing. Clarke (2006) proposes that research in the area of emotional intelligence and training should be extended to examine the impact of workplace learning (on-the-job learning), coaching, team-based learning, and specific workplace contexts on the development of emotional intelligence skills.

Emotional Intelligence and Recruitment and Selection

A number of writers have argued that emotional intelligence leads to successful recruitment decisions (Watkin, 2000). Goleman (1995) argues that emotional intelligence should be used as a determinant of employment decisions based on his assertion of the link between emotional intelligence and performance. Zeidner, Matthews, and Roberts (2004a, 2004b) note, however, that Goleman provides no evidence of this relationship.

Fox and Spector (2000) provide support for the claim that emotional intelligence may be important in recruitment and selection processes. Fox and Spector develop hypotheses that the employment interview is a complex interaction between employer and employee in which emotional management, a component of emotional intelligence, plays a central role. The authors argue that emotional management skills associated with emotional intelligence contribute to interviewees' ability to regulate their affective state during interviews, and to display positive affect. They found that individuals who are able to regulate their affective state during the interview process (that is those with high emotional intelligence) were more likely to be successful in securing a job. The data from their study also revealed that the positive affectivity of the interviewee plays a major role in influencing the employer's decision to hire. These findings mirror the work of Isen and Baron (1991), who found that employees who were able to regulate mood in an organization were at a significant advantage in job interviews and in obtaining promotions.

In summary, this is another area where there is a significant lack of evidence about the role of emotional intelligence in selection and recruitment decisions. While measures of emotional intelligence are being used to make employment decisions in businesses, this has been based primarily on the links between emotional intelligence and work performance. As we will reveal in the next section this relationship is not as obvious or consistent as some recruiters may think.

Emotional Intelligence and Work Performance

Performance in workplaces can be assessed in several ways. Borman and Motowidlo (1993) distinguish between measures of task performance (ability to complete tasks) and contextual behaviors (helping behaviors and extra effort) that they describe as being just as important. Some authors consider decision-making behaviors to be an indicator of performance (Bandura & Wood, 1989). In this section we focus on 3 methods of measuring performance: task or "job" performance, contextual behaviors, and decision-making behaviors.

Individual Performance

Early proponents of emotional intelligence argued that emotional intelligence improves all work performance (Goleman, 1998). Jordan and his colleagues (2006) have argued that even a prima facie examination of this proposition suggests that this is not so. They argue that there are a number of factors including general intelligence, task knowledge and resources available that all contribute more significantly to performance than emotional intelligence would. In a recent article,

Jordan et al. (2006) demonstrated that assuming a large part of performance was attributable to emotional intelligence was overstating the case. The good news is that there is emerging evidence that ability-based measures of emotional intelligence (e.g., MSCEIT) have incremental validity in predicting performance over measures of the Big Five personality traits and measures of cognitive ability such as verbal and fluid intelligence (Lopes et al., 2005), and that even self report measures of emotional intelligence have incremental validity in predicting work performance over existing personality measures (Law, Wong, & Song, 2004). Jordan (2007) argues that for emotional intelligence to influence individual work performance, the task needs to have a significant emotional component (for instance, generating enthusiasm as a leader) or needs to be a task that directly involves the regulation of emotion (for example, dealing with agitated or unhappy customers). An examination of research looking at individual-level performance demonstrates this.

Our review of the literature has uncovered a significant number of studies that have relied on student samples with findings of links between emotional intelligence and performance on decision-making tasks (Day & Carroll, 2004) and performance on difficult cognitive reasoning problems while under stress (Lam & Kirby, 2002). Although student sample studies provide some control over the dependant variable (performance), the sampling frame in such studies is narrow. Consequently, in this section we seek to focus on work samples linked to actual performance outcomes.

Wong and Law (2002) assessed the link between self-rated emotional intelligence (based on the WLEIS) and supervisor-rated job performance. In this study, they found no relationship between emotional intelligence and supervisor-rated job performance in jobs that were low in emotional labor requirements; however, they found a significant, positive influence for employees involved in jobs with high emotional labor requirements. In a second study, Wong and Law (2002) showed a link between emotional intelligence (based on the WLEIS) and extra role / helping behaviors (contextual performance) based on a sample of public servants.

Rozell, Pettijohn, and Parker (2006) examined the link between emotional intelligence and sales performance. Using a measure of emotional intelligence (based on the SEIT), positive and negative affectivity, and sales performance, Rozell and her colleagues found a positive relationship between emotional intelligence and sales performance. These results need to be assessed carefully as sales performance in this study was self-rated. In another study examining the link between emotional intelligence and performance, Slaski and Cartwright (2002) examined the links between emotional intelligence and managers' performance assessed against 16 critical success factors that covered topics such as planning, organizing and decision-making. Significantly, these performance ratings were scored by the participants' direct supervisor, overcoming issues of self assessment bias.

In conclusion, there is emerging evidence of a link between emotional intelligence and individual performance. The ability to predict different performance outcomes using measures of emotional intelligence as an independent variable

demonstrate this. Significantly, some of this research has also shown that emotional intelligence measures can provide incremental validity over existing personality measures and intelligence measures.

Group Performance

Various models of team development (Gersick, 1991; Tuckman, 1965) note that for teams to develop and progress they have to resolve differences between team members. Emotional intelligence has been linked to group performance based on the fact that it assists in creating productive group interactions and assists individuals to deal with and resolve emotional issues in order to achieve high performance (Druskat & Wolff, 2001; Elfenbein, 2006).

Research into emotional intelligence and team performance is not as widespread as individual performance studies, and there are studies that have found no relationship between emotional intelligence and team performance (e.g., Day & Carroll, 2004; Rapisarda, 2002). Some research, however, points to the performance potential of emotional intelligence in teams. Jordan, Ashkanasy, Härtel, & Hooper (2002), for example, examined the links between emotional intelligence (measured with the WEIP) and team performance in a longitudinal study. Performance in this study was measured in terms of independent raters' scores on two variables: (1) team process effectiveness and (2) team goal focus during team meetings. Jordan and his colleagues found a performance difference in the first 3 weeks of their study with high average emotional intelligence teams outperforming teams with low average emotional intelligence. Interestingly, after the first three weeks the performance difference eroded to the point where there was no performance difference between the two groups after 10 weeks. Jordan, Ashkanasy, Härtel, & Hooper (2002) speculate that teams compensated for lower emotional intelligence through team development processes.

Jordan and Troth (2004), in a study of individual and team performance, found that emotional intelligence (based on the WEIP) was not predictive of individual performance in a decision-making task. When Jordan and Troth had the same task completed by teams, not only were the teams with higher emotional intelligence more successful, but their performance in the task was predicted by the level of team emotional intelligence. This finding raises an interesting question about the nature of task performance. While a task may be cognitive in nature, once it is completed as a group task, emotion emerges as a factor determining performance. In other words, group members' emotions need to be dealt with to enable maximum group performance. This provides support for the notion that the impact of emotional intelligence needs to be considered at multiple levels (see Ashkanasy, 2003).

In recent research, Elfenbein, Polzer, and Ambady (2007) found that the ability of a team to recognize teammates' emotions significantly and positively influenced their team performance approximately one year later. Offermann,

Bailey, Vasilopoulos, Seal, and Sass (2004) found a similar outcome in their study of emotional competence (based on the ECI) and individual and team performance. Indeed, their study showed that cognitive ability predicted individual performance, while emotional competence predicted team performance.

In summary, there is clear evidence of a link between emotional intelligence and performance in the workplace. In line with Jordan (2007), emotional intelligence seems to influence individual work performance when the task has a significant emotional component or if the task directly involves the regulation of emotion or working with others. Clearly, these criteria are a fundamental part of team work, and the findings in relation to emotional intelligence and team performance are significant – albeit with more workplace studies required.

Future Research Directions

As we have seen in this review, some research has been conducted on the outcomes of emotional intelligence in Industrial and Organizational Psychology domains. Our understanding of the field has improved dramatically over the last 10 years. There is, however, scope for more research. In line with the format we have already established, we will look at future research directions in both Psychology domains separately.

Industrial Psychology

Research has revealed that specific jobs have a higher emotional load for workers and require more emotional management (e.g., managers, service workers, nurses) (Mann, 1999). In these types of jobs, I/O psychologists should consider the emotional intelligence profile of employees as an additional indicator of whether an employee will achieve a good fit with a new position. There is a dearth of evidence about the effectiveness of using emotional intelligence criteria in job placement. Research could focus on particularly higher skilled jobs to determine whether placement of workers with high emotional intelligence in roles results in better performance from both themselves and the workers they employ.

As mentioned earlier within this chapter, there are a wide variety of emotional intelligence instruments commercially available to businesses. In addition to the wide variety of measurement tools, there are a wide variety of commercial ventures offering a range of emotional intelligence training and development packages to businesses. More research needs to be conducted in establishing the efficacy of these training interventions. For example, training interventions that conform to each of the differing models of emotional intelligence could be simultaneously conducted and compared, so that we can

ascertain exactly what types of interventions lead to the greatest increases in emotional intelligence and performance. Access to this type of information would be invaluable to corporate trainers, executive coaches, and practitioners involved in organizational development programs.

Organizational Psychology

The focus of research to date has looked at the impact of emotional intelligence on individual difference variables (e.g., job commitment, stress, leadership). Emotions, however, impact at multi levels of organizations (Ashkanasy, 2003). Ashkanasy (2003) provides a persuasive case that emotions have an impact at the within-person level, the between-persons level, the group level, and at an organizational level. While there are few studies that examine within-person emotional variability at work (see Fisher & Noble, 2004), at present there are no empirical studies examining this phenomenon in relation to emotional intelligence. There are also no studies looking at the impact of emotional intelligence on organizational culture. Both of these areas are ripe for further research.

Another important area for I/O Psychology researchers to consider is the role of emotional intelligence in self and other motivation. While some researchers consider motivation to be a factor in emotional intelligence (e.g., Goleman, 1995) other researchers see it as a related concept (e.g., Mayer & Salovey, 1997). Given the proposed link between emotional intelligence and motivation, and that research has revealed that motivation influences work performance (Locke & Latham, 1990), more research should be devoted to exploring this relationship in business contexts.

Conclusion

The aim of this chapter was to determine whether emotional intelligence researchers in the Industrial and Organizational Psychology domains have been able to back up claims with empirical evidence of the links between emotional intelligence and employee behavior and performance outcomes. At a time when businesses and practitioners are eager to adopt the mantra that selecting for, developing and training employees in emotional intelligence is the new panacea to solve all human resource problems, continuing, rigorous research evaluation is warranted to determine whether they are investing their money wisely.

The conclusions drawn from the findings in this book chapter indicate that there is some validity to the claim that emotional intelligence does play a role in shaping employees' behaviors and work performance. However, at this stage, its role is specific in nature and only seems to relate to tasks or situations that have a requirement for emotional regulation. Given the relatively small amount

of empirical evidence contextualised to the workplace, we argue that emotional intelligence researchers in the Industrial and Organizational Psychology domains need to do some serious work in the next few years to clarify the role of emotional intelligence in Industrial and Organizational Psychology. Fortunately, the preliminary evidence we have presented in this chapter provides optimism that this can happen.

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Emotional Intelligence and Physical Health

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Biomedical advances of the past century have changed the patterns of illness in industrialized countries dramatically. No longer are infectious diseases such as tuberculosis, cholera, rubella, and smallpox major contributors to population mortality. Rather, the leading causes of morbidity and death today are related to chronic stress and unhealthy lifestyles (Mokdad, Marks, Stroup, & Gerberding, 2004). For example, in 2004 cardiovascular diseases and cancer alone accounted for close to 60% of all deaths in Canada (Statistics Canada, 2007). Other chronic conditions such as diabetes, rheumatoid arthritis, and high blood pressure are major contributors to illness and disability (Schultz & Kopec, 2003). Of continuing public concern is also the widespread prevalence of health risks associated with smoking, alcohol abuse, and obesity (Single, Rehm, Robson, & Truong, 2000; Yach, Stuckler, & Brownell, 2006), as well as the growing health-care costs tied to a spectrum of medically unexplained physical symptoms, including chronic fatigue, fibromyalgia, and migraine headaches (Kirmayer, Groleau, Looper, & Dao, 2004; Park & Knudson, 2007). In line with these trends, contemporary models of disease construe health and illness as a complex outcome of biological, psychological, and social factors (Engel, 1977; Suls & Rothman, 2004), with a particular emphasis on the role of emotions in these processes (Mayne, 2001; Salovey, Rothman, Detweiler, & Steward, 2000). Within this framework, the key areas of interest concern the direct physiological links between emotions, stress, and disease (Ader, 2007; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002), and the moderating role of individual differences in the way people perceive, experience, and cope with distressing experiences (Baum & Posluszny, 1999; Lazarus, 1999; Smith, 2006).

In recent years, the construct of emotional intelligence (EI) has attracted much research attention as a novel explanatory concept for various life outcomes, including health and wellbeing. EI encompasses such basic

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emotion-processing abilities as recognising, understanding, and describing emotions in self and others, as well as more complex competencies of regulating, managing, and using one's emotions to facilitate thought and behaviour (Bar-On & Parker, 2000). Petrides and Furnham (2000) have noted that most assessment tools for the EI construct fall into one of two broad types. The first are ability EI measures like the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, Caruso, & Sitarenios, 2003) and its predecessor, the Multifactor Emotional Intelligence Scale (MEIS; Mayer, Caruso, & Salovey, 1999), which assess relevant abilities using a performance based methodology. The second are trait EI measures that assess core competencies via a self-report format. There are over a dozen self-report EI instruments. The most widely studied include the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995); the Bar-On Emotional Quotient Inventory (EQ-i; Bar-On, 1997); the Assessing Emotions Scale (AES; Schutte et al., 1998); and the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2003).

Empirical studies investigating the associations between EI, stress, and health have typically focused on different occupational or educational environments. Both literatures have documented reliable significant associations between higher trait EI, lower subjective distress, and better self-assessed physical health, using a variety of EI measures and samples. For example, evidence for the inverse relationship with occupational stress and burnout has been obtained using the Dulewicz and Higgs (2000) EI questionnaire in a sample of UK mid-level managers (Dulewicz, Higgs, & Slaski, 2003), the Tsaousis (2003) trait EI questionnaire in two diverse samples of Greek employees (Nikolaou & Tsaousis, 2002; Tsaousis & Nikolaou, 2005), the AES in a Polish sample of social service workers (Ogińska-Bulik, 2005), and the Swinburne University Emotional Intelligence Test (Palmer & Stough, 2001) in a sample of professional staff from Australia (Gardner & Stough, 2003). Of the more widely known instruments, the EQ-i has been similarly linked with lower levels of work-related stress and fewer somatic complaints among British retail managers (Slaski & Cartwright, 2002), and with differential stress perceptions among the police, health, and child care professionals from Germany (Bar-On, Brown, Kirkcaldy, & Thomé, 2000).

In educational settings, higher scores on the EQ-i have been found to predict fewer daily hassles and fewer emotional and physical strain symptoms among Canadian university students tested concurrently (Dawda & Hart, 2000; Day, Therrien, & Carroll, 2005) and at a 3-month follow-up (Day et al., 2005). Similarly, higher scores on the AES have been correlated with lower levels of perceived stress among dental undergraduates studying in England, Greece, Romania, South Africa, Australia, Malaysia, and the US (Pau & Croucher, 2003; Pau et al., 2007), and with less disabling fatigue (e.g., tiredness, headaches, musculoskeletal strain) among university students in Australia (Brown & Schutte, 2006). Studies with American undergraduates have additionally shown that higher EI (assessed with the TMMS) was associated with lower emotional

distress, independent of basic personality (Shulman & Hemenover, 2006); and that EI continued to predict fewer somatic symptoms even after negative affect was controlled (Thompson, Waltz, Croyle, & Pepper, 2007). Other comparable lines of educational and organisational evidence include research with the TMMS in samples of university students, middle-aged women, and public health nurses from Spain (Augusto Landa, López-Zafra, Berrios Martos, & Aguilar-Luzón, 2008; Durán, Extremera, Rey, Fernández-Berrocal, & Montalbán, 2006; Extremera & Fernández-Berrocal, 2002, 2006), and studies with the TEIQue among students and nurses from Belgium (Mikolajczak, Luminet, & Menil, 2006; Mikolajczak, Menil, & Luminet, 2007).

A recent meta-analysis by Schutte, Malouff, Thorsteinsson, Bhullar, and Rooke (2007) statistically affirmed the existence of a reliable moderate association between EI and various health indicators. Their estimated weighted average correlations (corrected for sample size and collapsed across assessment methods) were $r = .22$ for physical health, $r = .29$ for mental health, and $r = .31$ for psychosomatic health. Comparisons between alternative measurements revealed that trait EI (assessed through self-report) was more strongly associated with mental health than ability EI (assessed with performance tests), and that of the three most frequently used self-report measures (EQ-i, AES, and TMMS), the EQ-i had the largest predictive value for mental health. Unfortunately, such comparisons were not performed for the physical and psychosomatic health domains (which are more relevant to the present discussion), because of the 35 studies analysed, only 10 included indicators of either, and all 10 used only self-report measures of EI. Not only do these figures expose the relative scarcity of research on the somatic correlates of EI, but the modest effect sizes observed between EI and physical health suggest that the mechanisms linking EI and disease processes may be multiple, indirect, temporally distal, and/or non-linear.

The rest of this chapter provides a detailed review of several research literatures connecting EI and physical health, organised under the rubrics of stress adaptation, adaptive coping, healthy lifestyle, and medical regimen. For each pathway, we first briefly describe how it may operate with respect to somatic health, and then evaluate existent empirical evidence for the role of EI and its individual components as moderators in these processes. Because the emphasis of this book is more on assessment issues than the theory of EI, our review is limited to only those studies that used instruments specifically developed to measure EI. However, readers interested in a broader perspective on the role of affect regulation in physical health and illness are referred to key writings on the related construct of alexithymia (e.g., Lumley, Beyer, & Radcliffe, 2008; Lumley, Neely, & Burger, 2007; Taylor, Bagby, & Parker, 1997). Defined as a deficit in the ability to identify, describe, and attend to one's feelings and emotions, the alexithymia construct has produced almost 40 years of research specifically in the field of psychosomatic medicine (Nemiah, Freyberger, & Sifneos, 1976; Nemiah & Sifneos, 1970). Its features, in turn, have been theoretically and empirically linked with the conceptual domain of EI (Parker, Taylor, & Bagby, 2001; Velasco, Fernández, Páez, & Campos, 2006).

Pathways

Several scholars have offered to delineate the mechanisms that may account for the observed relationship between EI and physical health (van Heck & den Oudsten, 2008; Woolery & Salovey, 2004; Zeidner, Matthews, & Roberts, 2006). By definition, high EI is posited to promote adaptive regulation of distressing emotions (Salovey, 2001) and to influence successful coping with everyday stressors and challenges (Bar-On, 1997). Most salient, therefore, has been the hypothesis that the ability to understand and modulate one's emotional states should facilitate timelier recovery and more effective coping responses to stress, which would in turn diminish the adverse impact of prolonged distress on the body and reduce the likelihood of developing a disease. Likewise, high capacity for self-insight and self-regulation should prevent involvement in risky behaviours associated with maladaptive coping (e.g., smoking, drinking, excessive gambling) and instead promote a more positive lifestyle that increases longevity and physical wellbeing. In terms of coping with pain and sickness, too, EI-related competencies should facilitate less ruminative and more active coping through treatment seeking and adherence to medical regimens, thereby reducing the severity and chronicity of the illness experience itself. In short, EI is expected to moderate the processes of getting ill, staying healthy, and recovering from disease through its associations with adaptive emotion regulation and coping.

Stress Adaptation

Modulation of pathophysiological mechanisms that directly connect negative emotions to disease is one avenue through which EI may impact physical health. Under stress, subjective feelings of agitation and strain are accompanied by the activation of the sympathetic-adrenomedullary (SAM) and the hypothalamic–pituitary–adrenocortical (HPA) axes, which respectively stimulate secretion of catecholamines (e.g., adrenaline) and glucocorticoids (e.g., cortisol). Although brief exposure to these chemicals is beneficial as they heighten sympathetic arousal, boost immune activity, and increase energy and motivation, continued overproduction of the stress hormones evoked under conditions of frequent or chronic distress can, over time, cause pathological alterations in autonomic, endocrine, and immune functions. Repeated SAM activation can lead to chronic cardiovascular hyperarousal marked by elevated blood pressure and high resting heart rates (Krantz & McCeney, 2002; Rozanski & Kubzansky, 2005), whereas excessive HPA activity can result in dysregulation of metabolic (blood sugar imbalances), immune (under-production of antibodies), and inflammatory (over-production of proinflammatory cytokines) processes (Kiecolt-Glaser et al., 2002; Sapolsky, Romero, & Munck, 2000; Tsigos & Chrousos, 2002).

There is overwhelming empirical evidence (reviewed in Black & Garbutt, 2002; Glaser & Kiecolt-Glaser, 2005; Segerstrom & Miller, 2004) that chronic stress and sustained negative affects (especially anger, depression, and anxiety) can precipitate the onset and progression of heart problems, hypertension, and diabetes; increase susceptibility to viruses, infections, and cancerous growths; delay healing of existing wounds and injuries; and exacerbate chronic inflammatory conditions such as arthritis, atherosclerosis, and periodontal disease. Given these widespread health consequences of prolonged, unresolved, or mismanaged distress, the ability to quickly recover from stress-induced arousal through effective emotion regulation is considered an important resilience factor in diminishing the overall burden of stress on the body (Lumley, 2004; Mayne, 2001; Rozanski & Kubzansky, 2005).

The question of whether individuals high in EI are better at recovering from acute stress has been addressed quite extensively in a line of mood induction experiments (Ciarrochi, Chan, & Bajgar, 2001; Ciarrochi, Chan, & Caputi, 2000; Fernández-Berrocal & Extremera, 2006; Gohm, 2003; Matthews et al., 2006; Petrides & Furnham, 2003, study 2; Ramos, Fernández-Berrocal, & Extremera, 2007; Salovey et al., 1995; Schutte, Malouff, Simunek, McKenley, & Hollander, 2002, study 3). In these studies, participants were exposed to one or more affect-laden procedures (e.g., viewing short video clips, reading passages or statements, writing stories, or doing other tasks) designed to elicit strong positive or negative emotions. Mood self-ratings were collected prior to the experiment, immediately after the induction procedure, and at a short delay following the experiment, which allowed testing for moderating effects of EI on baseline mood states, emotional reactivity to a laboratory stressor, and subsequent mood recovery. EI measures utilised in these studies included the trait-based AES, TEIQue, and TMMS, as well as the ability-based MEIS and MSCEIT.

With respect to baseline mood, results across the studies indicated that individuals who scored higher in EI came to the research laboratory in a better mood than their low-EI counterparts, and that this positive mood state could not be fully accounted for by individual differences in basic personality or self-esteem (Fernández-Berrocal & Extremera, 2006; Matthews et al., 2006; Petrides & Furnham, 2003, study 2; Salovey et al., 1995; Schutte et al., 2002, study 3). This finding is consistent with the inverse EI-stress relationship observed in the occupational and educational environments described earlier, and suggests that high-EI individuals tend to experience less discomfort associated with participating in a psychology experiment as well.

Interestingly, high EI did not necessarily lessen the impact of mood manipulation procedures on mood valence or intensity. Although some studies did find high-EI individuals to experience less immediate mood deterioration in response to the upsetting stimuli (Fernández-Berrocal & Extremera, 2006; Ramos et al., 2007; Salovey et al., 1995; Schutte et al., 2002, study 3), others recorded no effects of EI on lab-induced mood changes (Ciarrochi et al., 2000, 2001), while others reported higher EI to be associated with amplified subjective

distress (Matthews et al., 2006; Petrides & Furnham, 2003, study 2). It should be noted that the studies that reported findings of null or heightened reactivity had partialled out the effects of dispositional negative affectivity (e.g., trait anxiety, neuroticism) prior to the main analyses, whereas reports of attenuated negative emotional impact were confounded by this variable. Indeed, Gohm (2003, studies 1 and 3) showed that the degree of reactivity to mood induction was not a simple effect of high vs. low EI, but was determined by an interaction between the ability to identify and understand one's emotions (TMMS-Clarity) and dispositional emotional intensity, such that the propensity to experience one's emotions intensely amplified the mood-induction effects for individuals who had superior emotion processing skills. Therefore, it appears that individual differences other than EI play a more salient role in determining variations in subjective stress reactivity.

More importantly, and despite the variability in mood sensitivity, higher EI unequivocally predicted more rapid rebound from laboratory-induced distress across all experiments. High-EI individuals demonstrated greater mood improvements both in the assisted mood recovery design, when positive emotional stimuli were presented after the negative ones (Petrides & Furnham, 2003, study 2; Schutte et al., 2002, study 3), and naturally during a stimulus-free resting period (Fernández-Berrocal & Extremera, 2006; Salovey et al., 1995). Of the specific components of EI, ability to regulate one's emotions (both objective and perceived) emerged as a definitive moderator in these processes. For example, in a sample of female university students who had been previously shown a distressing video depicting sexual assault, only those who scored higher on the emotional Repair dimension of the TMMS exhibited greater attenuation in the feelings of anger and depression when they saw the same video again two days later (Ramos et al., 2007). In a study by Ciarrochi et al. (2001), three groups of adolescents watched either an amusing, neutral, or upsetting film, and then were asked to compose a short story relating to an ambiguous projective-type picture. Subsequent examination of their writings revealed that adolescents who had higher scores on the Managing Self-Relevant Emotions subscale of the AES generated more positive narratives in either the negative or the positive, but not in the neutral mood condition, thereby demonstrating greater efforts to manage induced changes in their moods. Similar results were also obtained with a performance-based measure of EI. Ciarrochi et al. (2000) observed that participants who watched a humorous comedy show remained in a greater positive mood 8 min afterwards compared to participants who watched an emotionally neutral documentary, but only if they scored higher on the Managing Emotions of Self branch of the MEIS. Individuals low in this ability were unable to maintain their induced positive mood over time. Whenever checked in a particular study, it is worth noting that the moderation effects of emotion regulation on the mood outcomes remained significant even after the common variance due to basic personality traits and self-esteem were statistically removed.

Do the mood regulation efforts of high-EI individuals translate into adaptive physiological changes that are ultimately responsible for long-term health? Very little experimental research on EI has included physiological markers of acute or chronic stress responses. Two notable exceptions are experiments by Salovey, Stroud, Woolery, and Epel (2002, study 2) and Mikolajczak, Roy, Luminet, Fillée, and de Timary (2007), which monitored salivary cortisol secretions in healthy community women and male students, respectively, as they took part in laboratory stress sessions involving videotaped speech and task performances. Despite some operational differences (the former assessed EI with the TMMS and had three stress sessions repeated on three consecutive days, whereas the latter used the TEIQue and had a single stress session plus a non-stress control condition), the findings from both studies converged to reveal meaningful variations in the patterns of biological stress response of high versus low EI individuals. Consistent with what has been found for subjective mood experiences, high EI was associated with lower levels of cortisol at baseline (during the anticipation period), but was not necessarily predictive of relative reactivity of cortisol response to the induction of acute stress. Importantly, however, high-EI individuals maintained lower cortisol levels throughout the whole laboratory session in both studies, and showed greater cortisol habituation to repeated stress over three days in Salovey et al. (study 2). In addition, Mikolajczak et al. demonstrated that the main effect of EI on the total cortisol secretion was specific to the stress condition only (vs. control) and could not be explained by individual differences in basic personality or related traits. It appears, then, that high EI can indeed provide direct protection against the deleterious health consequences associated with elevated HPA stress response, although this finding needs further verification with objective disease markers and longitudinal follow-up designs.

Adaptive Coping

To understand the specific cognitive and behavioural strategies that mediate the pathway between EI and successful stress adaptation, we next turn to the literature on EI and coping. The leading transactional stress paradigm (Lazarus, 1999; Lazarus & Folkman, 1984) suggests that, in an effort to resolve, tolerate, or escape a stressful situation, individuals purposefully engage in various coping behaviours that can either offset or aggravate the adverse effects of stress on the body. Several broad coping styles have been identified in the literature (Austenfeld & Stanton, 2004; Endler & Parker, 1994; Litman, 2006; Parker & Wood, 2008): task-focused coping, which includes actions directed at resolving the causes of stress (e.g., seeking solutions to the problem, action planning, emotional control); emotion-focused coping, which consists of efforts to repair negative emotions induced by the stressor (e.g., seeking social support, positive re-interpretation, emotional disclosure); avoidance coping, which

involves deliberate mental and behavioural disengagement from the upsetting situation (e.g., seeking distractions, denial, emotional repression); and passive coping, which is characterised by general lack of coping effort in the face of adversity (e.g., doing nothing, self-blame, rumination).

Adoption of a particular coping strategy is believed to be shaped by the individuals' appraisals of the situation as either challenging (manageable) or threatening (uncontrollable) relative to their personal resources and competencies (Folkman & Moskowitz, 2000; Lazarus & Folkman, 1984). Thus, confidence in one's coping abilities and perceptions of personal control over the situation would enable active coping through constructive emotion-regulation and problem-solving strategies, whereas low coping self-efficacy, confusion about the sources of stress, and perceptions of being powerless in the situation would elicit avoidance strategies or passive rumination and self-blame. The first two strategies are considered adaptive for health and wellbeing, as they act to reduce the emotional and physiological arousal and minimise the duration of stress. However, the latter two scenarios have been consistently linked with a host of maladaptive health outcomes, including more enduring subjective distress, elevated HPA activity, and increased somatic complaints (Day & Livingstone, 2001; Gaab, Rohleder, Nater, & Ehlert, 2005; Penley, Tomaka, & Wiebe, 2002).

EI-related abilities, in the context of coping, can be construed as an important personal resource that promotes challenge rather than threat appraisals, and proactive rather than disengaging coping responses to stressful situations (Jordan, Ashkanasy, & Hartel, 2002; Matthews & Zeidner, 2000; Salovey, Bedell, Detweiler, & Mayer, 1999). Empirical evidence in support of this hypothesis using measures of trait EI is quite diverse. In educational settings, for example, students with high perceived EI abilities (based on the TEIQue) have been found to report greater task self-efficacy and to hold less threatening appraisals in anticipation of performing a mock psychology test (Mikolajczak & Luminet, 2008) and during real college examinations (Mikolajczak et al., 2006, study 2). Saklofske, Austin, Galloway, and Davidson (2007) found high-EI students (identified with the AES) to uphold more internal versus chance locus of control over their own health, and to engage in more active-rational (e.g., problem solving, action planning, positive reappraisal) and less passive-emotional (e.g., feeling overwhelmed, catastrophising, self-blame) coping with everyday demands. Petrides, Pérez-González, and Furnham (2007) obtained analogous findings for both the TEIQue and the EQ-i, and further demonstrated that the associations between EI, stress appraisals, and coping behaviours remained significant after controlling for the overlap with the Big Five personality dimensions. Finally, Mikolajczak, Nelis, Hansenne, and Quoidbach (2008) extended this line of research to show that high EI (assessed with the TEIQue) was associated with more adaptive ways of managing not only stress, but also a range of other negative (e.g., anger, sadness, envy, jealousy) and positive (e.g., joy) emotions.

Comparable research on trait EI and coping has been undertaken in various organisational settings as well. King and Gardner (2006), for example, conducted an online survey of professional staff employees in New Zealand, asking them to describe a recent stressful work-related situation and indicate how they felt, thought, and behaved in response to it. They found that employees who scored higher on the Genos Emotional Intelligence Inventory (Palmer & Stough, 2003) felt less upset by the situation, viewed it as more challenging rather than threatening, and utilised more task-focused and fewer avoidance coping strategies to resolve the issue. Hunt and Evans (2004) similarly reported that, among British volunteers who had identified a traumatic experience in their life, individuals who scored higher on the Nottingham Emotional Intelligence Scale (NEIS, an 18-item self-report measure developed by the authors) used more approach-monitoring rather than avoidance-blunting coping responses and suffered from fewer trauma-related symptoms (e.g., intrusive thoughts, hyperarousal) as a result of the event, compared to individuals scoring lower on the NEIS.

The associations between perceived EI and coping have also been investigated under controlled laboratory conditions. Much of this experimental work was conducted with the TMMS, but the results are fully consistent with the non-experimental literature. Specifically, participants who scored higher on the emotional Clarity and Repair subscales of the TMMS were found to be less prone to experience threat-oriented ruminative and intrusive thoughts (Fernández-Berrocal & Extremera, 2006; Ramos et al., 2007; Salovey et al., 1995, 2002), and more likely to employ active (e.g., concentrating on the task, seeking help) rather than passive (e.g., giving up, distancing) coping strategies in response to an experimentally induced stressor (Salovey et al., 2002, studies 2 and 3). Finally, it is important to acknowledge that all three lines of research described above (educational, occupational, and experimental) have been able to demonstrate the mediating role of positive appraisals and active coping strategies in explaining the connection between self-perceived EI abilities (particularly regulation of emotions) and various stress-related outcomes, including less subjective distress (King & Gardner, 2006; Mikolajczak et al., 2008; Ramos et al., 2007), fewer physical symptoms (Mikolajczak et al., 2006, study 2), and healthier diet and exercise regimens (Saklofske, Austin, Galloway, et al., 2007).

Although much has been published on the link between coping and EI using self-report measures of the latter construct, research using performance-based EI measures remains quite limited. Among the few extant studies, Matthews et al. (2006) examined the impact of objective EI abilities (assessed with the MSCEIT) on emotional, cognitive, and behavioural responses of university students to three types of stressful experimental tasks (tedious, rushed, and impossible), controlling for the variance due to basic personality. Congruent with the trait EI literature, and regardless of the variability in personality dispositions, individuals scoring high on the MSCEIT experienced less rumination and worry and used fewer avoidance coping strategies in response to the frustrating tasks. However, contrary to expectations, the MSCEIT scores were

neither related to the participants' challenge appraisals of the task, nor did they predict the use of more task-engagement coping strategies as has been consistently found for trait EI. Moreover, coping did not mediate the association between ability EI and the degree of subjective distress evoked by the stressor.

At least two other studies (Bastian, Burns, & Nettelbeck, 2005; Gohm, Corser, & Dalsky, 2005) noted a similar disparity in the patterns of coping correlates between objective and self-report indices of EI. Using a cross-sectional sample of university students, Gohm et al. (2005) found that both perceived (TMMS) and actual (MSCEIT) EI abilities were associated with less use of avoidance strategies such as denial, wishful thinking, self-distractions, and substance use. Both scales also predicted greater use of positive emotion regulation strategies involving emotional disclosure and seeking social/emotional support. However, only the TMMS, but none of the MSCEIT scores, were related to more task-focused coping through direct problem solving, action planning, and positive re-interpretation of stressful events. This lack of shared variance between the MSCEIT and task-focused coping likely accounted for its non-significant association with a global index of adaptive coping reported by Bastian et al. (2005). In contrast, two trait EI measures (TMMS and AES) were significantly related to positive global coping style above and beyond the influences of cognitive ability and basic personality traits (Bastian et al., 2005).

Although only preliminary, these differential findings carry important implications for the role of EI in stress management and coping. On the one hand, they reinforce the notion that poor emotional insight, confusion about one's feelings, and inability to regulate strong emotions (whether the person realises this or not) can exacerbate the negative impact of stress on health through ineffective and potentially harmful coping behaviours. They also corroborate the experimental evidence that individuals with better emotional and social competencies (both objective and self-report) are more likely to engage in adaptive emotion regulation and mood repair under stress. However, being proficient in EI abilities alone may not necessarily enable more active efforts towards the long-term resolution of actual problems. Instead, the latter outcome seems contingent on the individuals' awareness, confidence, and active use of their EI resources. Indeed, Gohm et al. (2005) reported that, after taking into account individual differences in emotional intensity, higher objective EI (MSCEIT) predicted less life stressors but only among individuals who were also high in self-reported EI (TMMS); individuals who assessed themselves as low in EI experienced more stress regardless of their actual EI potential.

That the trait vs. ability measures of EI should produce differential associations with coping is not entirely surprising, as the two assessment approaches are known to tap separate aspects of the construct (Petrides & Furnham, 2003) and to correlate relatively weakly with each other (Livingstone & Day, 2005; O'Connor & Little, 2003; Warwick & Nettelbeck, 2004). More intriguing, however, is the evidence that different dimensions of EI on a single instrument may be associated with discrete coping preferences as well. In particular, studies

utilising the TMMS have consistently noted that while the subscales of emotional Clarity and Repair predicted less passive/avoidance coping and more task-focused coping ubiquitously to the rest of the trait EI literature, the subscale of emotional Attention (which is unique to this measure) was associated almost exclusively with positive emotion-focused coping through emotional disclosure and solicitation of emotional and social support (Gohm & Clore, 2002; Gohm et al., 2005; Montes-Berges & Augusto, 2007; Velasco et al., 2006). This coping pattern remained evident even after individual differences in the Big Five personality traits were taken into account (Gohm & Clore, 2002). In explaining this phenomenon, Gohm and Clore (2002) have reasoned that individuals who can understand their emotions well, and who are good at regulating their moods intrinsically, may be able to recover from the initial distress quickly, and consequently concentrate the majority of their coping efforts on dealing with the causes of the problem. In contrast, individuals who derive value from their feelings and pay a lot of attention to intense emotional states may focus their coping efforts first and foremost on expressing and regulating their emotional reactions, before or while attempting to deal with the problem. Indeed, most people tend to employ more than one coping strategy throughout the time-course of a stressful event, even though they report only the most immediate or salient one as their typical stress response (Carver & Scheier, 1994; Folkman & Lazarus, 1985).

If different EI profiles are differentially involved in coping preferences, is it possible that some coping approaches are more effective than others depending on one's EI? As a final issue in this section, we address the practical question of whether individual differences in EI moderate the relative effectiveness of strategies generally viewed as adaptive in reducing stress and the associated risks of illness. To this end, Baker and Berenbaum (2007, 2008) recently reported results from two prospective intervention studies evaluating the outcomes of problem-solving versus emotional-approach coping for individuals scoring low or high on the TMMS subscales of Clarity and Attention. They asked the participants to identify an ongoing stressful situation and then write/talk either about potential solutions and action steps they could take to resolve the problem (problem-solving condition), or about their emotional experiences and the reasons for their feelings under the circumstances (emotional-approach condition). Two weeks later, the participants provided information about their mood and physical symptoms, and described how they had coped with the situation since the intervention.

Baker and Berenbaum's (2007, 2008) combined results revealed that the relative effectiveness of the two coping approaches partially depended on the extent of the participants' EI resources. Individuals who were unaware, ambivalent, or confused about their feelings (low Attention/Clarity) benefited more from the emotional-approach intervention and from subsequent coping by actively identifying, expressing, and working through their emotions. Attempts to deal directly with the problem in the absence of adequate self-insight aggravated rather than improved the situation for these individuals. Conversely,

participants who were already insightful, attentive, and clear about their emotions (high Attention/Clarity) received greater benefits from participating in the problem-solving intervention and subsequently using more problem-focused rather than emotion-focused strategies. These interactions, however, held true only in terms of predicting improved subjective mood but not reduced somatic symptomatology. It is possible that the effects were weakened because the ability to regulate emotions, a defining facet of EI uniquely implicated in successful stress adaptation, was regrettably not considered in these studies. Nevertheless, further research on the applications of EI in the coping process is certainly warranted and should be extended to include objective indices of ability EI, as well as a broader range of EI-related competencies.

Taken together, the cumulative findings presented in this section provide compelling support for the notion that "adaptive coping might be conceptualized as emotional intelligence in action" (Matthews & Zeidner, 2000, p. 460). Individuals who understand the nature and causes of their feelings, and who are proficient in emotion-regulation abilities, are generally less likely to collapse under the pressure of experimental or real-life stressors; they are also more likely to take proactive steps towards restoring their emotional balance and resolving their problems. Furthermore, conscious use of one's EI resources, whether assisted or intrinsic, appears to be instrumental in maximising the effectiveness of the total coping effort. Adaptive coping, in turn, acts to reduce the duration of stressful experiences and, in so doing, lessens the chances of developing health problems associated with chronic hyper-activation of physiological stress-response systems.

Healthy Lifestyle

In addition to regulating the direct effects of chronic stress on the body, EI may impact physical health indirectly, through its associations with habitual coping behaviours that carry added health benefits or health risks of their own. Examples of task-oriented ways of protecting one's health under stress include planful efforts to maintain regular exercise, nutritious diet, proper hygiene, adequate sleep, and supportive social networks, all of which have been associated with increased positive mood and better health-related quality of life (Cohen, 2004; Kant, 2004; Penedo & Dahn, 2005; Strine & Chapman, 2005). Despite the theoretical appeal of the idea that EI may act as a facilitator of these positive life practices, few studies have tested the proposed associations empirically, and fewer still examined the possible mechanisms behind them. Of the various behaviours, regular engagement in planned exercise has received the most sustained attention in the EI literature, with significant positive correlations obtained to date using the Tsaousis (2003) trait EI questionnaire in a sample of Greek psychiatric hospital employees (Tsaousis & Nikolaou, 2005, study 2), and in two separate samples of Canadian university students using the

AES (Saklofske, Austin, Galloway, et al., 2007) and a short form of the EQ-i (Saklofske, Austin, Rohr, & Andrews, 2007). In addition to replicating the existence of a bivariate relationship, the latter two studies also demonstrated that higher EI mediated the association between basic personality traits and regular exercise practices independently of the participants' exercise attitudes (Saklofske, Austin, Galloway, et al., 2007; Saklofske, Austin, Rohr, et al., 2007). In other words, individuals who maintained a regular exercise regimen were able to do so by mobilising their EI resources.

In terms of other health-promoting behaviours, the same three EI measures (the Tsaousis questionnaire, AES, and EQ-i) have been found to correlate with more time dedicated to personal relaxation (Tsaousis & Nikolaou, 2005, study 2), healthier dietary strategies, (Saklofske, Austin, Galloway, et al., 2007), and larger social support networks, even after controlling for basic personality (Austin, Saklofske, & Egan, 2005). The only non-significant finding in this area (based on work with the performance-based MSCEIT) was with respect to taking care of one's physical appearance (e.g., time spent on grooming, clothing, make-up) after gender differences were taken into account (Brackett, Mayer, & Warner, 2004). Although much of this work needs to be replicated, these preliminary reports are nevertheless congruent with the findings from the general coping literature, that proactive task-focused coping behaviours may be related only to trait EI but not to ability EI.

In contrast to the scarcity of research on EI and positive health behaviours, the area of unhealthy lifestyle practices has received much more attention. Among the most common maladaptive coping behaviours are substance abuse issues, where individuals smoke cigarettes, drink alcohol, or consume "comfort" foods as a way of alleviating stress-related tension (Laitinen, Ek, & Sovio, 2002; Roohafza et al., 2007; Steptoe, Wardle, Pollard, Canaan, & Davies, 1996). Although these behaviours afford a temporary emotional relief, they are inherently ineffectual in resolving problems or reducing the accumulated emotional baggage. Moreover, a lifestyle characterised by over-reliance on substances has been linked with increased rates of morbidity and mortality. Long-term smoking is a major risk factor in coronary heart disease, cancer, and lung and respiratory problems (Brook, Brook, Zhang, & Cohen, 2004); heavy amounts of alcohol use can cause damage to liver and kidneys, increase the chances of stroke, and precipitate accidental injury or death resulting from intoxication (Cargiulo, 2007; Paglia & Room, 1999); whereas unmoderated intake of calories, saturated fats, and cholesterol can lead to obesity and hypertension (Ganley, 1989; Laitinen et al., 2002).

The earliest and most comprehensive program of research on EI and substance use to date constitutes a series of studies by Trinidad and colleagues (Trinidad & Johnson, 2002; Trinidad, Unger, Chou, Azen, & Johnson, 2004; Trinidad, Unger, Chou, & Johnson, 2004). These authors investigated the associations between ability EI (assessed with the MEIS), smoking intentions and behaviours, and various smoking-related risk factors among grade 6–8 adolescents from the US, while controlling for the effects of age, gender, and

academic aptitude. Trinidad and Johnson (2002) reported that adolescents who were good at identifying and understanding emotions smoked significantly less frequently (ever, daily, or weekly) than their low-EI peers. Higher EI was also associated with more confidence in being able to refuse cigarette offers from peers and less intention to smoke in the next year – two of the key psychosocial risk factors for adolescent smoking (Trinidad, Unger, Chou, Azen, et al., 2004; Trinidad, Unger, Chou, & Johnson, 2004). Finally, consistent with the moderating function of coping, the protective effects of EI were especially evident for adolescents with high-risk characteristics: despite having hostility-prone personality or enduring high levels of peer pressure, those with better EI abilities were less intent on smoking in the subsequent year than those who had very poor EI (Trinidad, Unger, Chou, & Johnson, 2004).

However, attempts to replicate the association between EI and smoking in older undergraduates and using the revised version of the MEIS, the MSCEIT, have been unsuccessful (Brackett & Mayer, 2003; Brackett et al., 2004). Furthermore, studies conducted with self-report measures of trait EI have also produced inconsistent results. For example, Brackett and Mayer (2003) found that neither the AES nor the EQ-i were associated with daily number of cigarettes, yet smoking frequency was significantly and inversely related to the self-report EI scores in the Tsaousis and Nikolaou (2005) study. Saklofske, Austin, Galloway, et al. (2007) reported no significant differences in the AES scores between students who self-identified as smokers or as non-smokers, whereas Limonero, Tomás-Sábado, and Fernández-Castro (2006) found students who smoked on a daily basis to score significantly lower on the Repair subscale of the TMMS compared to students who had never smoked (although there were no differences between never-smokers and occasional smokers). Furthermore, among regular smokers, those who scored lower on the Clarity and Repair subscales started smoking earlier and smoked more cigarettes per day compared to smokers with higher EI (Limonero et al., 2006).

Equally inconsistent results have been found for EI and alcohol use. One of the earlier reports by Riley and Schutte (2003) indicated that lower scores on the AES could significantly predict alcohol-related problems among adults, although contrary to the expectation this relationship was not mediated by coping. Subsequent studies with this measure, looking at the amounts of alcohol consumed among undergraduate students, found either a moderate relationship that disappeared after the Big Five variance was controlled (Austin et al., 2005), or no significant bivariate correlation at all (Saklofske, Austin, Galloway, et al., 2007). Brackett and Mayer (2003) reported that only the EQ-i, but not the AES or the MSCEIT scores, correlated with lower weekly alcohol consumption in their sample of undergraduates, an effect that nevertheless remained significant even after the differences due to basic personality and verbal intelligence were taken into account. However, a follow-up study using the same design identified the MSCEIT as a significant predictor above and beyond the Big Five and verbal ability, but for male students only (Brackett et al., 2004).

There are two possible interpretations of these inconsistent findings. The first is that there is no real association between EI and substance use; there is a spurious method factor causing some correlations to be artificially inflated. Whatever this method factor may be, it is clear that the inconsistencies cannot be attributed to the idiosyncrasies of any single EI measure. This explanation is also at odds with the reliable association found between EI and avoidance coping, of which substance use is a salient strategy. Alternatively, and more likely, is the interpretation that there is a meaningful link between EI and substance use; however, one or more systemic confounds not accounted for in the existing studies (and addressed below) is interfering with its detection. Indeed, the antecedents of substance use are multivariate in nature, representing a complex interaction of personal, socio-cultural, and situational factors (Galizio & Maisto, 1995; Kassel, Stroud, & Paronis, 2003). Since the hypothesised connection between EI and health-relevant behaviours derives from the coping framework, the relationship should really only be evident when these behaviours are motivated by the desire to reduce negative feelings or improve mood under stress. For the same reason, the effects of EI should be most salient when the coping-related behaviours reach a certain threshold of frequency or severity in response to rising levels of distress. When the degree of stress is tolerable, or when these activities are undertaken for purely social reasons, there is little theoretical justification for EI to be involved. In fact, a seminal study by Goldman, Kraemer, and Salovey (1996) demonstrated this caveat fairly early on, when they found that higher TMMS scores predicted fewer symptom and illness reports among students only under the conditions of high stress (during an exam period), but not under moderate stress (beginning of the term).

If this second interpretation is valid in the case of substance use, then the unaccounted differences in stress and motivation may explain why EI was significantly correlated with lower frequency of smoking among regular smokers (Limonero et al., 2006), but was unrelated to smoking status when non-smokers were compared with occasional or mixed types of smokers (Limonero et al., 2006; Saklofske, Austin, Galloway, et al., 2007). It may also explain the non-significant findings by Austin et al. (2005) and Saklofske, Austin, Galloway, et al. (2007), who reported that the amount of alcohol consumed by students in their samples was related to higher trait extraversion rather than to negative affectivity or trait EI, suggesting that the observed drinking behaviour was more social than stress-driven in nature. Another potential confound alluded to (e.g., Brackett et al., 2004), but generally overlooked in these studies, is the main effect of gender on substance use patterns. For example, men tend to consume greater amounts of alcohol than women, whereas women have a stronger tendency towards stress-driven eating (Laitinen et al., 2002). At present, however, there is no research examining the moderating role of EI on stress-related dietary habits. To untangle these theoretical contingencies we encourage future studies on EI and substance-based coping to use true or quasi-experimental designs that control for varying levels of subjective stress and substance

preferences. Observations in naturalistic settings should estimate the proportion of substances consumed for stress-relief purposes relative to the total substance intake characteristic of each individual, as well as differentiate between excessive and normal amounts of ingestion. Finally, tests of mediation and moderation effects should be performed in addition to calculating zero-order and partial correlations.

It should be noted that habitual coping through other, non-substance based avoidance strategies, may also result in problematic levels of otherwise benign and ordinary life activities. In particular, there is growing public health concern about excessive indulgence in recreational activities like gambling, computer/video gaming, and Internet use (Griffiths & Wood, 2000; Nower, Derevensky, & Gupta, 2004). These technologies are highly stimulating and absorbing, providing both a powerful emotional boost and an active distraction from ongoing life concerns. In terms of direct physical effects, sustained use of computers and video-terminals is commonly accompanied by complaints of eye strain, elbow, wrist and neck pain, and tendinitis, although few extreme cases of tunnel vision, peripheral neuropathy, and epileptic seizures have also been documented (Bureau, Hirsch, & Vigevano, 2004; Griffiths & Wood, 2004; Kang et al., 2003; Wang & Perry, 2006). While most of these injuries are mild and reversible, more enduring and detrimental are the lifestyle changes associated with excessive engagement in these activities. Individuals who spend escalating amounts of their leisure time (over 30 hours per week) on games/Internet often report declines in personal hygiene and self-care, irregular or missed meals, sleep deprivation, reduced levels of physical activity, and deterioration of relationships with friends and family (Charlton & Danforth, 2007; Pratarelli, Browne, & Johnson, 1999; Yang, 2001). In addition, gambling and gaming often co-occur with smoking and drinking, which compounds their contribution to an unhealthy lifestyle (Desai, Desai, & Potenza, 2007; Huang, Jacobs, Derevensky, Gupta, & Paskus, 2007; Nower et al., 2004).

Unlike research on substance use, studies on the role of EI in computer misuse and problematic gambling have produced compelling and reliable results. In a small sample of Swedish students who completed an Internet addiction scale and Sjöberg's (2001) performance-based measure of EI, Engelberg and Sjöberg (2004) found that high-frequency Internet users, verging on problematic levels of involvement, had significantly lower ability EI scores compared to low-frequency, casual users of the Internet; this effect was independent of individual differences in basic personality. Kaur, Schutte, and Thorsteinsson (2006) reported a similar correlation for trait EI (measured with the AES) and problem gambling in a sample of adults from a large metropolitan area in Australia. They showed that, in line with the transactional coping model, the significant protective effect of high EI in reducing problematic gambling behaviour was partially mediated by the participants' beliefs of self-efficacy to control their gambling impulses and manage their gambling practices. Finally, in a recent study of two community-based samples of Canadian adolescents, Parker, Taylor, Eastabrook, Schell, and Wood (2008)

examined the predictive power of EI (assessed with a youth version of the EQ-i) for a cluster of addiction-related behaviours comprising gambling, Internet use, and video-game playing, which the authors labelled "dysfunctional preoccupation". The results of their latent path analysis revealed that EI accounted for as much as 58 and 31% of variance, respectively, in the extent of younger and older adolescents' dysfunctional preoccupation with these entertainment activities.

In general, while some findings in this area have consistently found EI to be implicated in certain health-relevant lifestyles, such as taking regular exercise or maintaining a balanced leisure schedule, its status in relation to other everyday behaviours, including substance use, remains uncertain. However, an interesting trend has emerged from this line of research. Specifically, the impact of EI was more readily detected when the target behaviour was habitual or excessive (and hence had real health implications) rather than occasional or commonplace. This qualitative distinction along the dimensions of frequency and maladaptiveness reinforces the hypothesis that the impact of EI on health is specific to situations involving chronic and/or elevated levels of distress.

Medical Regimen

How one copes with imminent or ongoing illness and invasive medical procedures constitutes another special case where EI may have an additional bearing on the illness prognosis and health-related quality of life. It has been proposed that sustained or suppressed negative emotional states can exacerbate pain and slow down the process of healing and recovery, whereas active expression and constructive repair of emotions can promote psychosomatic resilience in the face of serious health adversities (Lepore & Smyth, 2002; Pennebaker & Chung, 2007). In line with this hypothesis, there is some medical evidence that EI moderates the impact of traumatic diagnoses and treatments on the degree of pain and emotional distress experienced by patients. A prospective study by Carranque-Chaves et al. (2004), for example, reported that higher scores on the emotional Clarity and Repair subscales of the TMMS predicted less severe experiences of postoperative pain among 32 patients who had undergone abdominal (digestive or urological) surgery. Another study by Schmidt and Andrykowski (2004) found that higher scores on the TMMS were significantly associated with fewer avoidant cognitions and less anxiety and depression among 210 women diagnosed with breast cancer, even after controlling for the demographic (age, marital status, education) and clinical (time since diagnosis, stage of the disease, treatment) variables. Moreover, EI interacted with the perceived quality of social environment in influencing levels of emotional distress among these women, such that the negative impact of low social support was significantly less pronounced for women who had higher EI.

Therefore, EI competencies may act as a protective buffer against added stress and complications for individuals living and coping with an illness.

Does high EI also promote more adaptive illness behaviours? Given its associations with more active/engagement and less passive/avoidant coping tendencies, it can be hypothesised that individuals with greater EI resources would be more likely to submit to regular health checks, seek professional consultations when experiencing health concerns, and comply with treatments for identified health problems. Studies that examined participants' reports on the number of doctor visits have found either a significant positive relationship (Saklofske, Austin, Galloway, et al., 2007) or no relationship (Austin et al., 2005) with the AES scores. However, this data can neither confirm nor disconfirm the hypothesis, because a measure of absolute frequency of medical visits may not be appropriate to demonstrate greater readiness to seek help among individuals who are less prone to have somatic complaints in the first place. On the other hand, studies utilising a different methodology have documented a reliable association between higher EI and greater intention to seek help for emotional problems and suicidal ideation among adolescents (Ciarrochi, Deane, & Wilson, 2002) and young adults (Ciarrochi & Deane, 2001), although this finding applied more to informal sources of support (e.g., family, friends, pastor) rather than professional help in the context of non-medical, mental health.

We know of two studies that have evaluated effects of EI on compliance with prescribed medical regimens. The first is a small pilot study by Gamboa, Hughes, and Marcenes (2005), who followed the progress of 29 dental patients for three weeks after they completed a standardised two-visit treatment protocol for chronic periodontitis. On each visit, the patients received supra-gingival scaling and polishing and were instructed on proper oral hygiene practices (e.g., tooth brushing, flossing, tongue brushing) to be followed at home. After three weeks their levels of plaque and gum bleeding were re-assessed and matched with their scores on Cooper and Sawaf's (1997) EI questionnaire. Although the treatment resulted in significant reduction of both plaque and bleeding for all patients, high-EI individuals showed greater improvements in their dental condition compared to low-EI patients, indicating that they were more likely to comply with the oral hygiene instructions in that period of time. Although this finding is yet to be replicated with other measures of EI and controlling for basic personality dimensions, it represents one of the first attempts to connect EI with objective biological markers of disease.

The second study on EI and treatment adherence was conducted by Willard (2006) with 50 HIV-positive adults who were prescribed daily combination antiretroviral medications. Participants were asked to indicate, on a scale from 1 to 10, how often they took their HIV medications, and the responses were correlated with their MSCEIT scores. Contrary to expectations, results revealed no significant association between ability EI and the extent of self-reported adherence among these individuals. It should be noted, however, that the majority (73%) of the participants reported taking their medications as

prescribed (i.e., scores of 9–10 on the adherence scale), yet the mean MSCEIT score for the sample was 1.5 standard deviations below the North American norms. It is unknown whether such strikingly low EI levels are characteristic of this particular sample only (the participants were not screened for depression or disabilities), or whether they can be generalised to all individuals living with HIV/AIDS. Nevertheless, it raises interesting questions about group differences in EI levels of individuals suffering from, or at risk for various acute and chronic health conditions, which we encourage researchers to pursue more systematically in the future.

Given its promising role as an individual-differences moderator of patients' illness, treatment, and recovery trajectories, the potential value of EI assessment in patient-centered care should not be overlooked. At present, however, the piecemeal and virtually non-existent state of research on EI in medical populations precludes us from drawing any definitive conclusions regarding its clinical utility.

Implications

The idea that EI may be implicated in health-related quality of life is compelling on many levels. Conceptually, EI is defined as a set of abilities and competencies essential for adaptive stress management and successful coping with life demands (Bar-On, 1997; Goleman, 1995; Mayer et al., 1999). As such, it has been hypothesised to influence many salient life outcomes, including health and wellbeing. Empirically, multiple studies have recorded reliable moderate correlations between higher EI, lower emotional distress, and better somatic health across diverse samples, in different life contexts, and using various measures of EI (Schutte et al., 2007). Researchers have also begun to delineate specific pathways and mediating variables likely involved in these processes (reviewed in previous sections). Finally, from an applied standpoint, the malleability and trainability of EI (Parker, Saklofske, Wood, Eastabrook, & Taylor, 2005) has made EI-related competencies an attractive target for various stress- and health-related programs and interventions (Pennebaker & Chung, 2007; Slaski & Cartwright, 2003). Nevertheless, many questions remain unanswered in this area of inquiry, partly due to the relative novelty of the EI construct, and partly due to methodological complexities associated with stress, health, and EI assessment.

To date, much of the research on EI and physical health has focused on pathways involving moderation of direct pathophysiological effects of stress on the body. To this end, there is solid experimental evidence that greater EI competencies (especially emotion regulation) facilitate more resilient psychophysiological response to acute and repeated stressors, characterised by faster rebound from negative mood states and lower secretion of cortisol via the HPA axis. There is also experimental and cross-sectional evidence that the

connection between EI and stress adaptation is mediated by individuals' habitual cognitive-behavioural coping styles. In stressful situations, greater EI resources tend to support appraisals of mastery and self-efficacy versus helplessness and self-blame, and enable coping efforts towards help-seeking and active resolution of the problem versus passive denial or avoidance. The next important step in this line of research is linking EI with objective indices of the immune and cardiovascular status (e.g., lymphocyte levels, resting blood pressure), as well as with the actual disease endpoints manifest in various medical populations. Furthermore, if EI is indeed a protective factor against the negative consequences of stress, then training EI abilities under controlled experimental conditions should result in improved bio-behavioural indicators of health among individuals naturally exposed to high levels of daily stress (e.g., military personnel, nurses).

A smaller proportion of research has also examined pathways involving indirect contributions of EI to health through various health-related behaviours. There is emerging evidence, for example, that high-EI individuals are more likely to maintain proactive self-care practices (e.g., regular exercise, relaxation, healthy diet) and enjoy greater social support resources that can be relied upon in times of stress or illness. High-EI individuals are also less likely to develop certain problematic habits like excessive preoccupation with entertainment activities (e.g., gambling, gaming, Internet) to the exclusion of other aspects of balanced living. However, the jury is still out on whether, or under what circumstances, EI relates to such widespread health-risk behaviours as smoking, drinking, and overeating. Likewise, there is notable paucity of research on the utility of EI assessments in medical settings, particularly with respect to patients' treatment adherence, recovery prognosis, and coping with chronic pain and functional disability.

In terms of methodological implications, it should be noted that most of the findings described in this chapter have been replicated using both self-report and performance-based measures of EI, which makes interpretations based on common-method variance highly unlikely. The only exception to this cross-method consistency was observed for task-oriented coping, where trait EI, but not ability EI, was associated with more use of proactive behavioural strategies. That this differentiation held true both in terms of generalised coping styles and in specific applied cases (e.g., self-care behaviours, compliance with medical regimens) suggests that the trait-ability distinction is conceptually meaningful and should be taken into account in future studies. In addition, most lines of research have been able to demonstrate either mediation effects or incremental predictive utility of trait EI over basic personality traits (particularly, emotional intensity), supporting the notion that research on EI can add to the existing body of knowledge on individual differences in health outcomes. Finally, because many of the proposed pathways entail processes that are long-term, cumulative, and contingent on stress levels, we would expect the link between EI and health to be non-linear, with effects strengthening progressively with older age, greater exposure to stressful life circumstances, and higher personality

disposition towards emotionality. Therefore, we encourage future studies in this area to include a wider cross-section of ages, backgrounds, and occupations, and to employ longitudinal, multivariate designs that account for interactions between EI, stress, and personality.

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Emotional Intelligence and Clinical Disorders

Karen Hansen, Jenny Lloyd, and Con Stough

Introduction

The topic of emotional intelligence (EI) has generated a great deal of interest in both researchers and mental health professionals as it offers a new perspective in the study of emotions and disorders of emotion. While historically emotions were thought to interfere with cognitive processing, it is now acknowledged that, when managed appropriately, emotions can provide essential information about how to solve daily problems. From this perspective, the intelligent use of emotions is considered essential for psychological adaptation (Mayer & Salovey, 1997; Salovey, Bedell, Detweiler, & Mayer, 1999; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995).

This chapter will explore current research on the relationship between EI and clinical disorders such as depression, anxiety, Post Traumatic Stress Disorder (PTSD), compulsive gambling, sex offending and personality disorders. As this area of research is only in the embryonic stage, the purpose of this chapter is to discuss the potential clinical applications of EI and to also outline some possible areas for future research.

Dimensions of EI and Their Relationship to Mental Health Variables

Emotional Intelligence (EI) represents a global capacity to deal with emotions and emotional information. It involves a set of skills that define how effectively we perceive, understand, reason with and manage our own and others' feelings (Palmer, Gignac, Ekermans, & Stough, 2008). The application of EI for understanding mental illness has obvious face validity. Emotional disturbances are a

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fundamental aspect of most clinical disorders – flattened affect and anhedonia in Schizophrenia; emotional lability and severe alterations in mood in Bipolar Disorder; negative emotional bias and emotional dysregulation in Depression; problems identifying and describing feelings in Alexithymia; and fear for no adequate reason in Anxiety Disorders (Lane and Schwartz, 1987).

While there are numerous models and measures of EI (e.g., Mayer, Salovey, & Curuso, 2000; Bar-On, 1997; Schutte et al., 1998; Tett et al., 2005; Petrides & Furnham, 2001; Palmer & Stough, 2001) a number of EI dimensions are common across measures. In particular, the ability to recognize and express emotion, the ability to perceive emotions in others, and the ability to manage and control emotions are dimensions that appear on almost every EI measure. These dimensions of EI are closely aligned to some of the more common symptoms of clinical disorders. An increasing number of studies are linking these dimensions of EI to various indices of mental health.

Recognizing and Describing Emotion

The ability to recognize and describe emotion is a dimension of EI that is associated with a number of clinical problems. For example, people who do not understand their own emotions well are more prone to substance use disorders, eating disorders, and somatic complaints (Taylor, 2001; Bach & Bach, 1995; Conrad, Schilling, Langenbuch, Haidl, & Liedtke, 2001). An inability to recognize and describe emotion is also related to negative indices of well-being such as depression and anxiety (Ciarrochi, Scott, Deane, & Heaven, 2003) while the non-expression of emotion is also related to stress (Conrad et al., 2001).

Recognising and describing emotions is also related to alexithymia – a concept well-known to clinical psychology (Coffey, Berembaum, & Kerns, 2003). Alexithymia is characterised by a difficulty in describing and identifying feelings and having externally focussed, concrete thinking (Taylor, Parker, & Bagby, 1997). Numerous studies have found strong negative correlations between EI and alexithymia (Austin, Saklofske, & Egan, 2005; Dawda & Hart, 2000; Parker, Taylor, & Bagby, 2001; Saklofske, Austin, & Minski, 2003; Schutte et al., 1998).

Perceiving Emotions in Others

The ability to perceive emotions in others is a dimension of EI considered essential to form and maintain quality interpersonal relationships (Sarni, 1999). Deficits in this ability have been linked to a number of issues relevant to mental health including social support, substance use, and disorders such as Autism.

Ciarrochi et al. (2001) found that adolescents who scored higher on an EI measure of perceiving emotions reported greater amounts of social support and were more satisfied with their social support. An inability to perceive emotions in others has also been linked to behaviours such as smoking and alcohol

consumption (Austin et al., 2005; Trinidad & Johnson, 2002; Tsaousis & Nikolaou, 2005). It has been suggested that these individuals may be less equipped to resist peer pressure, which might account for negative associations found between EI and these substance use behaviours.

An inability to perceive emotions in others is also a major feature of Autism. The ability to enter into emotional relationships is considered the main difficulty for people with Autism, a difficulty compounded by an inability to understand other people's facial expressions (Baron-Cohen, 1991).

Managing and Controlling Emotion

The ability to manage and control emotion is an important dimension of EI with links to emotion regulation – an essential feature of mental health (Gross & Munoz, 1995). Individuals who regulate their emotional states are healthier because they are able to accurately perceive and appraise their emotional states, they know how and when to express their feelings, and they can effectively regulate their mood states (Salovey et al., 1999). Research indicates that people with high EI are better at regulating their moods than others.

For example, Ciarrochi, Chan, and Caputi (2000) and Ciarrochi, Deane, and Anderson (2002) reported that an objective measure of emotional management skill was associated with a tendency to maintain an experimentally induced positive mood. This study also found that people who scored higher on measures of "managing the emotions of others" also reported lower levels of depression (Ciarrochi et al., 2002).

Schutte, Malouff, Simunek, McKinley, and Hollander (2002) also found that subjects with high EI experienced significantly less reduction in positive mood following a negative mood induction activity compared to subjects with low EI. Using a measure of emotional control (Roger & Najarian, 1989), Ciarrochi and Scott (2006) found that ineffective problem orientation, difficulty identifying and describing emotions, and rumination significantly predict well-being after 12 month follow-up, after controlling for baseline measures of well-being. This finding suggests that low levels of emotional competence preceded decreases in well-being, rather than merely co-occurring with it. Importantly, the results of this study indicated that the three main emotional competence variables predicted unique variance in aspects of well-being (i.e., variance not predicted by other variables) (Ciarrochi & Scott, 2006).

Overall EI and Psychological Health

The relationship between overall levels of EI and numerous psychological adjustment variables has been well documented in non-clinical adult samples. For example, high EI is negatively related to psychological distress and depression (e.g., Dawda & Hart, 2000; Slaski & Cartwright, 2002, 2003; Tsaousis & Nikolaou, 2005; Martinez-Pons, 1997; Schutte et al., 1998) and positively related to

health-related quality of life, life satisfaction and social network factors (Austin et al., 2005; Extremera & Fernández-Berrocal, 2006; Palmer et al., 2002; Ciarrochi et al., 2002; Martinez-Pons, 1997; Gannon & Ranzin, 2005). Higher levels of EI are also linked to greater feelings of emotional well-being (Bar-On, 1997; Salovey & Mayer, 1990; Salovey et al., 1995), higher positive mood (Schutte et al., 2002), higher self-esteem (Ciarrochi et al., 2000; Schutte et al., 2002), and higher optimism (Schutte et al., 1998). Saklofske et al. (2003) also reported that EI accounted for variance in happiness and well-being not accounted for by personality measures. While there is substantial evidence of a link between EI and variables measuring psychological health, does this relationship translate to clinical populations?

Specific Disorders

Depression

An inability to regulate negative emotions is considered a risk factor for depression. It would be expected that the managing and controlling emotions aspect of EI would be particularly relevant to this disorder. While a number of studies have shown a link between EI and depression in non-clinical samples (Dawda & Hart, 2000; Martinez-Pons, 1997; Tsaousis & Nikolaou, 2005; Schutte et al., 1998), there is a paucity of data investigating the relationship between EI and clinical depression.

Downey et al. (2008) observed significant associations between severity of depression and the EI dimensions of Emotional Management ($r = -0.56$) and Emotional Control ($r = -0.62$) in a sample of clinically depressed patients. In this study, 62 patients (59.70% female) with a DSM-IV-TR diagnosis of a major affective disorder and 39 aged matched controls (56.40% female) completed self-report instruments assessing EI (SUEIT: Palmer & Stough, 2001) and depression (BDI-II: Beck, Steer, & Brown, 1996) in a cross-sectional study. Based on the results of this study, the authors posit that measures of EI may have predictive value in terms of early identification of those at risk for developing depression. The current study points to the potential value of conducting further studies of a prospective nature.

These findings suggest a potential relationship between specific components of EI and clinical depression – in particular the dimensions of Emotional Management and Emotional Control. However, significantly more research is needed in this area particularly in clinical samples.

Social Anxiety

Social anxiety involves a characteristic fear about interacting in social situations and involves significant difficulties in interpersonal functioning. The construct of EI represents skills that are critical to interpersonal functioning. Surprisingly there are few studies of the relationship between EI and social anxiety.

Summerfeldt, Kloosterman, Antony, and Parker (2006) investigated the relationship between social anxiety and EI, as well as the combined impact of these variables on interpersonal adjustment. Their sample consisted of a large (n = 2629) non-clinical sample of undergraduate students. The Bar-On Emotional Quotient Inventory: Short (EQ-i:S), was used as a self-report measure of trait EI. It comprises four scales: intrapersonal (self-awareness and self-expression; "It's hard to express my intimate feelings"), interpersonal (social awareness and interpersonal relationship "I'm good at understanding the way other people feel"), stress management ("I believe that I can stay on top of situations") and adaptability ("My approach in overcoming difficulties is to move step by step"). As the authors hypothesised, low EI was highly related to social interaction anxiety, but not performance anxiety and EI was the dominant predictor of interpersonal adjustment, considerably reducing the unique contribution of interaction anxiety. The authors admit that reliance on self-report data is a limitation of the study because individuals suffering from social anxiety may be more likely to underestimate their abilities. They suggest that the use of a performance measure of EI in a longitudinal study of social anxiety may help determine the directionality of the relationship between EI, social anxiety and interpersonal adjustment.

Nolindin (2006) investigated the relationship between EI and social anxiety in a clinical sample. Compared to a control group, the clinical group scored lower on the EI subscales of emotional recognition and expression, understanding emotions, emotional management, and emotional control. As expected, the clinical group scored higher on a number of measures of social anxiety than the controls. Using the clinical group data, a hierarchical regression revealed that emotional control was a significant predictor of social interaction anxiety after controlling for depression and general anxiety. This dimension represents the degree to which individuals become 'hijacked' by their emotions.

Post Traumatic Stress Disorder

PTSD is an emotional illness that can develop following a traumatic life experience. Some of the disruptions to emotional processes in PTSD include: anhedonia; a numbing of emotional responsiveness; irritability and an increased tendency and reaction to being startled.

Hunt and Evans (2004) explored whether EI predicts how individuals respond to traumatic experiences. EI was measured using the Nottingham Emotional Intelligence Scale (NEIS) a brief, single factor measure of EI. The study sample comprised 414 participants from the general population. While participants were not selected based on having experienced a traumatic event, 298 participants reported that they had experienced such an event. PTSD symptoms (intrusion, avoidance and hyper arousal) were measured using

the Impact of Events Scale – Revised (IES-R). The Monitoring-Blunting Questionnaire (MBQ) uses participants' responses to a hypothetical situation to assess the degree to which participants use monitoring or blunting. Participants with higher EI reported fewer psychological symptoms relating to their traumatic experiences. Those with a monitoring coping style were more likely to have higher EI than those who use blunting in response to traumatic events. The authors argue that should future research identify that EI can be developed through training and that this higher EI has an impact on later responses to traumatic events, then the EI construct will have demonstrable value.

Generalised Anxiety Disorder (GAD)

Persons with GAD have difficulty understanding their emotional experience and may possess few skills to modulate their emotions. They may experience emotions as subjectively aversive and use worry and maladaptive interpersonal behaviours as defensive strategies to control, avoid, or blunt emotional experience (Mennin et al., 2002).

A series of studies by Mennin and colleagues used the TMMS and the TAS to investigate the relationship between EI and GAD. In study 1, students with GAD reported heightened intensity of emotions, poorer understanding of emotions, greater negative reactivity to emotional experience, and less ability to repair negative emotions than controls. Individuals in the GAD group were found to have significantly more difficulty identifying and describing emotions than did the control individuals, as reflected in scores on the TAS, and lesser skill in understanding their emotional experience, as evidenced by lower scores on the TMMS.

In study 2, these findings were largely replicated with a clinical sample. Compared to controls, patients with GAD demonstrated elevated scores on the TAS Difficulty Identifying and Describing Emotions subscales. The GAD patients also achieved lower scores on the TMMS Clarity of Emotions subscale than controls and patients with GAD also reported less ability to recover from a negative mood than controls on the TMMS Mood Repair subscale. In study 3, students with GAD – but not controls – displayed larger increases in self-reported physiological symptoms after listening to emotion-inducing music than after neutral mood induction. Further, GAD participants had more difficulty managing their emotional reactions than controls.

These results have implications for GAD and psychopathology in general. An emotion regulation perspective suggests adding EI treatment components to help clients become more comfortable with arousing emotional experience, more able to access and utilize emotional information in adaptive problem solving, and better able to modulate emotional experience and expression according to contextual demands (Mennin et al., 2005).

Adolescent Sex Offenders

Although to date there is little published material available regarding EI in adolescent sex offenders, there is some evidence to suggest that sex offenders have problems with the evaluation of their own emotions and the emotions of others. Previous research has shown that adolescent offenders have difficulty in labelling their own and the emotional states of others (Savitsky & Czyzewski, 1978), have difficulty in controlling their anger and establishing meaningful relationships with their peers, and are in families that are emotionally disengaged (Bischof, Stith, & Whitney, 1995).

Moriarty et al. (2001) investigated whether a battery of tests designed to measure different levels of EI could differentiate adolescent sex offenders from a non-offender control group. The battery comprised the Trait Meta-Mood Scale (TMMS), Davis' Interpersonal Reactivity Index (IRI), the Inventory of Interpersonal Problems (IIP-32), the Revised Toronto Alexithymia Scale (TAS-20) and the Openness to Feelings facet of the NEO PI-R. A discriminant analysis using all five tests showed that 89.9 per cent of the sample was correctly allocated their respective groups. Overall the sex offenders were higher on aggression and attention to feelings, less clear about their feelings and less capable to repair unpleasant moods and prolong positive ones. It was concluded that these findings could be the focus of treatment approaches for adolescent sex offenders.

Eating Disorders

There has been a recent move towards an examination of emotional processes in eating disorders (ED). Alexithymia is common in people with EDs. High scores are observed on alexithymia questionnaire measures (Schmidt et al., 1993) and ED participants also perform poorly on laboratory tests of emotion recognition in both adolescent and adult samples (Zonnevylle-Bendek et al., 2002; Kucharska-Pietura et al., 2004). Poor interpersonal communication and lack of empathy are also associated with Anorexia Nervosa.

Kucharska-Pieura, Nikolaou, Masiak, and Treasure (2003) investigated emotion recognition ability in patients with Anorexia Nervosa. They did not specifically measure EI but measured Emotion Recognition, which is analogous to Emotion Perception and Expression (ability measure). This study used the Emotion Recognition Experiment (ERE) to assess recognition of emotion in faces presented in a series of slides. The Voice Emotion Recognition Test (VERT) was used as a measure of recognition of emotion in spoken language (i.e., prosody). The Hamilton Depression Scale was used to control for Depression. Thirty women with Anorexia Nervosa (DSM IV diagnosis criteria; 23 with restricting and 7 with the binge-purge subtypes) were recruited from an inpatient Eating Disorders Unit. A comparison group of healthy controls

were recruited from female students and non-professional hospital staff. Kucharska-Pietura et al. found that the group with Anorexia Nervosa were poor at emotional recognition with a marked deficit in recognition for negative emotions in faces and for both positive and negative affect in voices. The decreased ability to recognise negative affect in faces remained even after adjustment for confounding variables such as age, education and depression. The authors argue the difficulty that Anorexia Nervosa patients have with recognising emotions from facial expression and vocal tone may contribute to the poor interpersonal communication and lack of empathy associated with Anorexia Nervosa.

Substance Abuse

It is widely accepted that people drink alcohol to regulate the quality of their emotional experience. Both clinical observations and empirical studies indicate that individuals use alcohol to reduce or manage dysphoria as well as to enhance positive emotional experience (Cooper et al., 1995).

Riley and Schutte (2003) investigated the relationship between EI and substance-use problems. They used the Emotional Intelligence Scale (EIS) a self report measure of trait EI developed by Schutte. One hundred and forty-one volunteers were recruited from the general community and were required to be not currently undergoing treatment for substance abuse. Drug-related and alcohol-related problems were measured by self-report using the Drug Abuse Screening Test and the Self-Administered Alcoholism Screening Test. Participants also completed a measure of psychosocial coping. Riley and Schutte (2003) found low EI to be a significant predictor of both alcohol-related and drug-related problems. Poorer coping was found to predict drug-related but not alcohol-related problems. Coping was not found to be a significant mediator between EI and substance-use problems. The authors argue that should the link established between low EI and substance-use problems be found to be causal, treatment interventions might focus on increasing EI-related skills in individuals with substance-use problems.

Brackett et al. (2004) also reported that low EI was related to illegal drug use and excessive consumption of alcohol. In a sample of 89 undergraduate males, low EI (as measured by the MSCEIT), principally the inability to perceive emotions and to use emotion to facilitate thought, was associated with negative outcomes, including illegal drug and alcohol use, deviant behaviour, and poor relations with friends.

Trinidad and Johnson (2002) explored the relationship between EI and adolescent tobacco and alcohol use. In a sample of 205 adolescents, EI was assessed using the MEIS. In this study EI was negatively associated with tobacco and alcohol use.

A possible explanation of the associations between lower EI and substance abuse problems is that those with higher EI have more confidence, or self-efficacy, and can successfully deal with life's adversities without resorting to substances. There is evidence that higher EI is related to more general self-efficacy (Chan, 2004). This self-efficacy may explain why individuals with high EI are more able to resist the urge to use a substance than individuals with low EI.

Compulsive Gambling

Several models of gambling posit that difficulties in emotional processing contribute to the development or maintenance of problem gambling (Blaszczynski, 2002; Ricketts & Macaskill, 2004). However, few studies have investigated the relationship between EI and compulsive gambling.

Kaur et al. (2006) investigated whether lower EI would be related to less self-efficacy to control gambling and more problem gambling and whether gambling self-efficacy would mediate the relationship between EI and problem gambling. The sample comprised 117 participants (49 women and 68 men) who completed an EI inventory (SSEI), a gambling control self-efficacy scale, and a measure of problem gambling. In this study, lower scores on the measure of EI were associated with more problem gambling. In addition, lower EI was associated with less gambling control self-efficacy, and less self-efficacy in turn was associated with more problem gambling.

The authors theorize that lower EI may be associated with less gambling control self-efficacy because those who are less adept at processing emotions have fewer mastery experiences relating to gambling control, and perhaps are not able to benefit as much from vicarious learning based on others' emotional reactions in gambling situations. Further, low EI may predispose individuals to have lower optimism (Schutte et al., 1998) and other cognitive tendencies that can enhance self-efficacy expectations. Kaur et al. (2006) also found that gambling control self-efficacy partially mediated the relationship between EI and problem gambling. This finding lends support to the notion that one of the mechanisms through which EI may impact gambling is through its influence on the development of greater self-efficacy for controlling gambling. However, gambling control self-efficacy did not account for all of the variance shared by EI and problem gambling; this suggests that higher EI may assist individuals to avoid problem gambling.

The limited research in this area suggests that deficits in EI-related skills such as identification of emotion, the use of emotion to facilitate decision making, understanding of emotion and the ability to regulate emotion contribute to the development of gambling problems. These findings, together with previous research indicating that lower EI is associated with more substance abuse problems (Brackett et al., 2004; Riley & Schutte,

2003; Trinidad & Johnson, 2002), suggests that low EI may be predictive of a range of problem behaviours associated with difficulties in controlling impulses.

Autism Spectrum Disorders

Emotional deficits are considered to be one of the core features of the Autistic Spectrum Disorder s (ASD; Baron-Cohen, 1991; Bauminger, 2002; Bormann-Kischkel, Vilsmeier, & Baude, 1995). ASDs include autism, Asperger's, pervasive developmental disorder (PDD), Rhett's syndrome and childhood disintegrative disorder. These disorders share core symptoms of impaired communication, imagination and socialization (APA, 1994). Research in this area has primarily focused on emotion recognition and empathy (Baron-Cohen, 2001), including the ability to perceive a targeted person's emotional state, to take their perspective and to respond appropriately (Yirmiya, Sigman, Kasari, & Mundy, 1992). However, the research findings in this area have been inconsistent.

A study by Bormann-Kischkel et al. (1995) compared the performance of autistic individuals on emotion recognition tasks to a control group of non-autistic individuals. The emotion recognition task involved matching a photograph of a face to an appropriate emotion without any social context. The performance of the autistic sample was significantly poorer than that of the control group on this task.

Another study examining emotion recognition used a second task that included social context, comparing the performance of participants with ASDs (autism or PDD) to the performance of participants with attention deficit disorder (ADD), conduct disorder (CD), dysthymia and a control group with no disorders (Buitelaar et al., 1999). ASD participants performed significantly worse on the emotion recognition tasks than all other groups, except the ADD group. The unexpected low performance of ADD participants was attributed to deficits with executive function, resulting in a failure to maintain attention for emotional tasks, rather than an inability to perform them. The findings in these studies imply an emotion recognition deficit in ASD participants when compared to normal and other disordered samples.

A study investigating empathy in ASD (Yirmiya et al., 1992) compared participants with autism to a normal control group. Empathy was assessed by response to a video clip. Autistic participants performed significantly worse on the empathy tasks than the control group. Additionally, higher cognitive abilities were associated with better performance in the autistic group but not the control group. This last finding supports the suggestion of a relationship between IQ and emotional ability in ASD with researchers proposing that those with ASD rely on cognitive strategies to help decode socially relevant

information (Bormann-Kischkel et al., 1995; Dyck, Ferguson, & Shochet, 2001). The use of cognitive strategies for emotionally based tasks could explain why participants with ASD have difficulties with emotion recognition in complicated but not simplified tasks (Hobson, 1986). The fact that deficiencies in emotional ability are still observed in ASD suggests that these cognitive strategies are insufficient and that emotional education would be beneficial. It must be noted that research exploring emotion recognition and empathy abilities in ASDs, particularly autism, have not used a consistent definition of disorders, with some adhering to APA strictures (e.g. Baron-Cohen, 1991), and others including participants based on an estimated location on the autistic spectrum (Dyck et al., 2001).

Research has shown that autistic children have difficulty in recognizing how different expressions of particular emotions are associated with each other, and this might contribute to their failure to understand the emotional states of other people (Hobson, 1986). There is little data investigating specific aspects of EI in the ASD.

Eldridge (2003) investigated EI in a group of adolescents with ASD. The sample comprised 19 adolescents with developmental disorders, and a control group of 774 adolescents. Emotional ability was assessed using an adolescent version of a self-report Swinburne University Emotional Intelligence (SUEIT) scale (Leubbers et al., 2007). The results indicated that the ASD group scored significantly lower on the EI dimension of 'understanding others' emotions' than the control group. No significant differences in EI score were observed on measures of recognizing and expressing emotion, using emotion to facilitate thought or managing and controlling emotion.

Borderline Personality Disorder

Disturbances in emotion are associated with most of the diagnostic criteria of Borderline Personality Disorder (BPD; Levine et al., 1997). According to the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders Fourth Edition; APA, 1994), BPD is characterised by a pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity. Research suggests that BPD is a disorder characterised by significant deficits in the ability to understand and regulate emotions and moods.

Leible and Snell (2004) investigated the relationship between EI and border line personality disorder symptomatology in an undergraduate student population. They used the Trait Meta-Mood Scale (TMMS), a self-report measure of several aspects of EI including: attention to feelings, clarity of experience of feelings and regulation of feelings. The authors also administered the Multidimensional Emotional Awareness Questionnaire designed to measure three aspects of EI: private emotional attention, private emotional preoccupation

and rumination and public emotional monitoring. The results of this study found that BPD symptomatology was associated with poor emotional clarity and emotional regulation and also revealed that BPD symptomatology was associated with lower scores on private emotional preoccupation and public emotional monitoring.

More research is required to clarify exactly which components of EI play a role in which aspects of BPD. It has been suggested that BPD features such as affective instability, chronic feelings of emptiness and inappropriate and intense anger are all indicative of problems in emotion processing. Similarly, symptoms such as impulsivity, self-harm, fear of abandonment, and dissociative symptoms also involve abnormal responses to emotions. Individuals with BPD might display these behaviours and characteristics due to an insufficient ability to identify and manage their emotions. In addition, problems with interpersonal relationships and identity disturbance in BPD may be related to an inability to express, use and manage emotions and emotional information.

EI may also have an important role to play in the diagnosis of other personality disorders (Petrides et al., 2007). Leible and Snell (2004) suggest that personality disorders may be systematically associated with a number of aspects of EI. The authors found varied patterns of EI factors for a number of personality disorder symptoms. For example, participants with paranoid personality symptoms reported less emotional clarity and emotional repair, but more public emotional self-monitoring and private emotional preoccupation while participants reporting more histrionic symptoms reported less emotional clarity but both more private emotional self-awareness and more public emotional self-monitoring.

Current therapies for individuals with BPD (i.e. Dialectic Behaviour Therapy) have a strong focus on helping people with BPD control and regulate their emotions, skills which would also be the focus of any treatment approach aimed at developing and enhancing EI.

EI as a Coping Mechanism to Maximise Mental Health

It has been suggested that high EI is a coping mechanism that facilitates "successful and efficient self-regulation toward desired ends" (Salovey, Bedell, Detweiler, & Mayer, 2000, p. 511). Taylor (2001) argues that if you are emotionally intelligent then you can cope better with life's challenges and control your emotions more effectively, both of which contribute to good psychological and physical health. Matthews and Zeidner (2000) claim that "adaptive coping might be conceptualized as EI in action, supporting mastery emotions, emotional growth, and both cognitive and emotional differentiation, allowing us to evolve in an ever-changing world" (p. 460). Despite these theoretical links, the literature on associations between EI and coping is relatively sparse.

Saklofske et al. (2007) found that EI showed a significant positive correlation with rational coping and a significant negative correlation with emotion-focused coping. While associations between EI and health locus of control have not previously been studied, Saklofske et al. reported that EI is positively associated with internal health locus, negatively associated with chance health locus and unrelated to powerful others health locus. Further information about the associations amongst these measures was obtained via factor analysis, with EI and coping scales being found to load on the same higher-order factor. Structural equation modeling showed this factor mediating the influence of personality on diet strategy and taking regular exercise. These findings were consistent with previous research on the transactional model of personality/coping associations, in which the effects of personality are mediated by coping (e.g. Deary, Blenkin, Agius, Endler, & Zealley, 1996) and indicate that, as suggested previously (Salovey et al., 2000), EI has aspects that relate to coping, and that investigations of the incremental validity of EI over personality should also include testing for mediation effects.

Hannigan et al. (2007) found that EI predicts positive coping strategies while Neuroticism predicts negative coping strategies. In this study, the relationship between coping strategies, emotional intelligence (EI) and personality were examined in a group of 78 individuals from the general population.

There is currently little information available on the associations between EI and coping. The possibility that EI, like coping, mediates the effect of personality on health outcomes (e.g., Deary et al., 1996) has not been investigated. The role of EI as a positive coping resource in health and other contexts appears to be an interesting topic for further study.

Implications for Clinical Psychology

The more concisely we conceptualise the features of clinical disorders, the better the treatment programs we are able to design. EI offers the opportunity to better conceptualise the emotional disturbances of a number of clinical disorders and hence has significant implications for treatment. Berenbaum et al. (2003) suggest that classifying the emotional disturbances of individuals with psychopathology can improve upon the incremental predictive power of current classifications and may prove more useful in providing a focus for treatment.

A number of authors support the utility of EI in clinical psychology and the notion that low EI may be a perpetuating factor in psychopathology and may also contribute to treatment resistance (Taylor, 2001; Ciarrochi & Scott, 2006; Pellitteri, 2002; Kafetsios, 2004; Maree & Fernandes, 2003). They recommend that clinicians consider the EI status of their patients when formulating a treatment plan and suggest that rather than relying solely on managed care and pharmacotherapy for these clients, the clinician should initially focus on

improving their client's EI competencies with a view to later psychotherapeutic intervention.

EI measures may be of benefit to counselors in a number of ways. They can help the counselor to identify client strengths and weaknesses and can provide feedback on how the client is improving. EI competence measures can also be useful in guiding counseling practice. They may be administered at client intake to identify what the client may be struggling with, and they can be administered throughout the counselling intervention to evaluate progress (Ciarrochi & Scott, 2006). For example, if a client has difficulty identifying emotions, then the initial part of therapy can focus on developing an emotion vocabulary with the client. Research has shown that if counselors can improve a client's ability to identify emotions, then that client will be less likely to experience high levels of distress in the future (Ciarrochi & Scott, 2006). The emotion management skills of the client, not just those of the counselor, are likely to determine the quality of the counseling session. It may be important, then, for counselors to identify those people with poor management skills and to recognize that such people may struggle to benefit from counseling. Some clients may need to be trained in emotion management skills to supplement and enhance their treatment (Ciarrochi & Deane, 2001).

Evidence is mounting that establishing and incorporating the EI of clients into therapy can be beneficial and successful. Measuring the EI of a client can provide a great deal of information about the client's current level of emotional functioning which can offer a starting point for therapy as well as accelerate the therapeutic process.

Summary

Despite the intuitive links between EI and clinical disorders, there is a distinct lack of empirical research in this area. Although there are now many non-clinical studies pointing to the negative impact of low EI on a person's mental health, there is still a great deal of research that needs to be done in this area with clinical populations.

To date, only a handful of studies have examined the relationship between EI and each of the mental health difficulties described in this chapter, with many studies suffering from inadequate methodology. For example, the majority of studies use university students as participants meaning that the majority of research findings are not directly relatable to clinical populations. Secondly, most research investigates the relationship between overall EI and the symptoms of interest. The application of EI as a unitary construct diminishes the complexity of the relationship between EI and clinical disorders and the ability of EI measures to identify deficits in specific sub-skills of EI and the relevance of these sub-skills to the clinical disorder of interest.

To fully realize the importance and relevance of EI to clinical disorders longitudinal, prospective studies are required to evaluate the degree to which low EI represents a risk factor for different clinical disorders. Prospective studies would be particularly important with 'at-risk' young people. Further evaluation of the impact of EI assessment and development on existing therapeutic processes would provide important information about the relevance of EI to clinical disorders and the necessity for offering EI training for psychologists to incorporate into their therapy.

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The Role of Emotional Intelligence in Education

James D.A. Parker, Donald H. Saklofske, Laura M. Wood, and Terri Collin

Introduction

It is more crucial today than ever before that students are academically prepared to compete for knowledge and technology-based jobs. For students who are not adequately prepared, the economic and social costs can be extremely high. Early withdrawal from secondary school, for example, has been linked with higher levels of unemployment, lower earnings, and increased health problems (Jimerson, Egeland, Sroufe, & Carlson, 2000; Reyes, Gillock, Kobus, & Sanchez, 2000; Rumsberger, 1995). Historically, much of the work on predicting academic success, from elementary school to college, has focused on the impact of various cognitive abilities, socio-demographic factors and economic variables (Parker, Summerfeldt, Hogan, & Majeski, 2004). The fact that much of the variance in academic success remains unaccounted for by these variables has encouraged researchers to investigate additional predictors, including personality and conative factors. In recent years there has been increased attention to the role emotional and social competency has in academic success.

Popular attention was drawn to the link between educational success and emotional and social competency by Goleman in 1995, who suggested that emotional intelligence (EI) was more important than IQ in predicting success in life, including academic success. Along with the claim that EI accounts for a significant amount of the variance in academic success (beyond levels that can be attributed to IQ), the idea that EI can be taught and should therefore be a part of school curriculum continues to receive wide-spread attention in the education literature. Unfortunately, as others have noted (Matthews, Roberts, & Zeidner, 2004), many of these claims have received limited or unsubstantiated empirical support. This chapter examines the research evidence on the role EI plays in student success across a broad range of educational contexts

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(e.g., elementary, secondary, and post-secondary levels). This chapter also examines recent work exploring the malleability of various emotional and social competencies at different education levels. Questions related to whether EI can be taught or promoted are of growing interest to educators.

Emotional Intelligence and Academic Achievement

Studies regarding the EI of children and youth tend to focus on two related questions: the relationship between EI and academic achievement and the association between EI and a range of variables measuring adjustment (or maladjustment) in the school environment. In the latter type of research, it is assumed that adjustment is an important predictor of academic achievement, in which case EI can be viewed as also having an indirect impact on success.

Children and Youth

Despite the acceptance among many educators that EI is important for the success of school-aged children, there is limited direct research investigating the link between EI and academic success at the elementary school level. A recent study provides some empirical evidence for the importance of EI among younger children (7–12 years of age). Eastabrook, Duncan, and Eldridge (2005) asked 72 elementary school children to complete the youth version of the Emotional Quotient Inventory (EQ-i:YV; Bar-On & Parker, 2000) at the beginning of the school year (September). These scores were subsequently matched with academic records at the end of the school year (June). The EQ-i:YV is based on the Bar-On model of emotional intelligence (Bar-On, 1997) and was developed for use with children and adolescents 7 years of age or older. Along with a total EI score, the instrument provides a score for intrapersonal abilities (consisting of related abilities like recognizing and labeling one's own emotions), interpersonal abilities (consisting of related abilities like identifying emotions in others and empathy), adaptability (consisting of abilities like being able to adjust one's emotions and behaviours to changing situations or conditions), and stress management abilities (consisting of abilities such as delaying or resisting an impulse). Eastabrook et al. (2005) found that above-average students (those in the top third of their class) scored significantly higher than below-average students (those in the bottom third of their class) on total EI, as well as on the interpersonal, adaptability, and stress management scales. Using discriminant function analysis, Eastabrook et al. (2005) demonstrated that the EQ-i:YV scales could discriminate between above average and below average students with an overall correct classification rate of 84%. These findings support the idea that EI is an important predictor of the academic success of students as young as 7–12 years of age.

Because peer relations have been found to have an impact on antisocial behaviour and early withdrawal from school, Petrides, Sangareau, Furnham, and Frederickson (2006) conducted a study to examine the association between EI and a variety of pro-social and antisocial behaviours. One hundred and sixty sixth graders completed a measure of EI developed by the authors called the Trait Emotional Intelligence Questionnaire – Adolescent Short Form (TEIQue-ASF) and were asked to name all classmates who fit a particular behavioural description. The behavioural descriptions included phrases related to co-operation, disruption, shyness, aggression, dependence, leadership and intimidation. A student deemed as good to have as part of the group due to being nice and co-operative, who joined in, shared and gave everyone a turn, for example, would be nominated as co-operative. The teacher was also asked to nominate students based on pro-social and antisocial characteristics. Petrides et al. (2006) found that students with higher levels of EI were more likely to be nominated as having leadership abilities, and being co-operative; these students were less likely to be nominated as disruptive, aggressive and dependent. Students with higher EI were also found to be rated as more pro-social and less antisocial by their teacher. The researchers suggest that EI is important for developing friendships during childhood and that because difficulties with peers early on in life can have consequences for later adjustment, suggest that low EI may be a developmental risk factor for a host of problem behaviours.

Qualter, Whiteley, Hutchinson, and Pope (2007) examined the role played by EI in the transition from primary school to high school. They examined the hypothesis that adolescents with higher levels of EI may cope better with the stressful transition than adolescents with low EI. Two consecutive cohorts of grade 7 students ($N = 170$ and $N = 169$) completed the EQ-i:YV (Bar-On & Parker, 2000) and a measure of self-concept at the beginning and end of the school year. The researchers also obtained end-of-year school reports for the students, which included marks and teacher comments. In examining whether students with high, average, or low initial level of EI coped better with the transition, the researchers found that both the high and average groups had fewer teacher concerns as indicated on the school reports than the low EI group. The high and average EI groups also had higher marks than the low EI group.

Parker, Creque, et al. (2004) examined the link between EI and academic success in a sample of 667 American high school students from grades 9 to 12. At the beginning of the school year students completed the EQ-i:YV (Bar-On & Parker, 2000). At the end of the school year the students' academic averages for that year were matched with their scores on the EQ-i:YV. Students were placed into one of three groups based on their averages (successful, average, and less successful), and the three groups were compared on the various EI scales. The study found that successful students (those in the top 20th percentile of their class) scored significantly higher than the middle group, who scored significantly higher than the less successful students (those in the bottom 20th percentile of their class) on the interpersonal, adaptability, stress management,

and total EI scales of the EQ-i:YV. The results were consistent regardless of gender or grade (9–12).

Petrides, Frederickson, and Furnham (2004), using a sample of 650 British secondary students, also examined the association between EI and academic success. Petrides et al. (2004), in addition to academic achievement, looked at "deviant" school behaviours in relation to EI. Results revealed that while EI, as measured by the Trait Emotional Intelligence Questionnaire (TEIQue; a measure developed by the authors), had no direct effects on academic performance, EI did moderate the effects of IQ. For students with lower IQs, high EI was a significant predictor of academic performance. As IQ scores increased, however, the impact of EI diminished. Further, unauthorized absences and expulsions from school were found to be related to lower levels of EI. It should be noted that the authors used only grade 11 students in their study and achievement was operationalized using a narrow range of subjects (math, science, and English).

Amelang and Steinmayr (2006) conducted a study with 227 university-bound high school students with a mean age of 17 years. The students were German speaking and completed measures of general intelligence, trait EI, and ability EI. Grades from their latest report card were also collected. Trait EI and ability EI were not found to significantly predict school performance. Intelligence was found to be a better predictor of academic success. It should be noted, however, that school performance was based on a narrow range of subjects (math, science, German, and language). The sample also consisted of only university-bound high school students and did not represent a typical high school population.

Since Petrides et al. (2004) demonstrated that as IQ scores increase, the impact of EI decreases, gifted students have attracted increased attention in the literature. A continuing controversy surrounding this special group is whether they are more or less emotionally and socially competent than non-gifted child. A related question is whether EI has an impact on the academic success of gifted children.

Using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, & Caruso, 2002), an ability based measure of emotional intelligence, Zeidner, Shani-Zinovich, Matthews, and Roberts (2005) found that gifted students scored higher on total emotional intelligence than non-gifted students in grades 7–10. More specifically, gifted students scored higher than the non-gifted students on understanding emotions and managing emotions. Using multiple regression, the researchers showed that these differences could be accounted for by differences in verbal ability (with no impact from gender). On the other hand, when the researchers looked at differences on a self-report measure of EI, the Assessing Emotions Scale (AES; Schutte et al., 1998), the non-gifted students scored higher than the gifted students and the difference was not accounted for by gender or verbal ability.

In another recent study on EI and giftedness, Lee and Olszewski-Kubilius (2006) asked 234 gifted students in grades 10–12 to complete the EQ-i:YV

(Bar-On & Parker, 2000). The researchers also collected information on the students' SAT scores (verbal, math, and combined). Analyses showed that the SAT scores were not related to EI scores. In comparing the gifted students to the normative scores available for the EQ-i:YV, the researchers found that gifted males were similar to the normative males on total EI, while gifted females scored lower on total EI than the normative females. Both male and female gifted students scored significantly higher than the normative sample on adaptability, but significantly lower on stress management. There were no differences on their intrapersonal or interpersonal abilities.

Schwean, Saklofske, Widdifield-Konkin, Parker, and Kloosterman (2006) examined the relationship between EI and giftedness while exploring the larger question of whether gifted students are best served by being taught in a regular classroom or whether they should be streamed into classes for special programming. One hundred and sixty-nine gifted children in grades 4–8 completed the EQ-i:YV (Bar-On & Parker, 2000), as well as had their EI rated by a parent and a teacher. The majority of the students ($N = 123$) were in special programs designed for gifted children, while the other 46 remained in a regular classroom setting. The researchers first examined whether there were any differences in the EI of these two groups. The gifted students in the regular classroom scored higher on self-reported adaptability, parent-rated intrapersonal, adaptability, and total EI and teacher-rated adaptability. The emotional intelligence of the total sample of gifted students was also compared to the emotional intelligence of a matched (on age and gender) sample of non-gifted students (for which self-report and parent ratings only were available). For self-reported EI, the non-gifted students scored higher on their interpersonal abilities, while the gifted students scored higher on the intrapersonal and adaptability scales of the EQ-i:YV. For parent ratings, gifted students were rated higher than non-gifted students on adaptability, stress management and total emotional intelligence.

Post-Secondary Students

While there is evidence that various cognitive abilities are important predictors of success in elementary and secondary school, the predictive power of these variables drops considerably in the post-secondary context. Rode et al. (2007) outline a number of reasons why EI is likely to be a good predictor of post-secondary academic success. The academic pressures at university can be much more diverse and stress inducing. Students face multiple assignments from different instructors with varying expectations. Learning to appropriately allocate time between academic and non-academic pursuits, while functioning as independent adults, can be a particularly difficult challenge for many individuals making the transition from high school to university or college.

The transition from high school to a post-secondary environment is known to be a stressful situation for most students (Perry, Hladkyj, Pekrun, &

Pelletier, 2001) and the level of stress reported during the first year is usually higher than what is reported for subsequent years (Ross, Niebling, & Heckert, 1999). One important indicator of just how stressful the transition can be is the large proportion of first-year students who end up failing or withdrawing prior to graduation (Pancer, Hunsberger, Pratt, & Alisat, 2000). It is not uncommon for many institutions to report that a quarter of the students who enter university from high school do not return for a second year of study (Pancer et al., 2000). The reasons typically reported by students for leaving university include change of academic program, personal issues, financial concerns and health problems. Of these problems, personal reasons are often the most common (Parker, Summerfeldt, et al., 2004). These issues can include difficulties making friends, being away from existing friends and family members, coping with independence, and developing proper study habits for the new learning environment.

Given the types of struggles faced by students in their first year, it is not surprising that several recent studies have demonstrated a link between EI and success in the first year of university. Parker, Summerfeldt, et al. (2004) examined the impact of EI on the academic achievement of first year students who had recently graduated from high school (within 2 years). At the start of their first academic year, students completed the short version of the Emotional Quotient Inventory (EQ-i:Short; Bar-On, 2002); this data was later matched with students' academic records for the year. Academically successful students (those with a first year average of 80% or greater) and academically unsuccessful students (those with a first year average less than 60%) were compared on the various EQ-i:Short variables. While the two academic groups did not differ on age, course load or high school average, academically successful students scored significantly higher than the unsuccessful students on the intrapersonal, adaptability, stress management and total EI scales.

A similar pattern of results was found in a subsequent study (Parker, Duffy, Wood, Bond, & Hogan, 2005) using samples of first year students at several American universities. Following the same procedure as Parker, Summerfeldt, et al. (2004), students completed the EQ-i:Short (Bar-On, 2002) at the start of first term (all participants had graduated from high school within the previous 2 years). Based on their first year grade point average, academically successful and academically unsuccessful students were identified. Parker, Duffy, et al. (2005) found the academically successful students to have higher total EI scores, as well as higher scores on most of the EQ-i:Short scales, than academically unsuccessful students.

Rather than using first year grades as the indicator of academic success, Parker, Hogan, Eastabrook, Oke, and Wood (2006) examined academic retention among first year students (all participants had graduated from high school within the previous 2 years). Parker et al. (2006) compared the scores from the EQ-i:Short, assessed during the first week of term at the university, in two groups of participants: students who withdrew from the university before the start of a second year and a sample of students (from the same cohort) who returned to the university for a second year of study (randomly matched with

the first group on the basis of age, gender, and ethnicity). Students who were persisting with their studies were found to score significantly higher than students who withdrew on most of the EI dimensions assessed by the EQ-i:Short.

Not all of the previous research using post-secondary samples has found EI to be a useful predictor of academic success. O'Connor and Little (2003), in a small study that used 90 introductory psychology students (aged 18–32), asked students to complete both the EQ-i (Bar-On, 1997) and the MSCEIT (Mayer et al., 2002). Cumulative GPA was used as the indicator of success and was matched with the various EI variables. The total EQ-i score, as well as the intrapersonal and stress management scores, were significantly correlated with GPA; the total MSCEIT score was not associated with GPA, although the Understanding Emotions dimension of the MSCEIT was significantly correlated. It is important to note, however, that all significant correlations were weak in magnitude. The authors concluded that the low pattern of correlations suggested that EI was not a good predictor of academic success.

Newsome, Day, and Catano (2000) also present evidence that EI is not an important predictor of academic success in a post-secondary environment. The authors used a sample that consisted of 180 students from an introductory psychology course. Students ranged in age from 17 to 56 years, and only a third of the students were in their first year of student at the university. Participants completed measures of general intelligence, personality, and EI (assessed using the EQ-i). Using GPA as the measure of academic success, Newsome et al. (2000) found no significant associations between EI and academic success.

There are a number of methodological issues that likely explain some of the discrepancy in the literature on EI and post-secondary success. It should be noted that O'Connor and Little (2003), as well as Newsome et al. (2000), combined full-time students with part-time students, recent high school graduates with mature students, and first year students with upper year students. The work reported by Parker and colleagues focused specifically on full-time students who had recently graduated from high-school (within the previous 2 years). Part-time students, mature students and upper year students may face very different challenges than students recently making the transition from high school to university (Parker, Summerfeldt, et al., 2004). Since EI levels are expected to change with increasing age (Bar-On, 1997), the use of student samples with diverse age-ranges is a potential confound when studying the link between EI and academic success.

To date, most of the literature on EI and post-secondary success has tended to focus on the first-year experience. Barchard (2003), however, has investigated the impact of EI on academic performance for a sample of upper-year students. The researchers had a sample of 150 undergraduates (at various years of study at their institution) complete various cognitive, personality, and a variety of EI measures, including the MSCEIT (Mayer, Salovey, & Caruso, 1999) and the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Although EI was found to be associated with academic success (cumulative GPA for the academic year), cognitive ability and

personality variables were found to be better predictors of academic performance. The authors acknowledge the limited generalizability of their study, noting that they should have distinguished between different years and areas of study.

The potential differential impact of EI on academic success in different types of academic programs is a question that is just beginning to attract research attention. One exception has been in the area of business programs, where the link between EI and academic success has long been noted (Goleman, 1995). Rozell, Pettijohn, and Parker (2002) examined EI in a sample of undergraduate and graduate business students. The purpose of the study was to examine the relationship between EI and academic success. The researchers demonstrated a significant relationship between several factors of EI (as measured by the test developed by Goleman for his 1995 book) and academic performance, as indicated by GPA.

In a more recent study, Rode et al. (2007) examined the link between EI (measured using the MSCEIT; Mayer et al., 2002) and a variety of academic variables in a large sample of undergraduate business students. The researchers found that EI successfully predicted public speaking effectiveness, group behaviour effectiveness and cumulative GPA (but all at a relatively low level). Hierarchical multiple regression found EI to be related to public speaking effectiveness, but not group behaviour effectiveness or GPA. Interaction terms for EI and conscientiousness, however, were significant for all three variables above and beyond cognitive ability; relationships between EI and performance were stronger at a higher level of conscientiousness.

Medical Education Students

The education of medical professionals, particularly within nursing and medical education, has historically focused on the disease-process and the pathophysiology of disease in the patient. Although qualitative attributes such as interpersonal and communication skills, professionalism, and the ability to display and provide empathic and compassionate care are less tactile than the skills used to diagnose and treat, they are equally important. Success in medicine should not be restricted to the cognitive capabilities of health care professionals, but should also include the non-cognitive characteristics, which together impact the complete care of the patient. In recent years, attention has been shifting to the study and assessment of emotional and social competence in health education, in attempts to address concerns about the education of medical professionals and secure the health and safety of patients.

Training and education programs in the health field have placed an insurmountable reliance on the cognitive aspects involved in the discipline, and an underwhelming emphasis on the emotional and social skills that contribute to competence. The emphasis placed on cognitive abilities is linked to the manner

in which many health professions have defined success, as well as the fact that intellectual achievement and aptitude have been easier constructs to assess. Although traditional medical and nursing education has been based on an apprenticeship paradigm strongly influenced by the biomedical model (Carrothers, Gregory, & Gallagher, 2000; Freshwater & Stickley, 2004), education programs have begun to place more significance on non-cognitive abilities and the role in which these abilities play in effecting interpersonal (patient outcomes) and intrapersonal (professional success) outcomes. There are many important effects derived from being an emotionally competent practitioner. The ability to navigate through difficult patient interactions, cope with adverse situations, and be able to relate to patients, are qualities essential to meeting the expectations as defined within the role of a competent clinician. One example of the importance of a physician's ability to communicate effectively was documented in a study employing 232 oncology patients (Cassileth, 2001). Among the technical skills of the physician (e.g., correctness of treatment, physician competence), more than 98% of patients cited the importance of communication and psychosocial aspects of care such as the nature of information (e.g., quality), opportunities for mutual interaction (e.g., question asking), and physician understanding, as fundamental priorities of medical care.

Interpersonal and communicative abilities are important abilities in most EI models and these abilities appear to be critical to the daily outcomes of health professionals. Studies within nursing education have cited the important role played by EI in the use of adaptive coping strategies and reducing work-related stress (Montes-Berges & Augusto, 2007). Similarly, EI has been noted to be positively related with peer interaction within problem-based learning in undergraduate medical education, an important ability as many medical professionals function within team environments and the medical system at large (Austin, Evans, Magnus, & O'Hanlon, 2007). Empathy (a basic dimension in all EI models) has also been cited as a significant predictor in patient satisfaction and is clearly essential for impacting and securing patient outcomes (Kim, Kaplowitz, & Johnstone, 2004).

Various EI-related dimensions are becoming recognized as variables that need to be used when selecting individuals into medical school and residency programs (Carrothers et al., 2000; Louie, Coverdale, & Roberts, 2006). Some medical and nursing schools have begun to use EI measures to predict the performance of those individuals entering the health profession system (Louie et al., 2006). It is important to highlight the narrowness of the typical selection process for medical programs. While this process may include interviews, essays, personal statements, and biographical essays, it continues to focus primarily on high GPA's and MCAT scores. In general, there is under emphasis on components like empathy and non-verbal communication – skills linked with positive physician–patient and nurse–patient relationships. Medical educators have begun to emphasize the need for medical programs to explore factors other than the MCAT (particularly non-cognitive attributes associated with effective physicians) as potential criteria for selection into medical school

(Albanese, Snow, Skochelak, Huggett, & Farrell, 2003; Cohen, 2001). Important medical professional organizations, such as the Accreditation Council for Graduate Medical Education (ACGME), the American Board of Medical Specialties (ABMS), and the Royal College of Physicians and Surgeons of Canada, have emphasized the multiplicity of physician roles such as medical expert, collaborator, manager, health advocate, scholar, professional, and communicator and the need to develop and utilize tools that assess the many skills of a competent practitioner (Accreditation Council for Graduate Medical Education, 2001/2002; CanMEDS 2000 project, 1996; The Medical School Objectives Writing Group, 1999).

Teaching EI

Children and Youth

Given the growing empirical link between EI and academic success, it is not surprising that there has been an increase in interest in programs and activities that target the development or enhancement of various EI competencies in children and youth in elementary and secondary schools. Implementation of programs that target emotional and social competencies has become a priority in many schools (Elias, Bruene-Butler, Blum, & Schuyler, 2000). Until recently, however, there has been little evidence supporting the inclusion of such programs within schools. This section reviews some of the evidence supporting the inclusion of social and emotional interventions and programs within the elementary and secondary school system. Teaching emotional intelligence within the school system can be approached in many ways. Pellitteri, Dealy, Fasano, and Kugler (2006), for example, suggest that intervention can take place at three different levels: school based (programs that attempt to create a positive school climate); class-based (learning opportunities that are embedded in regular school curriculum); and individual-based (learning activities focused specifically on creating or promoting a specific EI-related ability). Although many programs in existence claim they assist in the development of EI, empirical data is often lacking with respect to whether (and by how much) these programs improve specific competencies.

Eastabrook et al. (2005), noted earlier, examined the link between EI and academic achievement in elementary school aged children, as well as the impact of a curriculum program designed to enhance students' levels of emotional and social competency. Students completed the EQ-i:YV (Bar-On & Parker, 2000) at the beginning of the school year (September), as well as at the end of the school year (June). In comparing the students' scores over time, the researchers showed that total emotional intelligence scores were higher at the end of the school year, as were interpersonal and stress management scores, which were strongly focused on within the program (getting along with others and anger

management are examples of topics covered by the program). This study provides evidence that EI scores can change and that programs implemented school-wide to enhance emotional and social competencies can make a difference.

Qualter et al. (2007) examined the successful transition from elementary to high school. They found that adolescents with higher levels of EI had greater success in their first year at high school. These researchers suggested that helping adolescents develop better coping strategies through EI training might help them better navigate the transition. To answer this question Qualter et al. (2007) examined the impact of an EI intervention program on levels of EI, self-worth, and school behaviours. The program involved all teachers and grade 10 peer mentors attending an "EI awareness-raising" workshop and receiving materials related to EI to assist the grade 7 students with transition-related issues (e.g., bullying). Controlling for cognitive ability, the control group showed no change from September to June. The intervention group, however, showed significant improvement for those who were in the low EI group at the beginning of the year. The intervention group also saw changes in their perceived scholastic ability, and perceived social competence above and beyond what was found for the control group over the course of the academic year.

Although not developed specifically to be an EI intervention, the Promoting Alternative Thinking Strategies (PATHS) program is an emotional literacy program that has received a relatively substantial amount of research attention. The aim of the program is to help children develop a variety of emotional and social skills (e.g., self-awareness, empathy) through the use of lesson plans, home activities, activity sheets, as well as through other learning tools to be delivered by teachers (Kelly, Longbottom, Potts, & Williamson, 2004). Kelly et al. (2004) describe the inclusion of the PATHS program in a class of twenty-five 9 and 10 year old children for one year. Based on qualitative data from the teachers and students, the program appears to be a useful addition to the classroom; teachers felt that the program assisted in the students' development of emotional skills, particularly being able to understand and manage emotions. The teachers also reported more cooperation among the students. The students also enjoyed the program and felt that it helped them to handle their emotions better and to understand others. Additional empirical evidence for the use of the PATHS program is provided by Curtis and Norgate (2007). Five elementary schools were included in the pilot project and 3 schools were used as a control. For both the control and intervention samples, students were rated at the beginning of the year and again at the end of the year on a handful of behavioural indicators by their teachers. Significant improvements were seen among the intervention group, but not the control group, on all ratings by the teachers (emotional symptoms, conduct problems, hyperactivity, peer problems, and consideration). The researchers also reported on the positive feedback received from the teachers in the PATHS schools. The PATHS program has also been found to increase the emotional and social skills of preschool children (Domitrovich, Cortes, & Greenberg, 2007) and students in special-education classrooms (Kam, Greenberg, & Kusche, 2004).

Post-Secondary Programs

Although job-related skills are important for success in the workplace, today's job market requires students to have additional skills that may or may not be taught in their university curriculum. It has been suggested that many students enter the workplace only to find that they are not prepared for many of the pressures that come with the job (Liptak, 2005). Post-secondary institutions have begun to show interest in helping their students develop the emotional and social skills needed to succeed after completing their degrees. Recent research has demonstrated the positive impact of postsecondary education on promoting emotional and social competency. Parker, Saklofske, Wood, Eastabrook, and Taylor (2005) examined the pattern of change in EI scores (as measured by the EQ-i:Short) in undergraduate students over the course of several years of study. They found that the EI levels of the students increased significantly over 3 years at the university, and that the increased levels were greater than levels that could be accounted for by simply being 3 years older. This study demonstrates that even without a specific EI program, universities are assisting students in becoming more emotionally intelligent.

VanderVoort (2006) has suggested that post-secondary institutions may want to require new students to take specific classes or programs that promote EI, or that existing courses in the curriculum be modified to foster the development of various EI abilities. A recent study by Wood, Zohar, Bates, and Parker (2006) examined the impact of a first-year business management course that sought to promote various emotional and social competencies. Students' EI scores at the beginning and end of the course were compared, as well as whether the change was similar to students not in the course. The study found that the students in the business course had significantly higher EI scores at the end of the course compared to a control group of first year students.

Morris, Urbanski, and Fuller (2005) developed a set of exercises to be used within business courses at an undergraduate or graduate level. They recommend that courses particularly suited for the exercises and inclusion of EI developments are those that focus on management, organizational behaviour and leadership. To assist in developing emotion recognition, the authors provide an activity revolving around the visual arts, while poetry is the medium used for developing emotional self-awareness. The impact of these exercises was assessed by Morris et al. (2005) using several student learning projects/assignments, examples of which are anecdotal evidence from self-reflections and students' ability to analyze case studies. The evidence gathered suggests that the activities had positive impacts on the students.

Wood, Parker, Rowbotham, Taylor, and Eastabrook (2006) recently reported on the impact of a student mentoring program conducted with first-year students at a small Ontario university. The study included 635 full-time first-year students who had started their post-secondary education within 24 months of graduating from high school. At the start of the academic year,

the students completed an EI measure called the College Achievement Inventory (CAI; Wood, Parker, & Taylor, 2005). Using previously established cut-off scores, 276 students were identified as "at risk" for academic failure or withdrawal. The at-risk students were randomly assigned to two groups: Approximately two-thirds of the students were invited to participate in a student-mentoring program over the summer months, while the remaining students were used as a control group. The program was delivered over the summer months using student mentors who had experience working directly with students (e.g., residence dons). The program consisted of regular phone or email contact between the mentors and the at-risk students. Activities related to the phone contact focused on assisting the students to identify and develop plans for overcoming a variety of personal, financial, and academic challenges. The researchers were able to show that at-risk students who participated in the summer mentoring program were more likely to return for their second year than those at-risk students in the control group (81% versus 67%).

Future Research

The work presented in this chapter summarizes significant contributions to the growing body of literature on emotional intelligence. It is important to note, however, that this is a relatively new area of research and, despite the recent influx of empirical papers, much work remains to be done. Some of the recent evidence is conflicting and leaves many unanswered questions and avenues to be explored. A discrepancy in the findings that tends to stand out is the difference in results based on whether an ability-based measure of EI (e.g., MSCEIT; Mayer et al., 2002) or a trait-based measure of EI (e.g., EQ-i; Bar-On, 1997) is used. Different results also occur depending on how success is defined. EI seems to be important for success in some academic areas but not others. Future work needs to look at a variety of subject areas within the elementary and secondary curriculum to see where EI plays a role. For post-secondary institutions it may be necessary to determine whether EI differentially predicts success by major; perhaps emotional and social skills are important for liberal arts more so than for the sciences.

It is also critical to look at additional indicators of success. Studies that have been conducted often focus on a single academic year. Future research should look at long term predictability of emotional intelligence by examining multiple years of academic performance. Does EI in grade 9 predict marks in grade 12? Does EI in the first year of university predict marks in the third year? Even more important, perhaps, is to look at whether EI in grade 9 predicts completion of high school and whether EI in the first year of university predicts retention to graduation. Much of the research presented in this chapter has also been conducted in a somewhat piecemeal fashion. There is a need for comprehensive studies examining the impact of EI on academic success. Researchers should

take into account such factors as general intelligence and personality, as well as demographic variables such as age and gender, when conducting such studies.

One area that needs more exploration is the assessment of EI educational programs, for both school-aged and post-secondary students. There is a vast literature promoting the inclusion of emotional-social learning in academic settings; however, the empirical support to back the ideas is very sparse. Zeidner, Roberts, and Matthews (2002) suggest that little is known about the actual effects of EI programs and that few of the programs that exist can actually be called EI interventions. This is likely due to the fact that many of the programs called EI interventions predate the concept of EI (Zeidner et al., 2002) and therefore were not developed to be such a program. Rather than trying to fit existing school-based programs into the EI paradigm, perhaps programs need to be developed with the specific objective to enhance the emotional intelligence of students.

Zeidner et al. (2002) provide guidelines for developing and implementing EI programs within schools. Programs should be based on a clear conceptualization of EI, should have specific objectives, and the context for the implementation of the program needs to be clearly outlined. The program should also be fully integrated into the school curriculum and allow for the transfer of skills learned in the classroom to other contexts. Staff must be provided with professional development opportunities related to program implementation, and program effectiveness should be assessed in the most psychometrically sound way possible. It is expected that as the construct of EI becomes more familiar many of the questions that remain regarding its impact on learning and success, as well as whether it can be taught, will be better addressed. Despite some shortfalls, the studies presented in this chapter offer a good starting off point for future research in this area.

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Part IV
New Directions and Conclusions

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Emotional Intelligence Across Cultures: Theoretical and Methodological Considerations

Gina Ekermans

Introduction

Societies continue to become more culturally diversified. In part this is due to the globalization of world trade and increase in migration and tourism. In addition, multinational corporations are gaining increased influence. The international workforce continues to become more heterogeneous and the workplace more multicultural. These changes influence the behavioral sciences, which are becoming more cross-culturally orientated (Fontaine, 2005). Researchers and practitioners of industrial/organizational psychology should be cognizant of cultural diversity and its implications in the workplace. One such implication is that cross-cultural psychological assessment continues to increase (Casillas & Robbins, 2005; Van de Vijver, 2002).

Tests of Emotional Intelligence (EI) are increasingly being used extensively around the world. For example, the Twenty-item Toronto Alexithymia Scale-III (TAS-20) (Parker, Taylor, & Bagby, 2003) has been translated into 18 languages. Spanish, French and Portuguese translations of the English Trait Meta-Mood scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) exist (Fernandez-Berrocal, Extremera, & Ramos, 2004; Queirós, Fernández-Berrocal, Extremera, Carral, & Queirós, 2005). The Bar-On Emotional Quotient Inventory (EQ-i, Bar-On, 1997) has been translated into 22 languages and normative data is available in more than 15 countries (Bar-On, 2000). Three peer-reviewed publications that report results based on French (Mikolajczak Luminet, Leroy, & Roy, 2007), Greek (Petrides, Pita, & Kokkinaki, 2007) and Spanish (Petrides, Pérez-González, & Furnham, 2007) translations of the English Trait Emotional Intelligence Questionnaire (TEIQue, Petrides, & Furnham, 2003) exist.

When tests are transported from one culture to another the comparability of psychological measurements across different cultural groups should be

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investigated. More specifically, statistical tests of bias and equivalence should routinely be conducted as such bias and equivalence investigations have theoretical and practical (applied) relevance. Bias refers to a range of factors that introduce disturbances into cross-cultural assessment. The measurement implications of bias in terms of the comparability of scores over cultures, is termed equivalence (Van de Vijver & Leung, 1997). Culture influences the transportability of instruments on various levels. For example, an absence of structural equivalence (i.e., obtaining equal factor structures in various cultural groups, Van de Vijver & Leung, 1997) could point towards bias at the construct level. In practice this could mean that a given psychological construct differs across cultural groups. Research has shown that the dimension *Interpersonal Relatedness* in the Chinese indigenous personality measure, the Cross-Cultural Personality Assessment Inventory (CPAI-2), does not load on any of the Big Five personality factors in the Western model (Cheung, Cheung, Wada, & Zhang, 2003). Another example is conceptions of intelligence in non-Western cultures that include "social intelligence" not included in traditional Western intelligence tests (e.g., the work of Sternberg, 1986).

When anomalies at item level exist, item bias is detected. Differential item functioning could point towards differences in the psychological meaning of items over cultures or inapplicability of item content in a specific culture. Two types of item bias with different practical relevance exist. Non-uniform item bias (i.e., differences in item discrimination) has implications at the metric invariance/equivalence level. The implication of evidence of this type of bias is that latent variables are not measured on the same metric scales across different groups. Hence, workplace decisions (e.g., personnel selection) based on relative differences between groups on the latent trait (e.g., EI) may not be meaningful, except where group specific norms are used to avoid adverse impact (e.g., similar selection ratios for majority and minority groups). Uniform bias (i.e., a difference in item difficulty) exists when the regression of the observed item scores on the latent variable differs across groups in terms of the item intercept. If assumptions of scalar equivalence remain untested, the impact is likely to be minimal for within-cultural-group decisions. This is because within a more or less homogeneous group, effects score bias should be distributed randomly over scores. However, between-group differences may be erroneously interpreted in the absence of scalar invariance evidence. Group differences may be due to measurement bias and not to real differences in the construct or criterion that is the target of measure. In the absence of such equivalence investigations, the truth about group differences on the latent trait (i.e., EI) and subsequent practical implications for group membership in the workplace, is simply not known.

The main focus of this chapter is a brief review of key aspects of three decades of research on emotion (i.e., emotional regulation, expression, and recognition) and culture as cross-cultural research on Emotional Intelligence (EI) is limited. Implications for EI conceptualization and operationalization within the framework of different cultures are discussed. The discussion centers on proposed arguments regarding possible cultural bias elements in

self-report EI instruments by focusing on two prominent self-report mixed model EI measures (i.e., Bar-On Emotional Quotient Inventory Short, EQ-i:S, Bar-On, 2002; Swinburne University Emotional Intelligence Test, SUEIT; Palmer & Stough, 2001). It is argued that the Western cultural origin of both these tests contains descriptions of EI as defined within those cultures (i.e., Australia for the SUEIT and Canada for the Bar-On EQ-i:S). It is proposed that the increasingly multicultural global work environment mostly advocate value systems inherent to the Western industrialized world system (high individualism and low power distance; Hofstede, 1980, 2001). However, respondents being assessed within these environments are increasingly coming from different cultural backgrounds with known differentiation in cultural value dimensions. Hence, cultural differences in values could introduce bias into Western cross-cultural EI measures when these are applied cross-culturally. This has implications for research and practical workplace decisions based on such inventories. Specific items in these inventories are predicted to be susceptible to cultural bias based on the item content which, for example, taps some aspect of individualism or power distance (cultural dimension on which nations tend to differ). Methodological issues related to cross-cultural EI research is also highlighted.

Emotions, Emotional Intelligence and Culture

Next to motivation, perception, and cognition, emotions are viewed as one of the basic functions of the human psyche. Since the relatively recent advent of the construct of Emotional Intelligence (EI) in 1990 (Salovey & Mayer, 1990) the construct has continued to capture the interest of a wide audience of scholars and practitioners. Mirroring advances in emotion research, EI has been connected with numerous cutting-edge areas of psychological science, including neuroscience (Bar-On, Tranel, Denburg, & Bechara, 2003; Gawryluk & McGlone, 2007; Kemp et al, 2005). EI research continues to gain momentum with evidence from various studies displaying an association of EI with psychosomatic and physical health (e.g., Schutte, Malouff, Thorsteinsson, Bhullar, & Rooke, 2007; Saklofske, Austin, Galloway, & Davidson, 2007), life satisfaction (Extremera & Fernández-Berrocal, 2005; Gignac, 2006), work performance (Van Rooy & Viswesvaran, 2004), stressor appraisal and task performance (Lyons & Schneider, 2005), team (e.g., Jordan, Ashkanasy, Hartel, & Hooper, 2002) and academic performance (e.g., Parker et al., 2004; Austin, Evans, Goldwater, & Potter; 2005).

One area of research in EI, however, that remains a relatively uncharted domain, is that of cross-cultural EI research. Cross-cultural research aims to develop and extend a more universal psychology by investigating the generalizability of psychological theory in different cultures (the practice of

"transporting and testing"). Failures to establish generalizability (when research methodology and measurement instruments are sound) may be interpreted in terms of cultural variations in behavior (Berry, Poortinga, Segall, & Dasan, 2002). This has two implications for future cross-cultural EI research. Firstly, when monocentered instruments (instruments from a single Western cultural background, Van de Vijver & Leung, 2001) are used in generalizability studies (e.g., from Western to non-Western cultures), they are more likely to run into bias problems (Van de Vijver & Leung, 2001). Therefore, testing of the equivalence of scores across different groups should routinely be conducted (Van de Vijver & Leung, 2001). This is a weakness of the limited cross-cultural EI studies conducted up to this point. Secondly, when cultural bias (construct, item or method) is uncovered, ways to minimize bias (i.e., method bias) in EI assessment should be considered, whilst evidence of construct and item bias should be scrutinized to better uncover the cultural variability of the construct. This knowledge could then be applied in reducing ethnocentrism (Berry et al., 2002; Hofstede, 2001) in current EI instruments, as well as designing better "culturally tuned" EI development programmes (e.g., Herkenhoff, 2004).

This chapter is divided into three main sections. First, a brief overview of the current state of cross-cultural EI research is presented. Next a review of key aspects of three decades of emotions and culture research and possible implications for EI conceptualization and operationalization within the framework of different cultures is discussed. Lastly, methodological issues related to cross-cultural EI research is highlighted. The discussion will focus on two prominent mixed model self-report EI measures (i.e., the EQ-i: S, Bar-On, 2002; SUEIT, Palmer & Stough, 2001). The SUEIT model (Palmer & Stough, 2001) broadly subscribes to the (Salovey & Mayer, 1990; Mayer & Salovey, 1997) EI model. It defines EI in terms of five dimensions (i.e., Emotional Recognition and Expression, Understanding Others Emotions, Emotions Direct Cognition, Emotional Management and Emotional Control). The broader Bar-On model (1997, 2002) proposes that EI encapsulates emotional, social, and personal competencies, skills, and non-cognitive capabilities that may arise from the effective use or regulation of emotions and place emphasis on adaptation to environmental demands.

It will be argued that culture influences the transportability of instruments on various levels (e.g., structural or metric equivalence). For the purpose of this discussion, national culture is defined as the pattern of values, attitudes, and beliefs that affect the behaviour of people from different countries (Hofstede, 2001) described in terms of the Hofstede (2001) cultural dimensions. The relevant dimensions include: Individualism–Collectivism (i.e., the relationship of the individual to the group), Power Distance (i.e., status differentials that exist within groups) and Uncertainty Avoidance (i.e., rituals concerning the future and avoidance of anxiety) (Hofstede, 1980, 2001).

A Brief Review of the Current State of Cross-Cultural EI Research

Based on the Van de Vijver and Leung (1997, 2001) taxonomy[1] of studies in cross-cultural psychology, EI research in this domain has mostly yielded psychological differences and generalizability studies, and the empirical evidence on ethnic differences have been noted to be both "...scant and contradictory" (Matthews, Zeidner, & Roberts, 2002, p. 71). This remains to be true for research on both the prominent ability (the Multifactor Emotional Intelligence Scale, MEIS; and the Mayer, Salovey and Caruso Emotional Intelligence Test, MSCEIT; Mayer, Caruso, & Salovey, 2000) and the mixed model (self-report) measures of EI (e.g., EQ-i, Bar-On, 1997; Schutte Self-Report Inventory/ Emotional Intelligence Scale, SSRI/EIS, Schutte et al., 1998, SUEIT, Palmer & Stough, 2001).

For example, a recent psychological differences study with the trait based Emotional Intelligence Scale (EIS, Schutte et al., 1998) surprisingly reported higher total EI scores for minority ethnic groups (Blacks, Hispanics), leading the researchers to pose the question of whether in fact "...majority groups could sue using a claim of test bias" (Van Rooy, Alonso, & Viswesvaran, 2005, p. 694), as group difference in mean predictor scores could be a likely cause of adverse impact. Rozell, Pettijohn, and Parker (2002) reported significant differences between domestic ($n = 219$) and international students ($n = 76$) at an American university, in terms of overall EQ scores and individual factors on the Emotional Quotient test (Goleman, 1995). Acknowledging that the study assumes, and not explicitly tests, for whether cultural test score bias could be the cause of the reported cultural differences, they conclude that opportunities for success in business for the international students might be limited by their EI.

Three generalizability studies, to date, on the EI construct (mixed model measures) across diverse ethnic/cross national cultural groups exist. A study of the EQ-i: YV (Bar-On & Parker, 2000) on Canadian Aboriginal versus non-Aboriginal youth was conducted by Parker et al. (2005). This study is exemplary

[1] The taxonomy entails a 2 × 2 classification of studies in (cross-)cultural psychology, based on two dimensions (i.e., whether the purpose of the study is hypothesis-testing or exploratory, and whether or not contextual variables were included). Four categories are distinguished. Hypothesis testing studies include *generalisability studies* that explore whether research findings obtained in one group (e.g., Western group) can be replicated in another group (e.g., non-Western group). No contextual elements are taken into account. Equivalence is usually assessed. When contextual factors are accounted for in hypothesis testing studies, a c*ontextual theory/theory driven* study is conducted. Studies that have an exploratory orientation are grouped into *psychological differences* (no consideration of contextual factors) or *ecological linkage/external validation* studies. The former applies an instrument in two cultural groups, without any particular theory regarding the nature of cross-cultural differences to be expected. The latter, by including a set of contextual variables in an exploratory manner, aims to provide evidence for specific interpretation of observed cross-cultural differences (Van de Vijver & Leung, 1997, 2001).

in acknowledging and theoretically proposing how cultural factors might influence the operationalization of the construct in the two different cultural groups. The results of the Parker et al. (2005) study provided preliminary support for equivalence of the EQ-i: YV (Bar-On & Parker, 2000) scores over the two groups (results of a multi-group Confirmatory Factor Analyses, CFA, i.e., configural invariance,[2] is reported), although not to the extent that the full measurement invariance[3] (i.e., configural, metric and, scalar invariance) of the instrument is explicitly investigated. In addition, consistent group differences over the groups on the total EI score and Interpersonal, Adaptability, and Stress Management subscales (aboriginal students scored consistently lower) and post hoc discussions on possible effects and causes of these differences were presented. Evidence, albeit limited, to support the invariant operation of the EQ-i: YV, was presented in this study (Parker et al., 2005).

Rahim et al. (2002) investigated the relationship of self-awareness, self regulation, motivation, empathy, and social skills (Emotional Quotient Index, EQI; Rahim et al., 2002) of supervisors to subordinates' strategies of managing conflict. Single group CFA results for the EQI for the data from seven countries (USA, $n = 303$; Bangladesh, $n = 152$; Hong Kong and Macao, $n = 79$; Greece, $n = 132$; Portugal, $n = 86$; China, $n = 210$; South Africa, $n = 84$) was reported, as well as a fully unconstrained multi-group CFA analysis (configural invariance) for each of the countries with the USA sample. No theoretical explanations for why culture might produce differences in the cross-national CFA results were provided. No further tests of invariance were reported. The authors suggest that the results supported a somewhat consistent cross-country pattern, although admitting that there were differences in results, and that ". . .it is not possible to determine whether these differences came from the small and convenience samples or differences in cultures" (Rahim et al., 2002, p. 321). It should be noted that five of the seven country samples sizes fell below the $n = 200$ structural equation modeling sample size guideline (Hair, Black, Babin, Anderson, & Tatham, 2005), with the smallest sample being 79, casting doubt on the generalizability of the results.

The only cross-cultural EI study that has explicitly tested for full instrument invariance was on two early measures of self-report EI (TMMS, Salovey et al., 1995; TAS-20; Bagby, Taylor, & Parker, 1994) conducted by Ghorbani et al. (2002). By combining the factors of these measures into an input

[2] Configural invariance (Vandenberg & Lance, 2000) is also known as the test of "factor structure equivalence" (Hair et al., 2005). Evidence for configural invariance points towards a similar conceptualisation of constructs in different groups (absence of construct bias), to the extent of the data supporting the same number of factors and similar items associated with each factor (Meredith, 1993).

[3] A lack of measurement invariance evidence is known to compromise the unambiguous interpretation of between group differences (Byrne & Watkins, 2003; Cheung & Rensvold, 2002; Vandenberg & Lance, 2000) rendering cross-cultural comparisons on cultural mean differences to be misleading and ultimately, possibly meaningless.

(attention to emotions), process (clarity of emotions) and output (repair of emotions) information-processing system, they conducted CFA and measurement invariance procedures to fit the data, obtained from Iranian ($n = 231$) and American ($n = 220$) university students, to the model. Even though CFA and measurement invariance procedures provided evidence for cross-cultural similarities in the fit of the a priori higher-order factor structure, subsequent analyses revealed cross-cultural dissimilarities in the actual processing of emotional information (interrelationships among factors differed). This confirmed the notion that contrasts between Iranian and American social life (individualistic versus collectivistic values; Hofstede, 2001) might have implications for the processing of emotional information in these groups (Ghorbani et al., 2002).

Preliminary research on EI ability measures have proven no better in unraveling cross-cultural differences in EI. The criterion for correctness ("right" answers) on ability EI test items (MEIS, Mayer, Salovey, & Caruso, 2000; Mayer, Salovey, Caruso Emotional Intelligence Test, MSCEIT; Mayer, Salovey, Caruso, & Sitarenios, 2001) are typically based on target, expert or consensus criteria. Mayer, Caruso, et al. (2000) argue that the basis for claiming "right" answers is grounded in evolutionary and cultural foundations for the consistency of emotionally signaled information. They cite the work of Darwin on the evolution of emotion (1872/1965) and that of Ekman (1972) who have provided evidence for a strong universal emotional "language" and facial expression of emotion among humans. In addition, they argue that replications across literary sources and more recently, the Internet, of ideas or "cultural memes" is comparable to biological genes. Therefore, emotional ideas are disseminated and reproduced as popular ideas according to the degree to which they are found useful and functional within a given culture. They conclude that consensus criterion is the best single means of determining a correct answer by stating that "...if one subscribes to the idea that emotional signals evolve, either biologically or culturally, then a wide, representative, sample of observers is probably a good judge of correctness under at least some circumstances" (Mayer, Caruso, et al., 2000, p. 327). Based on this reasoning it could, therefore, be argued that when consensual scoring is used in ability measures, the possible effects of cultural bias in this type of EI measurement might be controlled. Could this be an alternative explanation for results reported by Roberts, Zeidner, and Matthews (2001), who report no differences between ethnic groups when consensual scoring was employed (MEIS, Mayer, Salovey, et al., 2000), but when expert scoring was used, White Americans outperformed minority American groups on many of the subscales? It should, therefore, be asked whether ethnic differences, when uncovered with expert scoring, could be interpreted as "real" differences between these groups, as it seems plausible to argue that cultural bias effects might be masked by

expert scoring. Therefore, should consensus scoring[4] not always be used to minimize any possibility of cultural bias in ability based EI measures?

The goal of the preceding section was to provide a brief and by no means exhaustive overview of previous attempts to study the EI construct over different cultures. As is evident, many theoretical and methodological challenges implicitly embedded in any attempt to study EI and culture, face the researcher attempting to tread this unchartered domain.

Culture and Emotion Research: Implications for EI

An important question central to this discussion is whether the notion of an "ideal" EI profile is context dependent, in the sense that "appropriate" or "effective" emotional behaviour, will in itself be dictated by the cultural origin of the measurement instrument used? For example, the two EI instruments included in this discussion (i.e., SUEIT, EQ-i:S) are classified as monocentered instruments (Van de Vijver & Leung, 2001). To what extent do such instruments and the construct they purport to measure, truly reflect the construct and all its facets in other cultures? Moreover, when imported measures are used, invariant psychometric properties and higher levels of equivalence of the instruments should be investigated. Where is the research evidence to support this? According to Hui and Triandis (1985) cross-cultural equivalence can be conceived in terms of a universality-cultural difference continuum and different levels of abstraction and concreteness. They argue that when imported measures are used, researchers should enhance validity and establish different levels of equivalence in order to surmount the goal of maximising both precision and meaningfulness of comparison in cross-cultural research. This universality-cultural difference continuum (to what extent constructs are considered universally applicable or meaningful in specific cultural context), also known as the etic–emic (Berry, 1969) debate, has permeated emotions research for three decades. Research on depression, anxiety and personality have also not proved to be conclusive on whether imported instruments capture human psychological phenomena that are invariant across cultures (Sue & Chang, 2003). For example, Leong, Okazaki, and Tak (2003) reviewed the assessment of depression and anxiety in Asia, and concluded that some imported measures (e.g., State-Trait Anxiety Inventory, Chinese Beck Depression Inventory) miss capturing culture specific elements (e.g., particular symptomatology in Chinese populations) of these constructs. Cheung et al. (2003) identified the factor, Interpersonal Relatedness, in the indigenous personality measure the

[4] According to Matthews et al. (2002), the test developers of the MEIS/MSCEIT are moving towards an operational definition of ability based consensus scoring, inferring that a person is more intelligent if he or she is closer to the population norm. They question the rationale for scoring an ability on this basis, arguing that, in this context, it is misleading to describe EI as an "intelligence".

Cross-Cultural Personality Assessment Inventory (CPAI-2), developed for the Chinese population. This factor did not load on any of the Big Five personality factors in Western models, whilst they also demonstrated that it was found among Caucasian US students who completed the CPAI-2, suggesting that Western measures may not have captured all meaningful important personality dimensions (Sue & Chang, 2003). Leung and Wong (2003), on the other hand, assert that broad personality patterns are universal. The successful international use and adaptation of the Minnesota Multiphasic Personality Inventory (MMPI-2) underscores this viewpoint (Butcher, Cheung, & Lim, 2003).

For almost three decades, emotion research has been dominated by the disciplinary preferences of researchers, leading to an oversimplification in the debate regarding the cultural universality or relativism of emotional experience. More specifically, psychologists and biologists have been inclined to overlook cultural differences, whilst anthropologists emphasize them, overlooking similarities (Ellsworth, 1994). Recent theoretical models endeavor to give an explanation for both universality and cultural variation by focusing on similarities and differences, across cultural boundaries, of particular components of emotion (Fiske, Kitayama, Markus, & Nisbett, 1998; Mesquita & Frijda, 1992; Scherer & Wallbott, 1994). Matsumoto (1989), for example, has proposed that even though emotions are biologically programmed, learning control of expression and perception is highly dependent on cultural factors. Kitayama and Markus (1994) published a volume of research consolidating empirical research dedicated to the premise that emotions are socially and culturally shaped and maintained. This happens, for example, through collective knowledge that is represented in linguistic convention (e.g., the nature of the affective lexicon and specific meanings of emotions terms; Wierzbicka, 1994, 1999). Therefore, it could be argued that the traits or competencies measured by self-report EI measures (per EI dimensions, e.g., emotional control, management) tap into this collective knowledge of the culture within which the test was developed. In administering a self-report EI instrument, the presence (or absence) of certain "traits", competencies, or behavioural tendencies that would allow a person to respond in an emotionally intelligent way to the environment and cope with environmental pressures, whether that be in the workplace (performance, team work, leadership, ability to cope with stress, burnout, e.g., Ogińska-Bulik, 2005; Slaski & Cartwright, 2002; Van Rooy & Viswesvaran, 2004) or life in general (life satisfaction, psychological and physical health; e.g., Schutte et al., 2007) is measured within the boundaries of the cultural origin of the test. If the potential to display appropriate emotionally intelligent behaviours is context-dependent, then it might be reasoned that the context (socio-cultural context) should be considered when the behavioural manifestations (through which EI is often measured) of EI are captured in the development of a self-report instrument. For example, key cultural dimensions (Hofstede, 2001) such as Individualism versus Collectivism, high or low Power Distance, and Uncertainty Avoidance could be significant influences in this process.

The following section provides a theoretical/conceptual discussion on how cultural group membership might introduce cultural specificity into the development of self-report EI items. The discussion is guided by key findings of three decades of emotion and culture research, specifically focused on emotional appraisal and regulation. It is proposed that cultural difference in values could introduce bias into Western cross-cultural EI measures where these measures are applied cross-culturally. Specific items are predicted to be susceptible to cultural bias based on the item content. Table 1 provides an overview of the proposed affected content of EQ-i: S and SUEIT items included in this discussion (the content in the table is approximations of selected items from these two inventories, i.e. the item content has been slightly modified from the original).

Emotional Regulation in Cultures

Emotional regulation refers to the processes related to influencing emotions that are experienced, situations under which a given emotion is experienced, and how and whether an individual expresses a given emotion (Gross, 1999). It could be argued that the cultural dimensions of Power Distance, Individualism/Collectivism, and Uncertainty Avoidance (Hofstede, 2001) may account for cultural specificity in emotional regulation abilities in respondents from different cultures, attenuating beliefs held about the "correctness" of such behaviours. The concept of emotional regulation appears in the SUEIT (Palmer & Stough, 2001) in the Emotional Control and Management[5] subscales, as well as in the Intrapersonal, Stress Management, and General Mood[6] subscales of the EQ-i:S (Bar-On, 2002). Consider, for example, that in individualistic cultures the identity is defined by personal goals and achievement, and emotion norms encourage emotions signaling independence, authenticity, and assertiveness (Triandis, 1994). In turn, collectivism stresses that behavior is a function of norms and duties imposed by the collective; hence the self is defined by one's relatedness to a social group whilst the views, needs, and goals of the collective are stressed (Triandis, 1988, 1994). Here, emotion norms promote emotions that signal interdependence and endorse harmonious relationships (e.g., sympathy), as opposed to prescribing concealments of emotions that may impede relationships with others (e.g., anger, pride). Apart from specific influence on emotional

[5] Emotional Control refers to how effectively emotional states experienced at work, such as anger, stress, anxiety and frustration, are controlled. Emotional Management refers to the ability to manage positive and negative emotions within both oneself and others (Palmer & Stough, 2001).

[6] The Intrapersonal subscale assesses the respondent's level of inner self-awareness. High scores indicate individuals who, for example, are in touch with and able to express their feelings, as well as are independent, strong and confident in conveying their ideas and beliefs. Stress Management refers to the ability to withstand stress without losing control or "falling apart". General Mood assesses the ability to enjoy life, be content, positive, hopeful and optimistic (Bar-On, 2002).

Table 1 Theoretical framework of predicted cultural bias in (approximated) content[1] of selected SUEIT and Bar-On EQ-i: S items

Item content taps behaviors related to…	Individualism/ collectivism	Power distance	Uncertainty avoidance	Display rules
being helpful towards others	×			
being concerned about others/what happens to them	×			
being more of a follower than a leader	×			
independence in decision making	×			
whether others perceive you as being assertive	×			
easily exploding with anger	×		×	×
having problems to control/manage anger	×		×	×
finding it easy to control anger at work	×		×	×
overcoming anger at work by thinking through what's causing it	×		×	×
experiencing strong emotions at work which are hard to control	×		×	×
finding it hard to control anxiety	×		×	×
expressing intimate feelings	×	×		×
expressing feelings to colleagues when anxious	×	×		×
finding it difficult to convey anxiety to colleagues	×	×	×	×
whether colleagues know you are worried	×	×		×
determining when a colleague's emotional reactions are inappropriate	×			×
whether a colleague's facial expressions reveal a lot to you about the way they are feeling	×			×
being happy/cheerful	×			
finding it difficult to enjoy life	×			
getting depressed	×			
understanding how others feel	×			
whether you can generate positive moods and emotions within yourself to get over frustration at work		×		
when a colleague upsets you at work, whether you think through what the person has said to find a solution to the problem	×			

Note. A cross opposite the item indicates that, due to the respective cultural value dimensions (or display rules); the item may be prone to display bias when included in EI measures that are used for cross-cultural assessment (e.g., transporting a Western developed measure to a non-Western cultural context).

[1] The content of the items has been slightly modified.

regulation discussed below, this cultural dimension might also influence the differential appropriateness of items and other subscales in the two inventories under discussion. It may be argued, for example, that items with content which focuses on behaviours like generally assisting/helping others, independence in decision making and whether one generally cares about other people, might introduce cultural bias into these measures as such item content taps into typical collectivistic values (and their associated behavioural manifestations). This could threaten the construct validity of these measures.

Individualism/Collectivism

According to Triandis and Gelfand (1998) conflict-inducing behaviours are minimized in collectivistic cultures (e.g., Malaysia, Indonesia, Philippines) whilst individualistic cultures (e.g., Australia, Canada, USA) will be more tolerant of individual deviance. Therefore, fewer constraints that govern a wide range of emotion expression experiences in and among members will occur. In addition, Kitayama and Markus (1994) inquire whether it might be that anger is a highly pervasive, central, and natural emotion in Western countries because of the emphasis on independence and the social norm of freely expressing internal attributes, such as rights, goals, or needs and hence because anger is most closely associated with blocking of these rights, goals and needs. Anger is therefore appropriate in situations where personal goals or individual rights are threatened (Averill, 1982). In addition, anger expression allows for restoring honor in this context (Cohen & Nisbett, 1994). In contrast, Asian/Eastern countries stress interdependence among individuals (attending others' needs and goals) (Hofstede, 2001; Triandis, 1994) and therefore Kitayama and Markus (1994) has asked whether it could be argued that anger is less common, natural and integrated into the social life of individuals in non-Western cultures, or even that the two forms of anger (in these two cultures) are distinct? This might have cultural bias implications for items in EI assessment instruments (which measure Emotional Control) that contain the word "anger", e.g. "I find it easy to control my anger at work".

Display Rules

In addition, the linguistic implications of using a term like "anger" in a self report instrument should also be considered. For example, the standard English US translation for "anger" in Japanese is, "ikari". It could be argued that if equivalent translation is assumed when this term is included in self-report questionnaire items, these two references to "anger" resemble each other by sharing important elements such as autonomic arousal and the use of certain face muscles. However, the exact set of participating components (e.g., instrumental responses, inhibitory tendencies) related to "anger" may vary widely across the two cultures (Kitayama & Markus, 1994). The most prominent influence here is the use of display rules in emotional regulation. Display rules

serve as socially and culturally learned norms that specify the appropriateness of displaying and expressing emotions and are known to be a source of cultural variation in emotional phenomena (Ekman, 1972). According to Ekman and Friesen (1975) display rules affect facial expressions of emotion in several ways. Facial expressions of an emotion may be displayed without a corresponding feeling. They could mask the presence of another inappropriate emotion, attenuate or enhance the apparent intensity of a felt emotion, or even entirely mask or inhibit a felt emotion. Recently, Matsumoto, Yoo, Hirayama, and Petrova (2005) found that when displaying fear, anger, or sadness, Japanese and Russian respondents are inclined to soften the impression by adding a slight smile, indicating that although they are distressed, "it isn't really that bad". Americans also express their emotions more visibly than do Japanese or Russian people. According to Matsumoto (1990, 1996) moderate displays of anger are fairly common in the USA. The display of sadness or other negative emotions are more appropriate towards friends and family, than acquaintances, with the opposite being true in the Japanese culture. However, in Japan it is considered appropriate to display anger towards subordinates, but any other display of anger is considered crude and inappropriate (Matsumoto, 1996).

Moreover, Ellsworth (1994) asserts that it is not only a matter of the visible behaviour (e.g., behavioral manifestations of anger); cultures also seem to differ in their beliefs about the appropriateness of even feeling certain emotions in certain contexts. For example, in American culture, in most social contexts it is considered inappropriate for men to cry, and also experience deep grief as strongly and frequently as women. Therefore, it could be argued that each culture's values about emotions and their expression may come to affect the essential experience (and the expression and, ultimately, the definition) of that emotion (Ellsworth, 1994).

Items like "I find it easy to control my anger at work", "I overcome anger at work by thinking through what's causing it", and "At work I experience strong emotions that are hard to control" are used to assess different components of emotional regulation in the EI measures under discussion. By including "anger" as an anchor and standard of cross-cultural comparison and generalization in EI assessment, it might be plausible to argue that an ethnocentric understanding of this emotion in emotional regulation is enhanced and maintained. Furthermore, it might be plausible to argue that respondents from countries with cultures with well-defined display rules, might very seldom "explode" with anger. If these lines of reasoning are followed it should be noted that items in this facet of EI measurement (emotional regulation) might be particularly susceptible to cultural bias (which would influence the transportability of the given instrument from Western to non Western cultural contexts).

Uncertainty Avoidance

The Uncertainty Avoidance (UA) Index refers to the degree a society is willing to accept and deal with uncertainty (Hofstede, 2001). The essence of uncertainty

is that it is a subjective experience, and that extreme uncertainty creates intolerable anxiety (Hofstede, 2001). Countries that score high on the UA dimension (e.g., Italy; Hofstede, 2001) tend to be more expressive cultures. In such cultures it is socially acceptable to express emotions, as anxiety is released through the showing of emotions through which society has created outlets (Hofstede, 2001). In low Uncertainty Avoidance societies (e.g., Malaysia, Hofstede, 2001), anxiety is released through passive relaxation, whilst such cultures are characterized by lower expressiveness. The norm is wide social disapproval of overly emotional or noisy behaviour. Items like, "I overcome anger at work by thinking through what's causing it", "I find it easy to control my anger at work" and "At work I experience strong emotions that are hard to control" therefore might contain cultural bias when used in EI measures applied in different cultures.

Power Distance

Power Distance (PD) prescribes how societies deal with inequality between people (Hofstede, 2001). In high PD societies (also termed a vertical society; Matsumoto, 1996), for example Malaysia, the workplace relations between employer and employee are strictly ruled and dependent on the decisions of the employer. Power is centralised as much as possible. Superiors and subordinates generally consider each other as existentially unequal (Hofstede, 2001). Emotions and behaviours that advertise and reinforce status are encouraged. In low PD societies (horizontal societies; Matsumoto, 1996) employers and employees work closely together, have equal status (even when education levels differ) and democratic practices are applied. Here, general predictions about the experience and expression, and hence regulation, of emotion is largely concerned with who is expected to and allowed to express which emotions to whom. The notion that in high PD cultures dominant strong emotions (e.g., anger and pride) will be expressed by superiors to subordinates (which will, in turn, express submissive emotions, e.g., appreciation, shame), has been confirmed by two studies (Bochner & Hesketh, 1994; Mondillon et al., 2005). In Japan, for example, it is appropriate for a high status person to express anger to subordinates, as this emotion implies high status and a threat to hierarchy (Matsumoto, 1990), whilst the inverse is known to be deeply offensive in Japanese culture (Matsumoto, 1996). A very clear influence of display rules is noted in this culture, as felt emotions by group members/subordinates (anger, sad, afraid) will be controlled to maintain group harmony. Once again, items containing the word "anger" ("I find it easy to control my anger at work" and "At work I experience strong emotions that are hard to control") may be susceptible to cultural bias depending on which group the respondent belong to. Items that refer to emotional regulation directed at group members, rather than members from other groups that imply a PD effect, may have better face validity and not be so prone to cultural bias. However, often 360 degree versions of EI tests, in which subordinates rate their leader's EI, are based on self report measures. An

item like "The person I am rating finds it hard to convey anxiety to colleagues" may be susceptible to bias as a leader in a high PD environment will most probably not convey anxiety to subordinates.

Emotional Expression

Although convincing evidence for the universality of posed and spontaneous facial emotional expression in early cross-cultural studies has been found (Ekman & Friesen, 1971; Ekman, 1972; Friesen, 1972), the concept of display rules (Ekman, 1972) and the neuro-cultural theory of emotion proposed by Ekman and Friesen (1969) served in acknowledging the presence of cultural variation in emotional expression. For example, a study by Pittam, Gallois, Iwawaki, and Kroonenberg (1995) recently reported agreement amongst Australian and Japanese respondents regarding the cultural differences in emotion expressivity (i.e. perceived expressivity of people of different cultural backgrounds). More specifically, Japanese were consistently rated as less expressive than Australians by all subjects (Pittam et al., 1995), providing confirmation of previous reported cultural and ethnic differences in intensity ratings of emotion expressions (Matsumoto & Ekman, 1989; Matsumoto, 1993; Scherer, Wallbott, Matsumoto, & Kudoh, 1988). Recent evidence suggests, furthermore, that these cultural and ethnic differences also hold in Irish and Scandinavian American immigrant groups (Tsai & Chentsova-Dutton, 2003) with Irish Americans consistently being more facially expressive (when asked to relive target emotions like happiness, love and anger), than their Scandinavian counterparts.

Emotional expression appears in the Bar-On (2002) EI model in the Intrapersonal subscale.[7] In the SUEIT, emotional expression appears in the compound Emotional Recognition and Expression[8] factor. Typical items include: "When I'm anxious at work, I find it difficult to express this to my colleagues", "I can portray how I'm feeling to colleagues through my body language", "Colleagues know when I'm worried", and "I find it hard to convey my anxiety to colleagues".

Individualism/Collectivism

A study of the appropriateness of displaying emotions in different social situations (individualistic versus collectivistic cultures), characterised by in-group (i.e., close family and friends) and out-group (i.e., in public, casual acquaintances) members, were conducted by Matsumoto (1990). Japanese subjects

[7] The Intrapersonal subscale measures emotional self-awareness, as well as the ability to express feelings and communicate emotional needs to others (Bar-On, 2002).

[8] Emotional Recognition and Expression refers to the ability to identify one's own feelings and emotional states, as well as the ability to express those inner feelings to others (Palmer & Stough, 2001).

rated the display of anger to out-groups as more appropriate than Americans. Americans, on the other hand, rated the display of disgust and sadness to in-groups as more appropriate. To Americans, the display of happiness in public was more befitting than to Japanese. In general, items in EI tests tapping emotional expression, refer to "others", "other people" or "colleagues" (e.g., "It is hard for me to share my deep feelings with others") with no indication as to the relationship between the expressor and perceiver. This may obscure effective measurement of emotional expression, as respondents are not allowed to indicate when it is more appropriate to display/express certain emotions to "others" or "colleagues". For example, if there is sufficient trust between colleagues, then colleagues may become friends, view each other as part of an in-group, and the expression of negative emotions within the American individualistic culture to "colleagues" should be appropriate. For example, an item like "I can tell others when I am angry at them" may then indicate effective emotionally intelligent behavior, which should facilitate stress relief and lessen burnout. If the same scenario in Japanese culture exists, it would not be deemed appropriate to display anger to friends (i.e. colleagues, the in-group), rendering this item problematic. Hence, it is recommended that items of emotional expression should differentiate between in-group and out-group members to more efficiently determine whether a respondent will appropriately display emotions (given the cultural context) and subsequent emotionally intelligent behaviours.

Emotion Recognition (Judgment) in Self and Others

Classic studies in literate and preliterate cultures (Ekman & Friesen, 1971; Ekman, 1972; Izard, 1971) provided evidence for the universality of recognition of "basic" emotions (i.e., anger, disgust, fear, happiness, sadness, surprise) in facial expressions, at above-chance accuracy. Critics of these studies have questioned the lack of ecological validity of the stimuli used (Mesquita & Frijda, 1992) whilst others have focused on methodological issues (e.g., use of forced choice repose formats; Russell, 1994). Others have argued that cultural differences in the data of these original studies were overlooked as the interest of the researchers was in exploring agreement, not disagreement (Matsumoto & Assar, 1992) and therefore the examination of cultural differences in the same data has received more attention recently (e.g., Mesquita & Frijda, 1992; Russell, 1994). For example, Huang, Tang, Helmeste, Shioiri, and Smoeya (2001) report results (Japanese and Caucasian Facial Expressions of Emotion photo set, Matsumoto & Ekman, 1988) that imply cross-cultural differences between American and Asian viewers in identifying emotions from static facial expressions. This was noted particularly when the posed emotion had negative consequences. In addition, evidence for the cultural universality (Scherer, Banse, & Wallbott, 2001) and differences (Van Bezooijen, Otto, & Heenan, 1983)

in recognition of emotions in vocal affect has been reported. A recent meta-analysis by Elfbein and Ambady (2002) provided compelling evidence to support an interactionist interpretation of emotional recognition. Although evidence was found for the universality of certain core components of emotion, evidence of an in-group advantage (i.e., understanding emotions more accurately when they are expressed by members of the same national, ethnic, or regional group) that accounts for the cultural variability in emotion recognition was also reported. The meta-analysis was based on the results of 97 studies (182 samples). More importantly, the results also suggest that the "...match between the cultural background of the expresser and judge is important..." (Elfbein & Ambady, 2002, p. 229), which is consistent with the theory of cultural learning of emotional behaviour. Moreover, the in-group advantage was also noted in groups that share the same native language (e.g., when English-speaking groups like Scottish, Irish and New Zealanders judged the emotional expressions of Americans) (Elfbein & Ambady, 2002).

Emotional recognition is a core facet of EI. It appears in the revised and refined Mayer and Salovey model (1997) as "branch one" termed Perception of Emotion (i.e., the ability to perceive emotions in oneself and others, as well as in objects, art, stories, and the like). In the Bar-On (2002) model it appears in the Intrapersonal as well as the Interpersonal subscales,[9] whilst being contained in the Emotional Recognition and Expression, as well as Emotional Understanding[10] factors in the SUEIT (Palmer & Stough, 2001). Items that tap into different elements of emotional recognition (verbal and non-verbal) and that may be influenced by an in-group advantage between the expresser and perceiver include: "It is hard to determine how a colleague is feeling from their body language alone", "I can tell how a colleague is feeling by the tone of their voice", "I can determine when a colleague's emotional reactions are inappropriate", and "Colleagues' facial expressions reveal a lot to me about the way they are feeling". It is important that the item content explicitly differentiate between in- and out-group members.

Individualism Versus Collectivism

As there is strong evidence to suggest cultural differences in emotional expression, differences in interpreting emotional displays are likely to exist between cultures. Some have suggested that due to an inward focus in individualistic cultures, individuals tend to project their feelings onto others. In contrast, in collectivistic cultures the ability to be aware of the impact of one's emotions on

[9] The Interpersonal subscales assesses the extent to which an individual is able to establish cooperative, constructive, and satisfying interpersonal relationships as well as the ability to understand and appreciate the feelings of others (Bar-On, 2002).

[10] The Understanding Emotions subscale measures the ability to identify and understand the emotions of others and those that manifest in response to workplace environments (e.g., staff meetings).

others is emphasized (Cohen & Gunz, 2002). Moreover, when estimating the intensity of facial expressions, Japanese tend to rate weak expressions as constituting of stronger underlying emotions than when Americans rate the same facial expression (Matsumoto & Ekman, 1989). In addition, they rate both happiness and negative emotions of lesser intensity than their American counterparts (Matsumoto & Ekman, 1989). These findings have been interpreted in the light of the effect of display rules (Matsumoto, Yoo, Hirayama, & Petrova, 2005). Americans may be more prone to trusting the authenticity of the display, whilst the Japanese are inclined to infer from a weak expression that even though a person feels a strong emotion, they partly inhibited it.

A recent study by Masuda, Ellsworth, Mesquita, Leu, and Veerdonk (2005) on Japanese and American university students, reports that social context affects the perceived intensity of facial expression. The results revealed that the perceived intensity of facial expressions (e.g., a central figure in picture displaying anger) judged by Japanese (collectivist culture), were more influenced by the social context of emotions (e.g., others in a picture showed to the respondent, also displayed anger), than the perceived intensity of expressions judged by individuals from individualistic cultures (i.e., the social context did not play such a big role in the judgment).

Items such as "Colleagues' facial expressions reveal a lot to me about the way they are feeling" and "I can determine when a colleague's emotional reactions are inappropriate" may be susceptible to bias due to the effect of display rules and values embedded in collectivistic versus individualistic cultures, as evidenced by the aforementioned studies. In addition, the item "I'm good at understanding the way other people feel" might be biased as Japanese will rarely describe themselves as "above average", no matter how skillful they actually are (Kalat & Shiota, 2007).

Cross-Cultural EI Research: Methodological Issues

Convergence of Two Approaches

Different terminology for the two distinct approaches, i.e., etic–emic, cultural-specific–cultural general, and cultural–cross-cultural, in the research of emotion across cultures are often used. The increasing emergence of the interactionist perspective permeating recent theoretical models (Matsumoto, 1989; Russell, 1994; Scherer & Wallbott, 1994) that account for universality and cultural variation in particular aspects of emotion, concur that both these strategies/approaches are important for advancement in the field. Mirroring these advances in emotion research, research on EI across cultures should aim to harness the potential of both these approaches whilst avoiding known methodological pitfalls. Cross-cultural research in EI to date is rudimentary and limited. Without such cross-cultural comparisons, psychological theory is

confined to its own cultural boundaries (Van de Vijver & Leung, 2001). In conducting cross-cultural EI research, ethnocentrism in current EI theories (and associated measurement instruments) may be reduced as the limitations of current theories are acknowledged, by seeking to extend the data and theory through inclusion of other cultures (Berry et al., 2002). For example, although scientific efforts addressing the matter of if and how EI can be developed, is in infancy (e.g., Wong, Foo, Wang, & Wong, 2007; Zeidner, Matthews, Roberts, & MacCann, 2003; Matthews, Roberts, & Zeidner, 2003), the utility of cross-cultural knowledge to enhance our understanding in this EI domain, should not be underestimated. If it is argued that more congruence (better fit) between personal and cultural norms/beliefs enhance social interactions and adjustment (typical outcomes of individuals with high EI) then a detailed understanding of how culture drives the norms of emotionally intelligent behaviour (in a specific culture), is an essential basis for any development intervention. This highlights the need for EI research studies conducted from within the cultural psychology framework. That is, where individual behaviour (or psychology), and culture are viewed and studied as mutually constitutive phenomena (Miller, 1997). Leung and Zang (1995), for example, noted the need for indigenous research and theorizing, as well as research that integrates different cultural perspectives, as vital to the establishment of more universal psychological theories and their usefulness.

Cultural Bias in EI Measurement Instruments: Construct, Item and Method Bias

The methodological ideal in cross-cultural psychology is to transport a procedure established in one culture, with known psychometric properties, to one or more cultures with the goal of making a cross-cultural comparison (Berry et al., 2002). The methodology of the natural sciences is mirrored in these comparative studies, with the preference for using standard instruments and a priori formulated hypotheses which is being tested in an experimental or quasi-experimental fashion (Poortinga, 1997). However, the practice of "blindly exporting" Western instruments to other cultures, without concern for the appropriateness of the measures, could seriously impede theoretical advances (Van de Vijver & Leung, 2001). In this chapter, various theoretical/conceptual propositions that explore why current Western monocentered self report EI measures might be susceptible to cultural bias, when exported to different cultures, have been suggested. Bias encapsulates a range of factors that introduce "disturbances" into cross-cultural assessment, influencing the comparability of scores across cultures (Van de Vijver, 2003). Hence, if bias is present, the differences in scores of the indicators of a particular construct do not correspond with differences in the underlying trait or ability (Van de Vijver & Tanzer, 1997). This has a bearing on the equivalence of the scores across cultures and more

specifically, the scope for comparing the scores over different cultures, with decisions on the absence or presence of equivalence being grounded in empirical evidence (Van de Vijver, 2003). It has been argued that the problem of bias in cross-cultural research is mostly related to three sources, i.e., the construct being studied, the methodological procedure and the item content (Byrne & Watkins, 2003; Van de Vijver & Poortinga, 1997; Van de Vijver & Tanzer, 1997). Cultural bias, when uncovered, provides systematic information about cross-cultural differences, which should not be equated with measurement error (Berry et al., 2002). Such knowledge (i.e., cultural specificity of the construct) could be applied in modifying existing EI instruments, as well in guiding the development of more culturally appropriate development interventions.

Construct bias is present when the effects of a biasing factor relate to the operationalization of a construct, and therefore the construct contains a degree of disparate meaningfulness when measured over the different cultural groups (Berry et al., 2002; Byrne & Watkins, 2003). If construct bias exists, the psychological construct is not identical across cultures (Van de Vijver & Leung, 1997). Consider, for example, the inclusion of a "happiness" subscale into the EQ-i (Bar-On, 1997). In European-American culture, the right to the pursuit of happiness (e.g., made explicit in American Constitution) shapes the view that happiness should be a defining personal characteristic central to the identity of self. Therefore, expression of unhappiness signals failure (D'Andrade, 1984) and would possibly be equated with less emotionally intelligent behaviour in this culture. In the Asian cultural model of emotion, moderation in emotional experience and expression serves the fundamental belief embedded in dominant religions (e.g., Buddhism) that there is a need for a balance between positive and negative feelings, each moderating the extent of the other (Mesquita & Leu, 2007). Here, the inclusion of a "happiness" subscale with item content that, for example, refers to being happy with your life, finding pleasure in life and generally being cheerful, may obscure the conceptualisation of EI in Asian cultures. That is, it could be argued that happiness may not be a central dimension that defines emotionally intelligent behaviour within the Asian cultural context.

In relation to item content, the effects of a biasing factor can manifest in a single or few items, known as "item bias" or "differential item functioning" (DIF) (Berry et al., 2002). Poor translation or inappropriate items for a specific context may cause item bias (Van de Vijver & Leung, 1997). Item bias involves a lack of equivalence in a separate indicator or item (Fontaine, 2008). Hence, if individuals from different cultural groups with an equal ability/trait/attitude do not have the same probability of giving a correct answer, item bias exists (Van de Vijver & Leung, 1997). If removing biased items eliminates group differences on the scale, the groups may have differed because of DIF rather than from inherent group differences in the construct. The previous sections attempted to explicate how cultural dimensions and subsequent cultural group membership,

could introduce these two types of bias into self-report EI measurement when applied cross culturally.

However, the possibility of method bias in EI measurement should also be considered. Method bias is present if the assessment procedure introduces unwanted inter-group differences (Van de Vijver & Leung, 1997). In this case the biasing factor influences responses on most, or all items (Berry et al., 2002). Four common sources of method bias include differential social desirability, differential response styles (e.g., extremity scoring and acquiescence), differential stimulus familiarity and the lack of comparability of samples (Berry et al., 2002; Byrne & Watkins, 2003). In addition, the language of assessment in multilingual persons, i.e., employees who work in big multinational companies often respond to psychometric questionnaires in their second language, might be a potential source of method bias (Church, 2001).

Applying Measurement Invariance in Cross Cultural EI Research

In cross-cultural psychology, typical statistical techniques used to investigate structural equivalence include Exploratory Factor Analysis, followed by target rotation and the calculation of Tucker's phi (Van de Vijver & Leung, 1997; Van de Vijver, 2003). Obtaining evidence of structural equivalence allows the researcher to conclude that the psychological constructs underlying the instrument are identical (Van de Vijver & Leung, 1997). However, a less popular alternative is to utilize CFA, which allows for the testing of a large set of hierarchically linked hypotheses of cross-cultural invariance (Van de Vijver & Leung, 2001). More specifically, the use of multi-group CFA modeling (Jöreskog, 1971) via Structural Equation Modeling (SEM) is especially functional and effective in establishing cross-national measurement invariance (MI) (Steenkamp & Baumgartner, 1998). Here measurement equivalence (or invariance) is defined as the mathematical equality of corresponding measurement parameters for a given factorially defined construct, across two or more groups (Little, 1997). More specifically, obtaining MI indicates that (Little, 1997, p. 56):

> (1) the constructs under investigation are generalizable to each sociocultural context; (2) that the least possible amount of sources of bias and error are present (e.g., cultural bias, translation errors); (3) it is valid to assume that cultural influences have not impacted the construct's underlying measurement features; and (4) it is permissible to assess between-culture differences as mean-level, variance and covariance, or correlational effects.

An increasing amount of researchers have applied measurement invariance procedures to address aspects of the cross-cultural generalizability of measures and their associated models (e.g., Crockett, Shen, Randall, Russell, & Driscoll, 2005; Culhane, Morera, & Watson, 2006; Little, 1997; Riordan &

Vandenberg, 1994) whilst others have focused on conducting cross-group comparisons with ethnic groups or different nationalities (e.g., Durvasula, Andrews, Lysonski, & Netemeyer, 1993; Ghorbani et al., 2002) as the basis for comparison, as opposed to gender or age (e.g., De Frias & Dixon, 2005; Gomez & Fisher, 2005).

With the recent resurgence of MI research, and increased application of the procedure, the aim is often to uncover instrument invariance as a way to ensure that group differences on the mean scores of a construct are meaningfully comparable. A different, and much less frequent application of MI tests is applying it in a hypothesis testing context where a priori conceptual and theoretical grounds (e.g., diversity in sociocultural contexts) may be identified as to why differences in psychological processes may exist (Vandenberg, 2002), and using MI procedures to uncover such differences. For example, Cheung and Rensvold (2002, p. 252) recently argued that, "metric invariance. . .need not be seen merely as an obstacle that must be surmounted before the equality of latent means can be assessed; rather it should be seen as a source of potentially interesting and valuable information about how different groups view the world. . .the same comment can be made with respect to any one of the measurement invariance failures considered." Therefore, in cross-cultural research such an approach to MI testing requires that an absence of non-invariance should be predicted a priori, based on the conceptual basis of differential cultural values (Chan, 2000), across the different groups that are being studied. This could be a powerful way to explore the cultural specificity of the construct, instead of just providing highly speculative, post hoc interpretations of why MI failed to hold over the various groups under investigation.

In extending the use of MI tests as a hypothesis testing tool in the context of cross-cultural research, the only two studies that have attempted this (Cheung & Rensvold, 2000; Riordan & Vandenberg, 1994) have been criticised for not operationalising the "trigger" event – for example, assuming that because a person belongs to a certain nationality, he or she automatically prescribes to the national value system (e.g., US nationals prescribing to an Individualistic value system, Malaysian nationals prescribing to high Power Distance). As the degree of prescription to these value systems was not directly operationalized the validity of the results have been questioned (Vandenberg, 2002). However, it could be argued this is a problem permeating almost all cross-cultural research. Recent empirical advances have seen the development of individual-level measures (Matsumoto, Weissman, Preston, Brown, & Kupperbuscg, 1997; Triandis & Gelfand, 1998) and its related concept of independent versus interdependent self-construals. However, individual level measures to accurately measure the other dimensions of culture still need to be developed and should in future be incorporated into studies as context variables to effectively unpack cross-cultural comparisons (Matsumoto, 2004).

Conclusion

Gohm (2004) in her commentary on the target article of Matthews et al. (2004) in *Psychological Inquiry* ("Seven myths about emotional intelligence"), notes cross-cultural work, especially in non-Western countries, as an obvious area for further investigation to expand our current understanding of EI. In this chapter current available cross-cultural EI research was reviewed. Weaknesses of these studies were outlined. Attention was drawn to the need to examine cultural bias and inequivalence in future culture-comparative EI studies. To this end a review of key aspects of three decades of emotions and culture research was presented, whilst implications for EI conceptualization and operationalization within the framework of different cultures were discussed. The discussion focused on emotional regulation, expression and recognition as key aspects of EI. Suggestions are made how cultures may differ on these aspects of EI. It was argued that such differences may be a result of the fact that cultures (with different cultural value dimensions) differentially define appropriate and adaptive emotionally intelligent behaviours. Hence, cultural differences in values (e.g., Power Distance, Individualism) could introduce cultural bias into Western cross-cultural EI measures when these are applied cross-culturally. Specific items were predicted to be susceptible to cultural bias based on the item content, which, for example, taps some aspect of Individualism or Power Distance values (cultural dimensions upon which most nationalities differ). The presence of cultural bias (construct, method or item bias) would express itself in the structural, metric or scalar equivalence of the given instruments, when measures are transported from one culture (e.g., Western) to another (e.g., non-Western).

As a first step in the advancement of cross-cultural EI research, this chapter illustrated the need to differentiate cultural bias from true construct variance in self-report mixed model measures of EI. This is important in cross cultural EI research in general. It also has practical implications when such measures are utilized in the increasingly multicultural workplace. The equivalence of measurement operations of transported measures should routinely be inspected before mean differences on the latent trait may be meaningfully compared across groups. EI has been described as, "highly influential and important in occupational settings, a construct that may even hold the promise of a predictor with reduced adverse impact" (Zeidner, Matthews, & Roberts, 2004, p. 394). EI has been found predictive of real life criteria (Van Rooy & Viswesvaran, 2004) and is increasingly being used in the workplace as a predictor (Van Rooy et al., 2005). If equivalence assumptions remain untested, the practical utility of EI as a valid predictor when utilised over different cultural groups, may be questionable. An absence of metric equivalence, for example, requires within group norms to avoid adverse impact in personnel selection decisions. Whether such norms are available and being used is an issue beyond the scope of this chapter.

The development of EI inventories in Asia and Africa, independent of Western influences, might add valuable knowledge to the current conceptualization of

the construct. The development of such indigenous scales may uncover other aspects of emotional intelligent behaviors which are cultural specific, and have strong predictive validity within that culture (or even other cultures). It is proposed that the development of such inventories should be completely void of Western influence so as to allow for true cultural conceptualizations of the construct to be captured. For example, even though The Emotional Intelligence Scale (WLEIS) was developed in Hong Kong by Wong and Law (2002) it may still not capture the full conceptualization of EI in this culture. This is because the scale was developed by asking students to generate items for the four Mayer and Salovey (1997) EI dimensions. It may be argued that this imposed a Western, ethnocentric definition of the construct into the scale development process. Although a recent replication in the Beijing and Shandong provinces in mainland China found support for the four factor structure of the WLEIS (Wang, 2007), it does not necessarily preclude the existence of other dimensions of EI in this culture (not included in this scale).

On a practical level cross cultural EI assessment practices should be uniformly applied – especially when research is being conducted. For example, a respondent's verbal ability may influence test results in the form of method bias and confound MI (equivalence) results. Marsh (1996) has demonstrated a negative relationship between the observation of a negatively keyed item factor and verbal ability. This suggests that individuals with less verbal skill (e.g., bilinguals) may have difficulty reading negatively keyed items accurately, particularly those items with double negatives. Wong, Rindfleish, and Burroughs (2003) have also identified cultural variability in the applicability of reverse-worded Likert-type questions. They report such items to be problematic when administered to East Asian, but not Western, populations. Hence, when possible, mother tongue testing should be conducted. This implies that translation equivalent versions of instruments should be used.

In addition, the possibility that method bias exists as a product of national differences in response styles, should also be routinely inspected in cross-cultural research. Extreme Response Styles (ERS) is the tendency to use the extreme ends of a rating scale (Cheung & Rensvold, 2000; Van Herk et al., 2004). Acquiescence Response Style (ARS) is also known as agreement bias, i.e., a tendency to agree with questions, regardless of question content (Johnson, Kulesa, Cho, & Shavitt, 2005). In Western cultures this type of method bias should be minimal as high Individualism (Hofstede, 1980) is associated with less ARS (Van Hemert, Van de Vijver, Poortinga, & Georgas, 2002) and not related to ERS (Johnson et al., 2005). However, method bias may be more pronounced in scores obtained from non-Western societies characterized by Collectivism and high Power Distance (e.g., Malaysia, India). That is because high Power Distance is associated with ERS (Johnson et al., 2005) and more ARS (Van Hemert et al., 2002). Collectivism has also been found to be positively related to ARS (Smith, 2004). Demonstrating that a measure is free of ERS and ARS eliminates alternative explanations for observed cross-cultural

differences. Such response styles may lead to invalid inferences in cross-cultural research (Van Herk, Poortinga, & Verhallen, 2004) if left undetected.

Future research should also be aimed at the quantification of bias and equivalence (Van de Vijver & Leung, 2000). Suspected biasing factors should be measured. For example, by including a social desirability measure together with measures of the target construct in the design of a study, the presence or absence of this type of bias may be confirmed/rejected. In addition, measuring contextual factors (i.e., including explanatory variables) may assist in verifying (or rejecting) particular interpretations of cross-cultural differences. This facilitates a movement away from post-hoc, speculative, unvalidated interpretations, often found in exploratory cross-cultural studies. A monotrait-multimethod research design could also be used to empirically examine bias (Van de Vijver & Leung, 2000).

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Emotional Intelligence in Sport: Theoretical Linkages and Preliminary Empirical Relationships from Basketball

Con Stough, Mathilde Clements, Lena Wallish, and Luke Downey

Recently there have been suggestions from within sports psychology (e.g., Meyer & Fletcher, 2007) that there are similarities in the use of psychological tools and programs in the corporate and sporting worlds. Therefore it is somewhat surprising that despite the growing body of research supporting emotional intelligence (EI) as an important tool for identifying superior performance levels within the workplace, it is yet to be the subject of rigorous research within other performance arenas such as the sporting environment. The aim of this chapter is to explore the potential relationship between EI and sport basis of their type of sport. The chapter starts with a discussion of earlier conceptions of emotions in sport, progresses to discuss the construct of EI and then provides some empirical data assessing the utility of at least one application of EI to the elite sporting arena. Throughout the chapter we propose theoretical linkages between EI and elite sporting variables that should be the focus of future empirical research.

Emotions in Sport

Sports psychologists and professional athletes have started to evaluate the linkages between emotion and competitive sporting performance, and in particular how moderating and appropriately expressing the experience of emotions can facilitate performance (Vallerand, 1983). To date the majority of research into the impact of emotion on sporting performance has been focused on the control of the physical manifestation of emotions such as rage and frustration and how they impact on performance rather than on the cognitive management of the emotions that caused the emotional display (Vallerand, 1983). Only recently has research broadened to look at the more cognitive side of emotion,

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with researchers such as Schachter (1964), Lazarus (1966) and Weiner (1981) all proposing cognitive theories in which both arousal and cognitions are required in the experience of emotion. While it is generally well acknowledged that emotions play an important role in the sporting arena (D'Urso, Petrosso, & Robazza, 2002), the exact nature of their role in sporting performance is still very under-researched. It has been argued that not only is the expression of emotion highly prevalent on the sporting field, but it is an essential aspect of performance in all sports (Vallerand, 1983). For example, the inability to appropriately manage emotions experienced in competitive situations may lead to such things as an inappropriate outbursts of rage or aggression and can often lead athletes to be penalized or excluded from competing, while those who are able to effectively manage their emotions can channel their emotions into the production of motivation and drive. It is therefore important that athletes learn how to recognize these emotions, express them appropriately, and manage them effectively (Botterill & Brown, 2002).

While there has been difficulty providing a clear and precise definition of emotion (Lazarus, 1991), researchers have generally established three main components of emotion: subjective experience, physiological changes, and observable behaviour (Young, 1973), and in each individual study the researcher uses a variation of this basic theory, identifying different guidelines for what constitutes each of the three stages.

Many of the current theories on the role of emotion in sport are limited to one aspect of emotion, such as optimal levels of arousal or balance between positive and negative emotions, which means that while each individual theory adds to our understanding, there is no one particular model that can be used to explain the complete relationship between the full range of our emotions and sporting performance (D'Urso, Petrosso, & Robazza, 2002). There has been an acknowledgement that there is a need for a model that integrates the important contributions from each of the major theories (Crocker & Graham, 1995).

Recently Hanin (2000) argued that there was a lack of research investigating the role of emotion in sport. With most of the research being inclined to focus on anxiety-performance relationships, what little research that has been done in this area has tended to have a negative emotion bias. Yet recently there has been a growing movement amongst researchers to examine the role of positive emotions in sporting performance (Hanin, 2000). Recent research by Hanin and Stambulova (2002) has identified the importance of distinguishing a specific set of emotion content that is optimal or dysfunctional for an athlete's performance. The research has suggested that due to the dynamic nature of emotional content it would be useful to isolate temporal patterns of emotions throughout a particular competition or several competitions so as to plan psychological interventions and strategies for performance improvement (Hanin & Stambulova, 2002).

Based on Hanin's Individual Zones of Optimal Functioning (IZOF) model, it has been proposed that the function of emotions in the sporting arena be studied through five basic dimensions; form, content, intensity, time and

context (Crust, 2002). Acknowledging that a wide range of emotions, other than anxiety, characterize sporting experience, Hanin's model (2000) suggests that a range of positive and negative emotions can both facilitate, as well as inhibit, performance. The model suggests that positive and negative emotions may exert beneficial or detrimental effects, depending on their idiosyncratic meaning and intensity. That is, a specific emotion may be beneficial for one athlete but may be detrimental for another, depending on the meaning the individual attaches to that emotion.

Importantly the IZOF model suggests that different intensities of an emotion may result in improved or impaired performance in the same athlete. Each athlete differs on the interaction of affect hedonic tone (positive or negative) and functional impact (facilitating or inhibiting) (Hanin, 2000). Because of the interactive effects of emotions, the functional impact of emotions upon performance can be best explained by resource-matching (Robazza & Bortoli, 2003). That is, facilitating-positive and -negative emotions will reflect the availability of resources and their effective recruitment and use. To sustain mental and physical effort in achieving goals, facilitating-positive emotions would help the athlete to produce energy and organize functions. Conversely, facilitating-negative emotions would result in more energy production than utilization (Robazza & Bortoli, 2003). In keeping with this concept, inhibiting-positive and -negative emotions will reflect a lack or loss of resources or the inefficient recruitment and utilization of them. Inhibiting-positive emotions will reflect a decreased effort or energy loss, whereas inhibiting-negative emotions will result in an inadequate energy production and utilization (Robazza & Bortoli, 2003). The model assumes that the total impact of emotion upon performance can be predicted on the basis of interactive rather than separate effects of energy mobilization and energy utilization functions (Hanin, 2000).

Mayer and Salovey's Ability Model of Emotional Intelligence

Salovey and Mayer first coined the term "emotional intelligence" (Salovey & Mayer, 1990). Formulating the term as a challenge to intelligence theorists, who have historically considered arousal of affect as disorganizing cognitive activity, Salovey and Mayer (1990) described Emotional Intelligence as a form of social intelligence. Consistent with earlier research on social intelligence (Ford & Tisak, 1983) and Gardner's (1993) intrapersonal and interpersonal intelligences, Salovey and Mayer's (1990) original conceptualization of EI viewed the ability to process affective information as an intellectual aptitude. In keeping with Sternberg's (1997) definition that "intelligence comprises the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context", Mayer and Salovey (1997) developed an ability model that suggests that EI abilities develop with age and experience similar to crystallized intellectual abilities. Their model emphasizes four cognitive

components: the capacity to perceive emotion, to integrate it in thought, to understand emotion, and to manage emotion.

Within this model EI refers to a form of intelligence that involves the ability to monitor one's own and others' emotions, to discriminate among them, and to use emotional information to guide one's thinking and actions (Salovey & Mayer, 1990). It has been suggested that individuals predominantly react and interrelate within an environment because of the way they feel and think, rather than on rationality alone. Notably, it has been argued that the competencies underpinning EI, which enable people to demonstrate intelligent use of their emotions in managing themselves and working effectively with others, relate to workplace performance (Gardner & Stough, 2001). Yet, perhaps what is most attractive about this construct to the corporate world is that, unlike traditional models of intelligence and personality, it has been hypothesized that an individual can develop EI through awareness and emotional competency programs (e.g., see Gardner & Stough, 2002).

Mixed Model of Emotional Intelligence

Bar-On's (1997) mixed model of EI, like those of previous theorists such as Goleman (1995), considered EI to be composed of emotional aspects along with other aspects that were more traditionally associated with personality. Combining emotion and personality into a single construct, Bar-On considered there to be five components of EI, each containing numerous competencies. Bar-On's mixed model proposed that EI consisted of intrapersonal intelligence, interpersonal intelligence, adaptability, stress management, and general mood (Bar-On, 1997). Each of these five components consists of a number of competencies. Intrapersonal intelligence, or internal intelligence, includes emotional self-awareness, assertiveness, self-regard, self-actualization, and independence. Interpersonal intelligence, or external intelligence, consists of empathy, social responsibility, and interpersonal relationships. The third component, adaptability, consists of reality testing, flexibility, and problem solving, with stress management comprising stress tolerance and impulse control. The final component of Bar-On's theory, general mood, comprises traits usually considered to be part of personality, such as optimism and happiness. While many of Bar-On's (1997) components equate to those developed in the ability models his concept of EI is much broader. There are also significant differences in the measurement and assessment of EI within these models. The Bar-On measure, like many self-report measures, is often referred to under the umbrella of mixed models of EI and includes a range of traits, dispositions, beliefs, and behaviors.

It is beyond the scope of the current chapter to review and critically comment on the different models of EI. This has recently been done in a sports psychology journal by Meyer and Fletcher (2007) and more generally elsewhere in this book. However, it is noteworthy to point out that there are different models,

conceptualizations, and measures of EI, although there is to date no consensus as to which of these models and measures of EI are most appropriate and useful in predicting real life criteria. There are current scientific debates regarding the construct validity, which may or may not be resolved in the near future. There also appears to be a clear distinction between scientific discussion on, for example, the construct validity of a scale of EI and the actual popularity and use of the scale in the workplace. Sports psychologists will use models and measures that allow elite sports people to grasp and run with theories and ideas and that allow the quickest and most efficient transfer of information from coach or mentor to athlete. Whether a variety of different measures may work together in a synergistic manner by providing new and useful but independent understandings of the construct or simply to repeat information is not yet understood.

Theoretical Linkages Between EI and Sports Psychology

Attempting to link sports psychology variables to a model for both practice and research requires the adoption of a single model of EI in the first instance. Below we describe some of our thoughts in this regard with the Swinburne University Emotional Intelligence Test (SUEIT), also referred to as GENOS EI in a previous chapter in this book (see the chapter "The Genos Emotional Intelligence Inventory: A Measure Designed Specifically for Workplace Applications" by Palmer et al). Due to the considerable amount of overlap in theoretical content and structure of the existing theories, Palmer and Stough (2001) conducted a large factor analytic study using a population representative sample. The study involved six of the current predominant measures of EI including the MSCEIT, the Bar-On EQI, the Trait Meta-Mood scale, the twenty-item Toronto alexythmia scale-II, the scale by Schutte et al. (1998), and finally the scale by Tett et al. (1997). These 6 scales are highly representative of all the different models in Emotional intelligence (Palmer & Stough, 2001).

The test provides scores on five factors:

1. Emotional recognition and expression
2. Emotional reasoning
3. Understanding emotions of others
4. Emotional management (self and others)
5. Emotional control

Having acknowledged the excess of anecdotal reports regarding the similarities between successful leaders and organizations in the sport and business arenas (Weinberg & McDermott, 2002), we draw theoretical linkages between the workplace and the sporting environment when evaluating the EI literature. Similarly to the workplace, sport is a highly-charged and emotional environment, and one in which inappropriate emotions may hinder performance. Yet

despite bold statements such as "emotional intelligence is directly related to performance" (Abraham, 1999, p. 4) and "emotional competence is a learned capability based on emotional intelligence that results in outstanding performance at work" (Goleman, 2001, p. 1), there has been no significant theoretical links proposed between EI and sporting performance.

It is often noted by coaches, sport scientists, and psychologists, and the athletes themselves, that the most technically gifted athletes do not always end up as the best performers (Morgan, 2003). Typically, coaches have suggested these athletes possess abilities that their less successful colleagues lack, such as supreme self-confidence, mental toughness, unshakeability, and strong will (Morgan, 2003). While these qualities have traditionally been categorized as attributes of a "true sportsperson", perhaps a more appropriate classification, considering the growing body of literature about performance in the corporate environment, would be under the label of EI.

Based upon some of the theoretical links between attentional style and sport type and studies examining Hanin's IZOF model (Hanin & Stambulova, 2002), it is possible to make some tentative hypotheses relating the dimensions of the SUEIT to the three sport categories (closed-skill, individual open-skilled, and team open-skilled sport). These hypotheses are tentative, and therefore require empirical testing, as this is the first theoretical article of its type to link dimensions of the SUEIT or even any dimensions of EI to sporting classifications. Despite this, it is suggested that the EI dimension from the SUEIT, "understanding the emotions of others", is best related to Nideffer and Bond's (1989) finding that "awareness" significantly contributes to the equation separating athletes on the basis of their sport type. The "understanding of the emotions of others"dimension measures an individual capacity to recognize how others respond to their surrounding environment (Palmer & Stough, 2001). In Table 1 we propose some theoretical linkages between the 5 dimensions of the SUEIT and their relative importance for different types of sports.

According to Palmer and Stough (2001), high scores on the "understanding the emotions of others" dimension reflect the recognition and acknowledgement

Table 1 Summary of hypothesized relationship between dimensions of the SUEIT and the three sporting categories

Sport type	Emotional recognition and expression	Emotional reasoning	Understanding the emotions of others	Emotional management	Emotional control
Open-skilled individual	–	–	+	+	+
Open-skilled team	+	+	+	–	–
Closed-skilled	–	–	–	+	–

of how emotions influence organizational dynamics, as well as the ability to identify the emotional "overtones" of the environment. Therefore, within the sporting environment, an individual who reports high competency on this EI factor may be able to read his or her teammates' or opponents' emotional responses to the atmosphere of the competition. Furthermore, a high score on this dimension suggests that the athlete has a good understanding of why others in the competition are responding in a particular way and how it affects the individual or team's performance. Nideffer and Bond (1989) found that the "awareness" scores were least predictive of the closed-skilled sport category but most predictive of the individual open-skilled sport type. Thus it is hypothesized for future research, as shown in Table 1, that athletes performing open-skilled individual and team sports will be most likely to report using "emotional understanding" but athletes in the closed-skill category least likely.

In the example of tennis, an open-skilled individual sport, "reading" the emotions of your opponent is crucial to successful performance (Anshel, 1990; Orbach, Singer, & Price, 1999). The ability to identify that your opponent is experiencing "negative" emotions such as anxiety and self-doubt, allows an athlete to capitalize on his or her opponent's weaknesses (Anshel, 1990). For example in tennis, the athlete may force play around the baseline having recognized that his or her opponent has shown frustration throughout the match at points played around this area of the court (Anshel, 1990; Orbach et al., 1999). Conversely, by acknowledging that their opponent is experiencing "positive" feelings athletes can re-evaluate their own game-plans so as to change the dynamics of the match. Additionally, by understanding the appropriateness of an emotional response to a linesman's call for example, an athlete is able to recognize the emotional overtones of the game. By understanding the emotional dynamics of the competition, the player is able to adapt his or her play suitably.

High scores on the "emotional reasoning" dimension may indicate that some individuals make intuitive decisions based on feelings rather than on pure fact while others make decisions based more on analytical information (Palmer & Stough, 2001). This dimension is suggested to be similar to Nideffer and Bond's (1989) "analytical" attentional style, a characteristic found to be predictive of sport types. Therefore, athletes who score high on "analytical" attentional style may score lower on the "emotional reasoning" dimension of the SUEIT, indicating that they do not incorporate emotions into decisions regarding sporting performance. Speculatively, we propose that scores on the "emotional reasoning" dimension will be most predictive of the open-skilled team classification and least predictive of closed-skilled and open-skilled individual sports as shown in Table 1. In keeping with this hypothesis, in the open-skilled team sport of basketball it is hypothesised that it will be beneficial to performance for an athlete to incorporate emotions into decision-making when competing (Madden, Summers, & Brown, 1990). Basketball requires an athlete to play intuitively and to be flexible in adapting game-plans depending on the emotions within the competitive environment (Madden et al., 1990). That is, a successful basketballer is hypothesized to be able to quickly evaluate how different game

strategies will affect play by incorporating the technical information provided to her or him during practice drills, together with the athlete's "gut-feeling" on the correct choice of play.

Palmer and Stough (2001) suggested that the "emotional management" factor assesses the extent to which an individual is able to foster and maintain beneficial positive moods and emotions so as to effectively manage stress within oneself and others. By effectively managing one's own emotions an individual is better able to remain task focused and avoid external and internal distractions. According to Nideffer and Bond (1989), by shifting the focus of attention from a negative internal or external source to a more positive internal focus, an athlete is less likely to make mistakes. This finding is supported by Hanin's IZOF model (2000) that states that facilitating-positive emotions help an athlete to produce energy aiding performance. Theoretically, high competency levels of "emotional management" within a sporting environment will reflect athletes' ability to foster positive moods within themselves and their teammates, as well as effectively manage competitive anxiety levels. If making theoretical assumptions based on Nideffer and Bond's (1989) findings, the high competency on this dimension would be most predictive of high performance in closed-skill sports and least predictive of performance in the open-skilled team category. Notably "emotional management" has also been shown to be an important attribute of leadership within the workplace (Gardner & Stough, 2002), and therefore likely to be a dimension of EI reported by team captains. As indicated in Table 1, "emotional management" is also hypothesized to be predictive of athletes who compete as individuals. Successful performance in individual closed-skill sports requires the athlete to effectively manage his or her own moods and anxiety levels as there is no teammate support available. For example in the closed skill sport of diving, an athlete is assessed on the total score of a series of dives (Orlick & Partington, 1988). Hence, a diver would need to effectively manage negative feelings of self-doubt and anxiety after an initial poor diving performance so as to mentally prepare for the following dives (Orlick & Partington, 1988).

It may be argued that strong expressions of emotions such as anger, frustration, sadness and hostility are not constructive in the context of the workplace and can damage interpersonal relationships. Similarly, Hanin's IZOF model suggests that facilitating-negative emotions cause energy production rather than utilization, and subsequently result in poorer athletic performance. Hence it is theorized that athletes who score high on the "emotional control" dimension would be able to inhibit strong emotions, such as anger and hostility, from detrimentally affecting their thoughts and performance during competition.

Nideffer and Bond (1989) found that the interpersonal style, "control", was most predictive of individual open-skilled sport types but least predictive of open-skilled team sports. Therefore we propose that scores on the "emotional control" dimension of the SUEIT will be predictive of athletes performing open-skilled individual sports but not of the open-skilled team category. In keeping with this hypothesis, it could be assumed that the open-skilled individual sport of wrestling requires the athlete to control the impact of strong

emotions from detrimentally affecting their performance (Mahoney, 1989; Morgan, 1984). Undoubtedly the one-on-one competition of wrestling would elicit strong emotions such as anger and frustration; however, it could be presumed that the successful athlete inhibits such feelings from affecting his or her thoughts, actions, and behaviors while competing (Mahoney, 1989).

Palmer and Stough (2001) suggested that the "emotional recognition and expression" dimension assesses how well you perceive your own emotions and how effectively you express your feelings to others. Therefore within the sporting environment, athletes who indicate high scores on this dimension will be conscious of their emotions while competing and be able to express these emotions suitably and accurately within the performance arena. According to Hanin's IZOF model (2000), to sustain mental and physical effort in achieving goals, facilitating-positive emotions helps the athlete to produce energy and organize functions. By accurately assessing one's own emotions and effectively communicating those feelings, it could be assumed that an athlete is suitably organizing his or her emotion content to benefit performance (Hanin, 2000). Likewise by accurately displaying emotions during performance, an athlete presumably contributes to the development of a better team environment as teammates can more effectively respond to one another's displays of feelings. Druskat and Wolff (2001) suggested that team spirit is an important component of team building within the workplace. In a study of team dynamics within the workplace, Druskat and Wolff (2001) found that within the more effective teams, individuals are able to suitably express their feelings to one another and thus collaborate unreservedly. It would therefore seem that the advantages of accurately expressing one's emotions would appear to be greater for athletes competing within a team environment as team members competent in "emotional recognition and expression" would be better able to articulate issues important towards building the team's capabilities. As illustrated in Table 1 it is hypothesized that scores on this dimension would be more predictive of the open-skilled team classification and least predictive of athletes performing closed-skill sports.

In the example of volleyball, it is assumed that perceiving your teammate's feelings, as well as communicating your own emotions, would be crucial to successful performance (Leslie-Toogood & Martin, 2003; Mahoney, Gabriel, & Perkins, 1987). As volleyball requires the reading of hand-signals to determine strategies of play, successful volleyballers may be particularly conscious of all their movements and expressions to their teammates (Mahoney et al., 1987), including being overtly aware of their emotional expression. After a successful point in volleyball competition, teammates often express positive displays of emotion to one another by patting each other on the back, etc. (Leslie-Toogood & Martin, 2003). In doing so, they consciously indicate feelings of elation and encouragement to one another. Equally, it could be hypothesized that successful volleyballers would be very aware of how they were communicating their feelings, so as not to allow their opponents to effectively respond to their weaknesses.

Potentially, EI could provide additional information about sporting performance to other psychological models offering a comprehensive description about the role of emotions in competitive performance and training. Yet, perhaps what makes EI a useful addition to other psychological constructs to date is that it proposes ways to improve an athlete's capacity to deal effectively with his or her own and others' emotions. Unlike traditional intelligence theories and personality models, EI has been hypothesized as a key construct that can be developed through specific emotion focused training (Greenberg, 2002). Therapeutic and preventive training programs are already in place that could be helpful in preparing elite athletes for emotional problems that could intrude on competitive performance, so as to prevent them or correct them when they occur (Lazarus, 2000). Therefore it is conceivable that in the near future, sporting bodies will integrate EI into traditional sports psychology and mental training programs so as to gain that competitive edge over competitors.

Another potential role of EI within the sporting arena is in the development and training of athletes for post-sport careers. The importance of EI within a successful corporate environment is increasingly being supported by organizational psychology research (Gardner & Stough, 2002). As the authors foresee that the basic skills of EI will be similar regardless of the environment, transferring those skills from one arena to another will have obvious benefit to the athlete. Recent research in the area of Athlete Career Transition supports the idea that skills learnt within the sporting environment are valuable for an athlete's successful transition into the workforce (Lavallee & Wylleman, 2000).

Obviously there is the need for a large body of empirical study to be conducted so as to establish whether there is evidence for the utility of EI in predicting performance in sport. Yet on the basis of the research examining EI and workplace performance, investigation into the relationship seems warranted. Many researchers investigating EI within the workplace have acknowledged the potential avenue of study that the sporting arena provides. However, to date there has been no published work examining the relationship between EI and sport. Therefore, although the above hypotheses provide potential direction for future investigation, the possible research avenues examining the role of EI in sport are seemingly numerous. Several potential areas of particular focus could be in the areas of talent identification, emotional profiles for specific sports and profiling specific positions of play within team sports.

Empirical Relationships Between EI and Sports Psychology

The above section has described some potential theoretical linkages between EI and sports psychology variables. Now we turn our attention to some linkages (albeit preliminary) between EI and sports variables in the game of professional basketball. We propose, based on linkages between EI and workplace performance as well as some of our pilot work a number of hypotheses. It was

predicted that those individuals who have higher levels of Emotional Management and Emotional Control, would perform better under the stresses of competitive situations. It was hypothesized that those individuals who have higher accuracy in shooting from the field, three point line, and free throw line would show higher levels of Emotional Management and Emotional Control. It was also predicted that those individuals who made more defensive plays throughout the season would show higher levels of Understanding Emotions, shown in their ability to read the opposition through body language, enabling a greater number of steals, turnovers and blocked shots.

Considering the importance of rebounding in team and individual performance, and due to the fact that rebounding involves an understanding of opposition players, it was predicted that those individuals who had done the majority of the rebounding, both defensively and offensively, would show greater ability in understanding emotions in others and the environment.

Participants

The sample consisted of 49 elite basketball players comprising 31 male basketball players with ages ranging from 11 to 35 years ($M = 18.26$, SD = 6.32), and 18 female basketball players with ages between 15 and 27 ($M = 18.06$, SD = 2.26). Players were recruited from the South Australian Sports Institute, a government funded elite sports training centre and several teams from the Victorian Basketball League including the Frankston Blues, Kilsyth Cobras, Bulleen Academy, and Sandringham Sabres. Each participant was required to be either part of an elite development squad or to be playing at representative level in semi-professional leagues.

Materials

EI was measured using the Swinburne University Emotional Intelligence Test (SUEIT) ($\alpha = .83$), developed by Palmer and Stough in 1999. The SUEIT is a self-report inventory, which indexes the way people typically think, feel, and act with emotions according to the five factor model of the SUEIT.

Results and Discussion

Descriptive statistics, including means and standard deviations for the EI measures and the five subscales, age and shooting performance accuracies, are presented in Table 2 below.

All of the collected variables were then correlated in order to determine whether any relationships exist between any of the basketball performance

Table 2 Means and standard deviations of emotional intelligence, age and performance indicators

Measure	Mean	Standard deviation
Age	18.18	5.175
Emotional intelligence	209.94	20.98
Emotional recognition and expression	36.63	4.73
Understanding emotions external	70.12	8.42
Emotional reasoning	36.04	4.97
Emotional management	39.18	5.24
Emotional control	27.95	5.05
Field shot accuracy	39.42	8.82
Three point accuracy	18.01	16.41
Free throw accuracy	62.02	13.87
Total points scored	159.80	147.44

measures and EI. Because the focus of the present research was player performance and not actual court time, correlations were calculated between performance variables and EI whilst controlling for the number of games played and the average minutes on court, as players who play more games and spend more time on court are likely to show better performance outcomes in terms of outcome variables such as total points scored, etc.

Emotional Intelligence and Shooting Performance (Offense)

To test for the prediction that players with higher levels of EI would show greater accuracies when shooting from the field, from the three point line, and from the foul shot line, each of the three shooting accuracies were correlated with overall EI. The results indicated that there was no significant relationship between the three measures of shooting accuracy and overall EI. Additionally shooting accuracies were also correlated with the individual dimensions of EI, and while it was predicted that emotional management and emotional control would both show positive relationships with all three shooting accuracies, only weak correlations were observed. These results may be due to the fact that the results were based on a limited number of games, with some players playing as little as 5 games. The results may also be dependent on the number of participants, and as the sample size was relatively small, there was insufficient statistical power to show significant relationships. While the shooting accuracies were the main indicators of player shooting performance, the number of shots taken along with the number of shots made were also correlated with EI, as there are times when performance is indicated not only by the accuracy of the shots taken, but also by the number of shots taken. When correlated with the number of field shots taken emotional management showed a moderate correlation ($r = .44$, $p = .01$), indicating that players who take more shots from the

field tend to have greater emotional management. Similarly when correlated with field shots taken emotional control showed a moderate-strong correlation ($r = .59, p = .000$), indicating that players who take more shots from their field also tend to show greater emotional control. It was also found that emotional management ($r = .41, p = .015$) and emotional control ($r = .62, p = .00$) both showed moderate correlations with the number of field shots made, indicating that those who are better able to control and manage their emotions take more shots from the field throughout the season.

When assessing the relationship between emotional intelligence, the components of emotional intelligence, and shots from the three-point line, it was evident that the relationships were similar to those found for field shots.

The final measure of shooting performance was that of the free throw shot accuracy. Again, contrary to predictions, accuracy from the free throw line showed no significant relationships with any of the components of emotional intelligence. Emotional control ($r = .43, p = .011$) and emotional management ($r = .43, p = .012$), on the other hand, did show significant correlations with the number of shots taken from the free throw line, indicating that players who have the ability to control and manage their emotions generally take more shots from the three point line. Similarly, as would be expected, those who have higher levels of emotional control ($r = .47, p = .005$) and emotional management ($r = .49, p = .004$) are significantly more likely to score more points from the free throw line.

It was also found that there was a strong correlation between emotional control and the total points scored and a moderate-strong correlation between emotional management and total points scored, indicating that players with higher levels of emotional control ($r = .63, p = .000$) and emotional management ($r = .44, p = .009$) are significantly more likely to score throughout the season. Clearly training these dimensions could have significant performance advantages for professional basketball teams.

Emotional Intelligence, Rebounding and Defensive Plays (Defense)

While the main performance measure in basketball is the ability to score points, the ability to limit the number of points scored by the opposition is important. It was predicted that those who are better at understanding the emotions of others and the environment would have better defensive performance as they have the ability to read others' facial expressions and body movements, allowing them to predict the next move. Contrary to this expectation, there were no significant correlations between understanding emotions and defensive plays such as defensive rebounding, blocked shots and steals. Interestingly, individuals who made more blocked shots ($r = -.417$, $p = .014$) and more steals ($r = -.356, p = .031$) were less able to recognize and express emotions within themselves.

While it was predicted that those who are better able to understand emotions in others and the environment would show higher rebounding rates, both defensive ($r = .311$, $p = .053$) and offensive ($r = .427$, $p = .012$) rebounding correlated positively with emotional management, suggesting that players who are better at managing their emotions make more offensive and defensive rebounds throughout the season.

As this was the first study linking basketball statistics and performance with EI, there were a number of tentative hypotheses. Despite this there were a number of statistically significant relationships between different EI dimensions and basketball statistics that suggest that EI assessment and training may be useful in elite basketball performance.

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Understanding the Neurobiology of Emotional Intelligence: A Review

Joanne C. Tarasuik, Joseph Ciorciari, and Con Stough

Considerable interest and controversy has been devoted to the relatively new construct of Emotional Intelligence. Whilst research on EI has been growing rapidly, little is known about the complex biological processes that may underpin the construct. This chapter reviews the limited literature that exists on the neurobiology of EI and extends this area of knowledge by making theoretical linkages between neurobiological research associated with emotional processing and a model of emotional intelligence. Activation specific to *Understanding Emotions* appears to vary in accordance with the media by which it is presented, and may include the amygdala and frontal areas of the brain. Research into *Using Emotion in Thought* has shown that the emotion areas of the brain are activated and deactivated reciprocally with areas related to cognitive functioning, and the pre-frontal cortex and hippocampus are among the brain areas shown to influence how well we *Manage Emotions*. Theoretical linkages between a model of EI research and the neurobiology of emotion are needed to facilitate future research on this developing construct, particularly in the areas of the development of EI and deficits in EI clinical disorders.

What is Emotional Intelligence?

Emotional Intelligence (EI) was first coined by Salovey and Mayer in 1990, following Gardner's (1983) theory of multiple intelligences. Involving a connection between emotion and intelligence, EI refers to our cognitive capacity to deal with emotions (Mayer & Salovey, 1997), and is defined by specific competencies (Salovey, Bedell, Detweiler, & Mayer, 2000). Generally EI refers to the abilities to accurately and adaptively perceive, appraise and express emotion,

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understand emotion and emotional knowledge and make use of this knowledge by accessing or generating feelings to facilitate thought, whilst reflectively regulating emotions (Salovey, Mayer, & Caruso, 2002).

Research on EI has shown that it contributes to both a person's intellectual and emotional well-being (Salovey et al, 2000). EI is an important predictor of the success of personal relationships, family functioning, and success in the workplace (Salovey et al., 2002) and accounts for variance in effective leadership over and above personality (Palmer, Gardner, & Stough, 2003). Although research on EI has been growing rapidly, little is known about the biological processes that may underpin this construct. In this paper we review the literature on the neurobiology of EI. Because there are so few studies in this area we also generate theoretical linkages to studies assessing neurobiological processes measured during tasks requiring emotional processing that may be theoretically relevant to our understanding of the neurobiology of EI.

Conceptual Models of EI

Salovey and Mayer (1990) have proposed a model of Emotional Intelligence consisting of four branches that reflect the abilities associated with EI (Salovey et al., 2000). While other models have since been created, it remains the most accepted theoretical model of EI and is therefore an appropriate model to discuss and, subsequently, use to map biological processes.

The first branch of this model, *Emotional Perception and Expression*, examines a person's capacity to perceive and express his or her feelings. It involves recognizing and inputting information from the emotion system, from both a verbal and non-verbal form. Also examined is the ability to interpret emotional messages articulated through facial expressions and tone of voice, while recognizing the influence of different cultural artifacts (Salovey et al., 2002).

Emotional Facilitation of Thought, or *using Emotional Intelligence*, is the second branch of the Salovey and Mayer model, and examines how well one uses one's emotions to assist in different cognitive processes. It also plays an important role in determining the type and quality of mental simulations that a person employs (Salovey et al., 2000). Within the cognitive system, emotions can resemble cognized feelings such as being upset, which in turn can alter cognition, leading someone in a sad emotional state to believe that he or she is inadequate. There is also an emotional influence on the cognitive system that can be harnessed to assist in more effective problem solving, reasoning and decision making (Salovey et al., 2002).

Mayer and Salovey's *Emotional Understanding* branch examines an individual's ability to appraise the emotions of others (Salovey et al., 2000), and the insight they generate by observing the feelings of others (Salovey et al., 2002). It requires essential knowledge about emotion, including the ability to label emotions with words. Learning the ability to accurately perceive emotions and

know what they convey about relationships (Salovey et al., 2000), may assist in our understanding of interpersonal relationships (Salovey et al., 2002) and empathy towards others (Salovey et al., 2000).

The final branch of the Mayer and Salovey model, *Emotional Management* or *Emotional Regulation*, examines the regulation of emotion within the self and in other people. It assesses an ability to regulate mood maintenance and mood repair strategies, assisting in the avoidance of unpleasant activities, and in seeking out behaviors that bring about desired feelings (Salovey et al., 2000). The regulation of emotions in others involves the ability to harness them (Salovey et al., 2002). The ability to help others enhance or repair their moods is an important skill that normally encourages pro-social activity, and assists building and maintaining solid social networks (Salovey et al., 2000).

Integrating Neurobiological Research on Emotion onto a Conceptual Model of Emotional Intelligence

To date, there has been little research investigating the biological basis of EI. In the absence of empirical studies, Goleman (1995) suggested that the prefrontal areas are associated with EI, while Mayer, Caruso, and Salovey (1999) proposed that females were biologically equipped to better process emotional information. Clearly there is a need for better theoretical linkages between biological processes and EI. In this section we review relevant studies on the neurobiology of emotion, which map onto the Salovey and Mayer model of EI.

Various types of studies have been performed to assess the biological basis of emotions and emotional processing that may form part of the variables assessed within the construct of EI. These findings have been derived from studies on healthy adults, brain lesion studies, stimulation studies and drug studies, and have been performed on both humans and animals.

Understanding Emotion

The ability to *Understand Emotions*, based on Mayer and Salovey's *Emotional Perception and Expression*, and *Emotional Understanding*, branches can be hypothesized to involve various structures of the brain, including the amygdala, anterior cingulate cortex and particular frontal areas. Whilst there are not many patients with discrete amygdala lesions, the cases that do exist have demonstrated the unique role that the amygdala plays (Davidson, Jackson, & Kalin, 2000). Young, Hellawell, Van De Wal, and Johnson (1995) investigated the effect of an amygdalotomy on a 51-year-old patient, DR. She not only demonstrated poor recognition of emotions from facial expressions, but was also unable to accurately match the identity of the same face when presented with different emotional expressions. DR's deficits extended to the inability to even

imagine facial expressions of emotions. Young et al. (1995) considered that these findings indicated impaired knowledge concerning the patterns of facial features used to express emotions. Conversely, Anderson and Phelps (2000), reported the case of 54-year-old SP, who despite her bilateral amygdaloid damage and diminished ability to appraise the expressions of most emotions, was able to generate all facial expressions, and maintained a relatively intact lexical knowledge of most emotional states. From their observations, Anderson and Phelps (2000) concluded that the amygdala contributes selectively to the appraisal, but not the expression of emotions.

It has been postulated that abnormalities of the amygdala may account for many of the deficits associated with Autism, including those associated with "social intelligence" (Baron-Cohen et al., 2000) and thus understanding emotions. Whilst inferring what a person is feeling from the expression in his or her eyes has been shown to increase amygdala activation in healthy humans, no such patterns have been evident when the same task has been performed by individuals with Autism (Baron-Cohen et al., 1999), demonstrating an abnormality in the functioning of the amygdala associated with emotional processing.

Blair, Morris, Frith, Perrett, and Dolan (1999) reported that activation of the amygdala correlated with sad expression intensity during a gender identification task. Conversely, Gur et al. (2002), compared neural activity during the identification of the valance and age of faces displaying various different emotions, which suggested that the amygdala does not automatically become engaged when emotional stimuli is presented, but the response has emotional relevance. Similarly, Lane, Fink, Chau, and Dolan (1997) observed significantly greater neural activation in the rostral anterior cingulate cortex (ACC) following an emotional focus condition compared to a spatial focus condition. Such studies suggest that the amygdala and rostral ACC are involved with emotionally focused processing more specifically than simply processing emotional stimuli. Using PET, Wicker, Perrett, Baron-Cohen, and Decety (2003), also demonstrated participants involved in emotionally focused processing of faces demonstrated heightened activity in the superior temporal gyrus only while eye gaze was directed at the participant. The authors speculate that individuals become more emotionally engaged when eye gaze is directed at them, assisting in the processing of interpreting emotional content associated with faces.

The right somatosensory related cortices are thought to be associated with understanding emotions, as lesions to this area have resulted in impaired recognition of emotion from facial expressions (Adolphs, Damasio, Tranel, Cooper, & Damasio, 2000). Identifying ambiguous facial expressions has also been shown to activate the ACC, medial frontal gyrus (MeFG) and bilateral inferior frontal gyrus (IFG), areas not activated during gender identification (Nomura et al., 2003). As the connectivity between these areas increases with the level of ambiguity of the expression, this suggests that such frontal neural networks may be crucial to the processing of ambiguously expressed facial expressions (Nomura et al., 2003) and thus, the understanding of emotions in others.

The limited studies directly investigating the biological basis of EI began with Jausovec, Jausovec, and Gerli (2001), assessing biological processing during an EI task involving the identification of emotions pictures from the Mayer-Salovey-Caruso Emotional Intelligence Test (Salovey, Mayer, and Caruso, 1999) and the Multi-factor Emotional Intelligence Scale (Mayer et al., 1999). Results revealed a significant correlation between the level of EI and mean EEG frequency, with differences in brain oscillations of the upper alpha (10–12 Hz) and theta (4.4–6.4 Hz) bands. Jausovec and Jausovec (2005) later observed similar patterns in the gamma (>30 Hz) band.

Hornak et al. (2003) revealed the role of the OFC in the recognition of emotions in others. They demonstrated that lesions to the Orbital Frontal Cortex (OFC) can also result in deficits of identifying emotions in voices. In a sample of patients with different prefrontal surgical excisions, deficits were experienced by some patients with unilateral or bilateral lesions restricted to the OFC, and unilateral lesions of the antero-ventral part of the ACC. The ability to understand emotions from voice appeared to be unaffected by lesions to the Dorsal Lateral Prefrontal Cortex (DPFC) or medial lesions outside the ACC (Hornak et al., 2003). Wildgruber et al. (2005) observed activation of the right hemisphere, posterior superior temporal sulcus (BA22), and dorsolateral (BA 44/45) and orbitobasal (BA 47) frontal areas during the comprehension of affective prosody in contrast to a phonetic condition highlighting other areas associated with emotionally focused processing.

Lesion studies have revealed deficits in recognizing emotions specific to the media by which they are presented. Some patients with damage to the ventral frontal lobe have demonstrated deficits in identifying emotional expressions from faces and/or voice, despite intact facial recognition and voice discrimination (Hornak, Rolls, & Wade, 1996). A pooled sample of adults with Traumatic Brain Injury (TBI), revealed a significant impairment in interpreting audio and audiovisual displays of emotions. Whilst some participants showed deficits in recognizing still facial expressions, only one person from the entire sample displayed a deficit in the recognition of moving visual displays (McDonald & Saunders, 2005). These findings follow the case study of 48-year-old patient B, who displayed a deficit in emotional recognition following severe Herpes Simplex encephalitis, and extensive bilateral lesions (Adolphs et al., 2003). Although he was unable to recognize or name any emotion (other than happiness) from a static facial image, his recognition of emotions (other than disgust) from dynamic facial expressions, emotional stories and descriptions of emotive actions, was intact (Adolphs, Tranel, & Damasio, 2003). These studies depict that separate brain regions are involved in the recognition of different forms of stimuli, with the suggestion that the parietal and frontal cortical systems process dynamic emotional expressions, whereas the temporal and limbic-related cortices are utilized during the presentation of static emotional material (Adolphs et al., 2003). Pooled data from lesion patients has revealed that the right frontoparietal operculum, bilateral frontal pole and left frontal operculum are involved in the recognition of emotions from prosody, whilst the recognition of

emotions from facial expressions involves the right frontoparietal cortex (Adolphs, Damasio, & Tranel, 2002). Such cases demonstrate that cortical activity cannot be generalized across all elements of emotional processing.

The Emotional Perception and Expression branch of the Mayer and Salovey Model also involves the understanding of emotions within ourselves. Using fMRI Fossati and colleagues (2003) demonstrated that cortical activation changed when emotional stimuli was processed from a personal perspective. Comparing the "self-referential" judgment of personality traits to an "other-referential" condition, revealed that the right dorso-medial prefrontal cortex (DMPFC) is a main cortical area associated with self-referencing, proposed to reflect the processing of personally relevant emotional stimuli (Fossati et al., 2003).

Using Emotions in Thought

Humans are not simply predominantly rational beings, nor are they predominantly emotional beings, but a combination of the two (Salovey et al., 2000). Emotions are known to alter thinking in many ways (Mayer & Salovey, 1997) such as anxiety or fear disrupting cognition. On the other hand, emotions can also positively influence the cognitive system, prioritizing attention towards what is important (Salovey et al., 2002). Although there are various interactions between emotion and cognition, there are also reasons to view them as distinct constructs. Many cases of brain damage severely impair cognition but leave emotional responses intact, as is also evident in patients suffering from Down Syndrome and William's Syndrome (Bar-On, Tranel, Denburg, & Bechara, 2003). Conversely, Bar-On et al. (2003) have demonstrated the independence of EI and IQ from a sample of patients with damage to the somatic marker circuitry, by demonstrated low EQ-i (Emotional Quotient-intelligence), yet normal to high IQ. The observation of more powerful and easily induced emotions in young people and more sophisticated cognitive activities of adults also relates to this distinction. Such characteristics occur because the medial brain systems associated with emotion mature earlier than the more rostrally and laterally situated cognitive systems (Panksepp, 2003). Also, Yamasaki, LaBar, and McCarthy (2002) demonstrated that the role of prefrontal systems for attention and emotion may involve separate streams underlying potential neural systems for emotional distractibility and emotional cognition.

Emotional valance also influences cognitive processes. Using an emotional oddball task, Delplanque, Lavoie, Hot, Silvert, and Sequeira (2004) demonstrated that the P1, P2 and P3b components of the evoked potential varied between the presentation of pleasant, neutral and unpleasant target items. These waves are associated with visual processing and attention, suggesting that emotional valence influences cognition. Emotional valance also appears to influence cognition associated with an emotional stroop task (Perez-Edgar & Fox, 2003). Children who are more socially and emotionally maladjusted, but

not cognitively maladjusted over time, responded significantly faster to positive and negative words than to neutral words. ERPs revealed that the socially maladjusted children also had shorter latencies for negative words compared to positive words, with the reverse occurring in the remainder of the children (Perez-Edgar & Fox, 2003).

By comparing a number of emotion and cognitive tasks, Drevet and Raichle (1998) detected a reciprocal pattern of regional cerebral blood flow (rCBF). With increases and decreases in CBF reflecting activation and deactivation respectively, various emotion-related areas were activated during negative emotional tasks, and deactivated during some cognitive tasks, whilst the opposite occurred in areas associated with cognitive functioning. These findings may also reflect a mechanism of interaction between the two modes (Drevet & Raichle, 1998). A consequence of reciprocal activation of regions associated with emotional and cognitive processing can be observed during some depressive episodes. For example, when one is occupied by work-related tasks, dysphoria is often much less pronounced, but can worsen when the distraction of work is no longer present. Similarly, attention-demanding tasks may also temporarily interrupt the course of bereavement, which may reflect the suppression of emotional processing areas whilst cognitive operations require heightened attention (Drevet & Raichle, 1998), and are processed by separate neural systems (Yamasaki et al., 2002).

Wager and Thagard (2003), hypothesized that emotion and cognition interact during decision making, and developed a model to explain this integration. They proposed that the ventromedial prefrontal cortex (VMPFC) connects to the amygdala in order to predict the outcome of a response. The nucleus accumbens then acts as a gateway, filtering which outcomes pass through to ensure that the decision made promotes the behavior most beneficial to long term survival. By implementing their model into a network of spiking neurons, they were able to produce the expected outcome, and demonstrated that damage to the ventromedial prefrontal cortex handicaps this process, thus supporting claims of a neural level cognitive-emotion integration mechanism.

Although such studies do demonstrate a level of integration between emotion and cognition, lesion studies have reported patients with independent emotive or cognitive deficits, whilst Jausovec and Jausovec (2005) demonstrated this distinction in a sample of normals, reflecting that the two are also distinct constructs. They observed that significant differences in Event-Related Desynchronization (ERD) and Synchronization (ERS) associated with verbal/performance intelligence were only evident whilst participants completed the Raven's Progressive Matrices – a measure of general intelligence. Similarly, ERD/ERS differences associated with emotional intelligence were only evident during the "identifying emotions in pictures" task. These neural patterns may indicate to that IQ and EI are "distinct components of the cognitive architecture", (Jausovec & Jausovec, 2005, p. 232). In support of this, the results from a recent ERD study by Freudenthaler, Fink, and Neubauer (2006) suggested that

the EEG differences in cohorts of high and low EI levels, may support a neural efficiency model of emotion processing that is not solely restricted to the efficiencies associated with overall cognitive ability.

Managing Emotions

Managing emotions, or an inability to do so, may be reflected in the ability to inhibit aggression or violence. As such, a history of aggressive behaviour has been seen to inversely correlate with glucose utilization of the orbitofrontal cortex in individuals with personality disorders (Goyer et al., 1994), which may suggest this neural area is associated with emotional management. Selective reductions in lateral and medial prefrontal glucose metabolism has also been observed in murderers (Raine et al., 1994). Frontal involvement in inhibition has also been observed in healthy individuals with no abnormal behaviors (Pietrini, Guazzelli, Basso, Jaffe, & Grafman, 2000). In a study involving imagined scenarios, significantly greater rCBF in the medial frontal gyrus bilaterally, and inferior frontal gyri, was associated with individuals cognitively restraining versus unrestraining their aggression (Pietrini et al., 2000). This is in line with Gusnard, Akbudak, Shulman, and Raichle's (2001) suggestion that activity in the medial prefrontal cortex represents both self-referential mental activity and emotional processing. The size of the Cingulate has been suggested to play a similar inhibitory role (Casey et al., 1997). The results of a study requiring 5–16 year old children to complete a go/no-go task (measuring inhibitory processes), revealed a significant correlation between right ACC volume and control task performance, with both quicker and more accurate responses given by children with larger right ACC after controlling for age, IQ, and the size of the cerebral cortex (Casey et al., 1997).

There are several disorders that involve deficits in emotional management, including anxiety and phobias. Studies of individuals with such disorders have detected various neurological abnormalities, suggesting that several areas of the brain are implicated in managing emotions. Employing a qualitative CT-scan, Wurthmann et al. (1999) detected that the prefrontal cerebral spinal fluid (CSF) spaces of Agoraphobia patients were bilaterally enlarged more than in controls. As Agoraphobia is an anxiety disorder which is generally co-morbid with panic disorder (Barlow & Durand, 2002), this may reflect an association between the size of the prefrontal CSF spaces and the ability to control emotions.

Individuals with social phobia have also exhibited variation in neural activity compared to non-anxious individuals (Amir et al., 2005). Following exposure to facial expressions of disgust versus neutral faces, significant increases in ACC activity was observed in those with social phobia. Another study of social phobics revealed amygdala activation in response to neutral faces, thought to have reflected the perception of potentially fear-relevant stimuli (Birbaumer

et al., 1998). In individuals with arachnophobia, even phobia related linguistic stimuli have been shown to elicit neural activity patterns not observed in controls. Whilst activation increased in the pre-frontal cortex, insula and posterior cingulate cortex, these effects were limited to the individuals with arachnophobia (Dilger et al., 2003), and thus, those who were unable to regulate their emotions in such situations.

MRI has demonstrated biological evidence of Post Traumatic Stress Disorder (PTSD), yet another disorder pertaining to an inability to regulate emotions. Bremner et al. (1999), revealed that Vietnam veterans without psychiatric disorders had significantly less right hippocampus volume compared to controls, a finding replicated and extended to the left hippocampus by Gurvits et al. (1996). Hippocampus volume was also found to directly correlate with a veteran's combat exposure (Gurvits et al., 1996). Whether traumatic stress damaged the hippocampus, or the reduced hippocampus volume contributed to a predisposition to PTSD development, these studies suggest that the hippocampus may play a role in emotional control. Physiological reactivity of patients with PTSD has also been examined, following exposure to traumatic pictures and sounds (Bremner et al., 1999). Decreased blood flow was observed in the medial prefrontal cortex of PTSD patients following the presentation of traumatic material, although such activity was limited to this group (Bremner et al., 1999).

Whilst studies of individual anxiety disorders have revealed specific neural variations in anatomy and functioning, mediating neuroanatomy common to anxiety symptoms across different anxiety disorders may more generally reflect deficits of managing emotions. A pool of individuals meeting the criteria for Obsessive Compulsive Disorder (OCD), PTSD, or simple phobia revealed activation of paralibic elements, right inferior frontal cortex, and subcortical nuclei during the symptomatic condition of their study (Rauch, Savage, Alpert, Fischman, & Jenike, 1997). These areas may therefore be seen to generally influence the ability to manage emotions.

The post-mortem examination of the brains of teenage suicide victims – a clearly representative group of individuals unable to effectively manage their emotions, revealed significantly higher levels of 5-HT_{2A} receptors, protein, and mRNA expression in their prefrontal cortex and hippocampus, compared to age matched controls (Pandey et al., 2002). As the prefrontal cortex changes were restricted to the pyramidal cells of layer V, known to mediate 5-HT_{2A} receptor physiological actions, this area may be fundamental to dysphoria and thus, suicidal behavior.

Patients with ventro-medial lesions have demonstrated deficits in different components of emotional intelligence (Damasio, 1994). These patients have repeatedly demonstrated impaired social judgment which influences how they relate to others. Despite an often intact IQ, the patients often struggle to understand, express and effectively use their emotions, or even experience emotions normally (Damasio, 1994). This further suggests the notion that specific neural areas are associated with emotional intelligence and that

different neurobiological areas may be associated with the separate facets of this construct. Bar-On et al. (2003) investigated this idea by examining the emotional and social intelligence of patients with lesions localized within and outside the neural circuitry thought to mediate somatic state activation and decision making. Despite normal or above-normal cognitive functioning, patients with focal, bilateral lesions of the ventral medial cortex, and right unilateral lesions of the amygdala or right insula cortex, had significantly lower emotional and social intelligence as measured by the EQ-i (Bar-On, 1997) than patients with lesions outside this area. Following this, Bar-On and colleagues outlined what they believed to be the underlying brain structures associated with social and emotional intelligence. They proposed that it was incorporated in the higher order association cortices and dorsolateral sector of the prefrontal cortex involved with memory processes; the sub cortical limbic structures that trigger emotional responses; and limbic associated regions such as the insula, which are linked up by the ventro-medial prefrontal cortex (Bar-On et al., 2003; Yamasaki et al., 2002).

Developing Emotional Intelligence

It has been hypothesized that EI can be developed (Salovey et al., 2002). Neural plasticity has been observed in the key areas of the brain that are involved in the emotional circuitry, and some of the most impressive evidence for brain plasticity has been observed during emotional learning (Davidson, 2003). These findings may assist in understanding the neurobiological basis of EI. Meaney et al. (1996) have documented the effects of rats' early environmental influences on their central circuitry of emotion. A greater density of benzodiazepine receptors was evident in part of the locus coeruleus and the amygdala of the rats that had received greater maternal affection. Increased α_2 adreno-receptor density and decreased corticotrophin releasing hormone receptor density was also evident in their locus coeruleus. As a consequence, the rats' biological responses to stress changed, along with substantially reduced behavioral signals of fearfulness (Meaney et al., 1996). This model of plasticity in the emotion circuitry provides clues to the similar influence that appears to exist at the human level (Caldji et al., 1998). Morris, Ohman, and Dolan (1998) investigated unconsciously mediated emotional learning with an angry face and a masked neutral face, observing variations in amygdala activity between the group who had been conditioned and those not conditioned to the emotional face. This was suggested to reflect that neural activity in the amygdala might be associated with emotional learning (Morris et al., 1998). Such studies support the idea that the lessons taught on emotion, and the emotional life events we have undergone, influence our emotional achievements (Mayer & Salovey, 1997), and thus, EI training may show some utility (Salovey et al., 2002).

Conclusion

By understanding and assessing key research on the neurobiology of emotions that may be associated with EI, a platform for work on the neurobiology of EI can be proposed. This is clearly a fundamental first step in any empirical research linking neurobiological processes with Emotional Intelligence. Research in the area of *Understanding Emotions*, has indicated that the amygdala may assist in the knowledge concerning the patterns of facial features used to express emotions. Lesion studies have also revealed that separate brain regions are involved in recognizing emotions via different media. Research on *Using Emotions* suggests a combined use of the ventromedial prefrontal cortex, the amygdala and the nucleus accumbens, as well as the anterior cingulate cortex, with reciprocal activation and deactivation in certain areas related to emotion and cognitive functions reflecting an interaction between the two modes. The ability to *Manage Emotions* has shown to be influenced by the frontal and prefrontal cortex, as well as the hippocampus (especially the right hemisphere), the locus coeruleus, anterior and posterior cingulate cortices, the insula, paralimbic elements and subcortical nucleus. Limited studies have also observed variations in brain activity across participants with high and low EI, with a speculative suggestion that neural efficiency may be an possible explanation for this difference.

With this albeit preliminary platform to understand the neurobiology of EI, future studies can be conducted using modern imaging techniques such as EEG, functional MRI, infrared spectroscopy and MEG. These techniques will assist in our understanding of the neural activation whilst performing tasks requiring Emotional Intelligence as well as understanding differences in neurobiological processes used by individuals of differing levels of EI. Work with EI is still in its infancy, and an understanding of the biology behind such a concept will increase its construct validity and promote additional research. Although the presented studies have created insight into some of the biological activity underpinning EI processing, there still remains very little research directly examining biological processes underpinning emotional intelligence. Studies examining biological activity during emotional intelligence test performance are urgently required, to ensure the validity of EI.

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New Directions and Alternative Approaches to the Measurement of Emotional Intelligence

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Imagine a test developer struggling with the complex task of creating an assessment tool to measure an exciting new construct desired by educational, industrial/organizational, and clinical psychologists alike. The test developer first turns to the peer-review literature for a definition to act as a basis for this test, but finds instead heated debate and much disagreement. Researchers are using many different approaches to measure this new construct. In addition, the scores associated with these different approaches seem to measure different entities. The dissension about which approach is the most useful or valid leaves the test developer confused over which approach might measure the "real" construct. The measurement of emotional intelligence (EI) is currently at just such a somewhat precarious stage.

Our aim in the current chapter is to evaluate the existing approaches for measuring EI and suggest some new ones, perhaps providing a clearer path for our apocryphal test developer. Currently, there are two basic varieties of measurement tools used to assess emotional intelligence: (1) the typical performance, self-report, scales; and (2) the maximum performance, ability, scales. Despite the same label being attached to these two types of scales, corresponding scores are only weakly correlated, suggesting that they may in fact assess two different constructs (Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006; Goldenberg, Matheson, & Mantler, 2006; Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005). Some well-known examples of self-report scales include the Assessing Emotions Scale (AES; Schutte et al., 1998) and the Emotional Quotient Inventory (EQ-*i*; Bar-On, 1997). Indeed, these exemplars are but a small subset of self-report instruments available for research and for operational use. The large volume of assessments using this methodology stands in stark contrast to maximum-performance scales, where there is only *one* such EI assessment currently available for operational use: the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, & Caruso, 2002), and

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an earlier research-only instrument, the Multi-Factor Emotional Intelligence Scale (MEIS; see Mayer, Caruso, & Salovey, 1999).

In this chapter, we first outline the logic for evaluating validity evidence for EI tests, arguing that the self-report scales should not be labeled as if they could be used to validly assess emotional intelligence. We also evaluate the MSCEIT subtests using the same criteria, pointing out some strengths and weaknesses of this instrument. Finally, we suggest that alternative test development procedures (many from older traditions within emotions or social intelligence fields) may lead to promising new directions for the emerging sub-discipline of emotional intelligence.

Evaluating the Validity Evidence for an Emotional Intelligence Test

Given the label "emotional *intelligence*", a non-expert entering the field might reasonably assume that EI relates to the processing and knowledge of emotional information. That is, EI is one of multiple factors of intelligence whose differentiation from existing intelligence constructs lies in the nature of the information processed: emotions. It is assumed that emotional information from an external source, that is, observing another person's emotions, is also part of this domain, as well as one's own observed and resultant emotions in a given situation.

The label *emotional intelligence* thus implies a number of criteria for evaluating the validity of an EI test (see Mayer et al., 1999; Roberts, Zeidner, & Matthews, 2007). Firstly, EI test scores should show substantial positive correlations to other tests of intelligence, demonstrating the positive manifold (that is, consistent positive correlations) found among intelligence tests. Secondly, EI assessments should not relate too strongly to any *one* of the specific types of intelligence. That is, correlations between EI and existing intelligence constructs should indicate that EI measures a type of intelligence, but not *exactly the same type of intelligence* that other tests already assess. Thirdly, EI scores should relate to indicators of emotional functioning (e.g., coping with stress, peer-evaluations of empathy), indicating that this *emotional* intelligence operates in the domain of the emotions. Fourthly, as EI is an intelligence rather than a personality trait, EI test scores should relate to personality in the same way that other tests of intelligence do (i.e., $r = .30$ or less; cf. Ackerman & Heggestad, 1997; Ashton, Lee, Vernon, & Jang, 2000). These four criteria refer to important evidence for the construct validity of EI measures (see also Mayer, Roberts, & Barsade, 2008).[1]

Typical (Self-Report) Measures of Emotional Intelligence

It is quite clear from published research that self-report measures of EI do not meet Criterion 1 (substantial positive correlations with intelligence). It is also clear that they do not meet Criterion 4 (correlations with personality similar to

those of established intelligence measures). Indeed, as we shall demonstrate shortly, it seems that self-report tools assess aspects of personality rather than intelligence (see also, e.g., Mayer et al., 2008; O'Sullivan, 2007; Roberts et al., 2007; Scherer, 2007).

Correlations with Intelligence

Self-report measures of EI correlate only trivially with published measures of cognitive ability. For example, the EQ-*i* correlates $r = .08$ with both the General Adult Mental Ability Scale and the Wonderlic (Derksen, Kramer, & Katzko, 2002; Newsome, Day, & Catano, 2000). This trend is not isolated to the EQ-*i* but holds across all self-report measures of EI (see Barchard & Hakstian, 2004; Roberts, Schulze, & MacCann, 2008). This relationship is sufficiently low that even a substantial correction for attenuation would leave these findings well below desirable levels.

Correlations with Personality

Pérez, Petrides, and Furnham (2005; see also Tett, Fox, & Wang, 2005), evaluated a total of 21 self-report measures of EI, and found extremely high correlations (up to .87) with personality traits. The magnitude of these correlations indicates that self-report measures assess known aspects of personality. This finding clearly violates the fourth requirement: These measures should only be related to personality indicators to a similar degree as other measures of cognitive ability, which is not the case.

It is clear from this brief discussion of the main issues concerning self-report measures of EI that these instruments do not assess a type of intelligence, and thus have questionable construct validity. As measures of emotionality and emotional tendencies (rather than EI), the rating-scale methodology does have some obvious benefits for the test-developer or practitioner. After all, rating scales are: (a) reasonably easy to develop, (b) quick to administer, and (c) easily scored. However, labeling the resulting score as EI is misinformative and confusing, conflating an already complicated issue (see also Mayer et al., 2008). Roberts et al. (2007) suggest that research employing rating scales might still prove valuable, though it would benefit the scientific enterprise if it were couched as an attempt to more fully map the sub-factors of personality rather than anything to do with the intelligence domain.

Maximum Performance Measures: The MSCEIT

Assessments of EI should be analogous to cognitive ability tests, but with the content concerning emotions rather than acculturated knowledge (as in crystallized intelligence), abstract stimuli (as in fluid intelligence), visual patterns (as in

visualization abilities), or sounds (as in broad auditory intelligence). In the paragraphs that follow, we describe the MSCEIT (and MEIS) and evaluate the validity evidence against the four requirements introduced above.

The Four-Branch Model

The MEIS/MSCEIT conform to the hierarchical four-branch model developed by Mayer and Salovey (1997; Mayer et al., 2002), which are: (1) Emotion Perception, (2) Assimilating Emotions (into thoughts, plans, and actions), (3) Emotional Understanding, and (4) Emotion Management (of one's self and of others). Other researchers have expanded on this model with concepts and paradigms from the emotions, clinical psychology, or cognitive processing fields. For instance, Scherer (2007) argues that appraisal and communication are also potential bases for EI. Others have argued that the accurate perception of emotions or the ability to articulate emotions may also be related to EI (Davies, Stankov, & Roberts, 1998; Lane, 2000; Roberts et al., 2007). These views, however, are not inconsistent with the four-branch model; these components appear to share close conceptual parallels with the identifying and understanding branches.

Description of the MSCEIT

There are eight subtests in the MSCEIT, two for each of the four branches. The two Emotional Understanding tests employ a multiple-choice format (i.e., test-takers select the best of four options). In all of the six remaining tests, test-takers assign a rating to each option, rather than selecting the best option. For example, test-takers view a facial expression and then rate the presence of sadness, anger, happiness, and fear in a typical item from the Emotion Perception branch. In a typical Emotion Management item, test-takers might read about an emotional situation, and then rate the effectiveness of several strategies for managing such a situation. In order to avoid confusing this rating-based format with the self-report ratings, we refer to this type of item as a *rate-the-extent* scale. The rate-the-extent format is somewhat unusual for intelligence measurement procedures and may have implications for some research findings on the structure and correlates of the MSCEIT. The scoring of the MSCEIT is also unusual for a cognitive ability test, with responses weighted according to the judgment of an expert panel or large normative sample. Even so, the various major sub-scales of the MSCEIT demonstrate acceptable reliability, with scores of .93 and .91 for consensus and expert scoring respectively (Rivers, Brackett, Salovey, & Mayer, 2007). The four individual dimensions, however, have somewhat lower reliabilities, with studies finding reliabilities as low as .76.

Relationships with Cognitive Assessments

MSCEIT scores correlate at about $r = .18$ with fluid intelligence and about $r = .31$ with crystallized intelligence (Roberts et al., 2008). However, the strength of relationship to intelligence varies by branch. The strongest relationship with intelligence is that found between Emotional Understanding and crystallized intelligence ($r = .40$). All other branches show only small relationships to intelligence ($r = .03$–$.18$). Although these figures are based on a relatively small number of studies available from the peer-review literature, two conclusions can be drawn with some confidence. Firstly, if we accept that there should be a moderate or strong relationship between established measures of intelligence and EI, then the MEIS and the MSCEIT Emotional Understanding subscales are faring better than self-report measures. Secondly, the other branches (Emotion Identification, Facilitation, and Management) are not as strongly related to conventional measures of intelligence as Criterion 1 seems to demand of the construct.

One reason that Emotion Identification, Facilitation, and Management tests might not be substantially correlated with intelligence tests is the rate-the-extent format of test items. MacCann and Roberts (2008) tested this idea with a new research tool that assesses emotion management (the Situational Test of Emotion Management; see below) that may be administered in either multiple-choice or rate-the-extent format. Multiple-choice scores were more strongly related to Vocabulary scores than rate-the-extent scores ($r = .40$ compared to $r = .26$). Although Vocabulary is but one subfactor of intelligence, this study suggests that response format has an influence on scores, and could explain the stronger Understanding-Intelligence link (Roberts et al., 2008). In any case, with the response formats currently in place in the MSCEIT, only the Emotional Understanding branch clearly meets Criterion 1.

Relationships with Personality Assessments

Relationships of the MSCEIT to the Big Five dimensions of personality also differ by branch. In the Roberts et al. (2008) summary of recent publications, the only personality dimension to relate moderately (i.e., $r > .20$) with EI was Agreeableness. Agreeableness correlated at $r = .22$ with MSCEIT total scores and $r = .27$ with Emotion Management scores, low enough to indicate that the MSCEIT is not part of the personality domain. The small relationship to Openness often found for crystallized intelligence measures was not observed for EI. More generally, the conclusion is that MSCEIT scores, unlike that found for self-reports of EI, do not represent a facet (or facets) of personality, though the replicable relationship with Agreeableness is of some (and perhaps even considerable) theoretical interest.

Relationships with External Criteria Indicative of High Emotional Functioning

In addition to relationships with cognitive ability and personality, it is necessary to examine the relationship of EI with emotion-related criteria. The specification of such criteria is not entirely obvious, at least conceptually. In many cases, criteria involving an emotional component clearly have multiple causes, making for error variance in the criteria, which makes interpreting low correlations between EI and outcomes difficult. For example, relationship satisfaction may relate to EI, but may also have a number of other possible causes: financial security, social support, physical health, and lifestyle factors. Statistically controlling for all these variables is difficult if not impossible, at least in practice. Nevertheless, validity evidence for the emotional component of EI is important, and we summarize evidence of various kinds below, along with interpretations and caveats associated with these findings.

(1) *Coping and stress response*. A significant relationship between MSCEIT subscale scores and coping styles has been found by Gohm, Corser, and Dalsky (2005). Understanding and Management were related to behavioral disengagement ($r = -.25$ and $r = -.21$) and denial ($r = -.30$ and $r = -.21$). Management was also related to seeking emotional support ($r = .25$), seeking instrumental social support ($r = .23$), and to drug and alcohol disengagement ($r = -.16$). However, these were the only relationships among 13 possible coping scales, such that the conclusive statement "the MSCEIT predicts coping" might be considered an overstatement. In addition, a study by Brackett et al. (2006) found that male test-takers had total scores on the MSCEIT that predicted constructive/destructive coping responses, even after controlling for Big Five personality factors, psychological well-being, empathy, life satisfaction, and Verbal SAT scores (partial correlations ranged from –.22 to –.33). It is unclear why this finding was only significant for males, although it may be due to restriction of range among the females on both the MSCEIT and the constructive/destructive responses. Consistent with this idea, females scored significantly higher than males on the MSCEIT and constructive coping strategies, but lower on destructive strategies.

In one of the rare experimental studies of EI, Matthews et al. (2006) showed that EI as measured by the MSCEIT is significantly related to (pre-task) distress and worry stress states, even when controlling for the Big Five factors. Consistent with theoretical expectations, EI was also weakly, but significantly, related to an avoidance coping style under different stressful experimental conditions in this study. However, EI was not related to other coping styles (i.e., emotion-focused and task-focused coping) and, most importantly, EI did not predict task-induced stress when controlling for the Big Five factors. Hence, the evidence provided by this study does not support the notion that EI is a critical predictor of stress responses, as might be theoretically expected.

(2) *Relationship quality*. Couples where both partners were low on EI report lower relationship depth, lower support, poorer positive relationship quality, higher conflict, and greater negative relationship quality compared to couples where at least one member has high EI (Brackett, Warner, & Bosco, 2005). However, neither intelligence nor personality factors were controlled for in this study.

(3) *Social interaction*. Management subscale scores predicted self-reports of positive interactions with friends ($r = .31$), as well as friends' reports of positive and negative interactions and emotional support ($r = .33$; $-.30$; and .26; Lopes et al., 2004). Additionally, male scores on the MSCEIT predicted confederate and judge ratings of social behaviors after a social interaction, although female scores did not (Brackett et al., 2006). Again, this outcome may be due to the relatively high scores of females on both the predictors and the criteria.

(4) *Tobacco and alcohol use*. Scores on both the MEIS and the MSCEIT are negatively correlated with tobacco and alcohol use (Brackett, Mayer, & Warner, 2004; Trinidad & Johnson, 2002; Trinidad, Unger, Chou, & Johnson, 2005). The argument that these negative relationships constitute a form of validity evidence is not straightforward, as drug use is not strictly an emotional decision, even though there are emotional components. EI may act as a mediating variable, or may itself be mediated by other important variables (e.g., impulse control). There are a number of logical connections between EI and drug use that still need to be explicitly elucidated or empirically tested.

(5) *State anxiety*. MSCEIT scores also seem to be related to state anxiety, as the additional variance accounted for over intelligence and personality factors was estimated at 6% (Bastian, Burns, & Nettelbeck, 2005).

This body of evidence indicates that ability-based EI (as represented by the MSCEIT) does seem to relate to some important emotion-related outcomes. Notably, these correlations are also different for different branches, with Emotional Understanding and Emotion Management providing the greatest predictive utility. Given that Emotional Understanding also shows the most convincing validity evidence of the four branches, and that factor analyses conducted so far have found little support for the Assimilating Emotions branch (Ciarrochi, Chan, & Caputi, 2000; Mayer, Salovey, Caruso, & Sitarenios, 2003; Palmer, Gignac, Manocha, & Stough, 2005; Roberts, Zeidner, & Matthews, 2001), it conceivably makes sense to reconceptualize the four-branch model. In a revised model, greater weight might be given to Emotional Understanding, while Assimilating Emotions might be eliminated as a component of the model.

New Approaches to the Assessment of Emotional Intelligence

For a burgeoning research field such as EI to be defined by a single instrument with a single and somewhat unusual measurement method is a suboptimal state of affairs. Fortunately, new methods to assess EI are under development and the

work from many research areas steadily diffuses into the EI field. The assessment approaches we discuss in the passages that follow: (a) have been developed but are not commonly used in assessing EI, (b) are still in development, or (c) consist of concepts and methods that might potentially be leveraged to provide valid EI assessments. The list of all these different approaches to assessing EI includes information processing measures (such as inspection time and implicit association tests), as well as perceptual tests such as emotion recognition tasks, situational judgment tests (SJTs), and measurement paradigms from the conditional reasoning, principal-agent paradigm, and affective forecasting fields.

Information Processing Measures

Implicit Association Tests

The use of Implicit Association Tests (IATs) in detecting subtle biases is well documented – at the time of writing the current chapter, Greenwald, McGhee, and Schwartz's (1998) article introducing the IAT method has been cited more than 800 times in the literature. In essence, the IAT paradigm assesses the relative strength of positive and negative associations test-takers have for two opposing ideas (e.g., the strength of positive and negative associations for obese people versus slim people might indicate an implicit evaluative bias in favor of slim people). Mauss, Evers, Wilhelm, and Gross (2006) demonstrate that the IAT may be used to assess the implicit biases towards emotional expression and disclosure (e.g., the words "emotional," "disclose") as compared to emotional regulation and control (e.g., the words "controlled," "suppress"). Based on the premise that the people who regulate their emotions have implicit positive evaluations of emotion regulation, Mauss et al. (2006) suggest that their IAT (the Emotion Regulation–Implicit Association Test [ER–IAT]) assesses emotion regulation.

The ER–IAT demonstrated reasonable test-retest reliability ($r = .68$, $p < .001$, $N = 36$), but was unrelated to trait measures of emotion regulation. Clearly, both the small sample size and failure to provide convergent validity evidence render this study problematic. Indeed, the IAT measurement approach is not without its critics, as there is some disagreement about what the task actually measures (e.g., Fiedler & Bluemke, 2005; Mierke & Klauer, 2003). Nevertheless, it is one of the few available approaches that may have some potential to provide objective measures of emotion management. In addition, the approach can easily be adapted to assess other related constructs (e.g., empathy, emotion perception).

Emotion Recognition Assessments

The study of emotions in facial expressions is a far older research field than EI. Scientific research on facial expressions arguably stretches back more than a century, to Charles Darwin's *The Expression of the Emotions in Man and Animals* (1872). In psychology, Paul Ekman's seminal contributions to this

field date back to the 1950s. Ekman's corpus of work includes the specification of lawful rules linking muscular changes to facial expressions in the form of the Facial Action Coding System (FACS; Ekman & Friesen, 1978; Ekman & Rosenberg, 1997). The FACS was later used as the basis for several research tools assessing the recognition of facial expressions: (1) the Pictures of Facial Affect (POFA; Ekman & Friesen, 1976); (2) the Japanese and Caucasian Brief Affect Recognition Test (JACBART; Matsumoto et al., 2000); (3) the Micro-Expression Training Tool (METT; Ekman, 2004), and (4) the Subtle Expression Training Tool (SETT; Ekman, 2004). The vast research corpus in this domain could clearly be valuably applied to EI research. However, only in the last few years have some EI researchers begun to use these measures (e.g., Austin, 2005; Roberts et al., 2006).

In addition to these face-based assessments, there are currently assessments of emotion recognition ability for tone-of-voice such as the Vocal-I (e.g., Scherer, Banse, & Wallbott, 2001; Scherer, 2007) and the prosody measures from the Diagnostic Analysis of Nonverbal Accuracy (e.g., DANVA2-AP; Baum & Nowicki, 1998). The DANVA also includes subtests that assess the recognition of emotions from postures or gestures.

These assessments appear to correlate highly with each other when in the same modality, providing some evidence of convergent validity. For example, the DANVA2-AF and the JACBART correlate at $r = .80$ (Danforth, McIntire, & Schneider, 1997). However, Roberts et al. (2006) found that measures from different modalities (i.e., vocal and facial tests) were only weakly correlated. Specifically, the JACBART and Vocal-I correlated at $r = .17$. In addition, these measures do *not* seem to correlate with the Perceiving Emotions tests from the MSCEIT: Roberts et al. (2006) report a correlation of $r = .07$ between MSCEIT Faces and the JACBART. These findings suggest two testable hypotheses. Firstly, the ability to perceive emotions correctly may not be a single unitary ability, but may be specific to different modalities. Secondly, the MSCEIT method of rating the extent of emotion in a still photo of a face seems to capture a different skill from multiple-choice assessment of facial expression presented for only a fraction of a second (as in the JACBART). Whether the difference is due to the time limits for observation of the stimuli or due to the difference between multiple-choice versus rate-the-extent formats is not entirely clear at this juncture.

Emotional Intelligence Related to Inspection Time

Austin (e.g., 2005) has conducted studies relating self-reported, trait EI measures to an Inspection Time (IT) task, where respondents were given a speeded test and asked to discriminate between happy and neutral faces, sad and neutral faces, and two neutral symbols. IT is considered the minimal response time necessary to distinguish between two stimuli, and may be administered in a variety of different ways. Findings using this approach however, are rather mixed. For example, IT is weakly related to scores on a self-report EI measure ($r < .12$ for happy IT and sad IT), and an overall index of EI combining the various stimuli was found to be

weakly related to a general EI score from the Bar-On EQ-*i* ($r < .17$) (e.g., Austin, 2005; Austin & Saklofske, 2005; Stokes & Bors, 2001). What remains to be seen is if this IT task is substantially correlated with maximum performance measures of EI such as the MSCEIT. In going beyond the simple ability to distinguish between differing emotions, and considering how quickly an individual can accomplish this task, IT holds promise. The potential utility for such an application is rich, although it is necessary to tie this to real-world outcomes, as well as performance on maximum performance measures of EI.

Social Intelligence Measures as Emotion Perception Analogs[2]

The face, voice, and body language-recognition tasks discussed in the previous section represent the most direct analogs to emotion perception as conceptualized in the four-branch model (as assessed by the MSCEIT). However, there are several other assessments of nonverbal ability that appear conceptually related to the concept of EI and emotion perception. These include the Communication of Affect Receiving Ability Test (CARAT; e.g., Buck, 1984), the Profile of Nonverbal Sensitivity (PONS; Rosenthal, Archer, Hall, DiMatteo, & Rogers, 1979); the Interpersonal Perception Task (IPT; Costanzo & Archer, 1993); and the Child and Adolescent Social Perception Measure (CASP; Magill-Evans, Koning, Cameron-Sadava, & Manyk, 1995). Test-takers are presented with brief displays of people and need to discern such information as what stimuli the people might be looking at, what the relationship between people is (e.g., who is the boss, or the parent of a child), or what emotions the people are experiencing. The ability to correctly recognize emotions may form part of the social, interpersonal, or other kinds of nonverbal recognition that these tests assess.

In contrast to recognition measures, there are some existing assessments that attempt to tap explicit knowledge of social and/or emotional nonverbal phenomena. These include the Test of Nonverbal Cue Knowledge (TONCK; Rosip & Hall, 2004); and measures that assess test-takers' knowledge of deception cues, cues as to an individual's intelligence, and gender differences in social and expressive behaviors (Hall & Carter, 1999; Murphy, Hall, & Colvin, 2003; Vrij & Semin, 1996). Differences between explicit and implicit knowledge may be particularly important in EI, where facts and skills are rarely explicitly taught, but instead generally learned in a tacit or implicit way.

Situational Judgment Tests

Situational judgment tests (SJTs) are a type of test where individuals are presented with a situation (vignette) and then select either the most appropriate response or their typical response out of a list of possible choices. The method for constructing such a test is simple enough: (a) Items are generated (usually by critical incident interviews with subject-matter-experts); (b) responses are

generated (usually by a second group of subject-matter experts); and then (c) a scoring key is developed by a further group of experts (McDaniel & Nguyen, 2001). Several variations on this classic three-step procedure exist, such that virtually any test with situations as the item stimuli is commonly described as an SJT. Earlier situational measures of EI generally did not follow the three-step methodology. It is only in the last five years that situation-based tests of social or emotional intelligence have been informed by the SJT literature.

Early Precursors to SJT Measures of EI

Existing measures of EI resembling SJTs include the Levels of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990), the Emotional Accuracy Research Scale (EARS; Mayer & Geher, 1996), the MEIS Stories test (Mayer et al., 1999), and the MEIS and MSCEIT management tests. If we consider social intelligence as part of the EI domain, then Chapin's (1942) Social Insight Test might also be considered as a (very) early situational measure of EI. Each of these tests presents a situation as the basis for an item, but there is no indication that the classic three-step approach to developing SJTs was taken. For the MEIS and LEAS, the test authors generated the situations and scoring key. For the MSCEIT Management tests, an expert panel was used for scoring. For the EARS, items and responses were generated from abridged transcriptions of interview data, and scored according to the interviewees' endorsements (i.e., target scoring). More detail and example items from the LEAS, EARS, MEIS Stories test, and Social Insight test are given below:

1. *Levels of Emotional Awareness Scale* (Lane et al., 1990). Test-takers give open-ended responses to situations such as the following: "*You and your best friend are in the same line of work. There is a prize given annually to the best performance of the year. The two of you work hard to win the prize. One night the winner is announced: your friend. How would you feel? How would your friend feel?*"

Responses are scored from 0 to 5 in terms of the sophistication of the emotional detail involved, in line with a cognitive-developmental model of emotional experience. Variation in LEAS scores may be due to verbal ability as well as emotional awareness, as it requires sophisticated verbal expression of this emotional awareness.

2. *Emotional Accuracy Research Scale* (Mayer & Geher, 1996). Each item consists of several situations derived from the same individual (these situations were generated by interviewing the individual about their emotional experiences). For example: "*My best friend's father died this weekend. He had diabetes for a long time and as he got older his health grew worse and worse. I went to his funeral on Monday. Many of my friends from high school were also there because we all wanted to be there for our friend and because we all knew and liked her father. It made me realize how lucky I am to have younger healthy parents when I saw my friend standing there crying. Just watching her huge family come pouring into the synagogue also made me sad.*"

Test-takers are required to select the most appropriate word from twelve forced-choice pairs (e.g., mad – delighted; stomping feet – happy for another), where the correct alternative was whatever the target endorsed.

3. *MEIS Stories Test* (Mayer et al., 1999). Each item consists of a story of 2–3 sentences describing events happening to a fictitious person. For each story, test-takers rate the intensity of seven different emotions the protagonist experienced. Ratings were given on a five-point scale from "definitely present" to "definitely NOT present." For example: "*I was at home, and I got this upsetting phone call from a woman I work with. She is turning into a very aggressive and extremely demanding persona and was downright rude on the phone. She made unreasonable demands and was very angry. I think she's jealous and upset that she isn't involved in this successful project that I'm part of. Then, I had dinner with a friend who is really together and focused. I am questioning the work I am doing and wishing that I could be more even and focused like my friend.*"

4. *Social Insight Test* (Chapin, 1942). Each item describes a scenario consisting of social information about what the protagonist does. The test-taker must select the most plausible explanation for the protagonists' behavior from four possible alternatives (where the best alternative is determined by expert judgment). For example: "*Mr. Asher, when told that an acquaintance had purchased a new automobile, was heard to criticize him very strongly for spending so much money for a car when he probably could not afford one. Not long after this incident, Mr. Asher himself bought an expensive new automobile. About the same time he placed another mortgage on his house. Why did Mr. Asher criticize his acquaintance for an act he afterwards performed himself? (a) Because he probably had 'money left to him' upon the death of a near relative. (b) Criticism of his acquaintance got rid of an 'uneasy feeling' about something he contemplated doing himself.*"

These early measures point to the application of *emotional situations* as useful stimuli when assessing EI. However, none of these measures (with the possible exception of the EARS) applied an SJT approach to test development. Neither the situations nor the possible responses were based on real emotional experiences of an appropriate sample (as is the case in the classic SJT approach, where situations and responses are generated via interview data). In the last five years, a number of research teams have developed similar measures of emotion management and related abilities, but with a methodological basis that more clearly follows the SJT method (thus allowing greater ecological validity – that is, the test situation more closely mimics reality).

SJT Measures Directly Targeted to Assess Social and Emotional Intelligence

There are several emerging research groups, across the globe, that are developing social and emotional intelligence tests after the SJT tradition. A selection of such efforts is described in what follows.

1. *Social Intelligence Test – Magdeburg (SIM)*. Based on a newly developed and empirically tested facet model of social intelligence (Weis & Süß, 2005, 2007),

a multiple-construct, multimodal measure of social intelligence has been developed by a research team in Magdeburg, Germany: the Social Intelligence Test – Magdeburg (SIM; see Seidel, 2007; Süß, Seidel, & Weis, 2008). In this assessment battery, social understanding, social memory, and social perception are assessed using textual stimuli (e.g., emails, letters, diary entries), audio stimuli (e.g., recordings of phone-calls), photos (e.g., people showing gestures relevant in conversations), and video-based stimuli (e.g., people conversing in the kitchen as they cook a meal). The stimuli were selected on the basis of a taxonomy of social situations (see Süß et al., 2008) and culled from actual footage of volunteers (the protagonists) who were recorded for long periods of time. After viewing the stimuli that experts (academic psychologists) selected as test items, the protagonists answered detailed questions about the social and emotional content of those materials, which were used as the basis for scoring. That is, the SIM is an ecologically valid assessment of social intelligence based on target scoring. Structural analyses provide support for the underlying theoretical facet structure and social intelligence as a non-redundant construct of intelligence.

2. *Situational Test of Emotional Understanding (STEM)*. MacCann and Roberts (2008) developed SJTs assessing components of EI using accepted methodology underlying the SJT approach. The Situational Test of Emotion Management (STEM) was developed using interview data to specify situations, written responses from a second sample to specify response options, and expert panels to specify scoring keys. The STEM assesses fear-, anger- and sadness-management and can be administered in two formats: (1) multiple-choice (where test-takers select the best response to the situation); and (2) rate-the-extent (where test-takers rate the effectiveness of each response option). MacCann and Roberts (2008) showed that multiple-choice and rate-the-extent tests show different patterns of correlations: Multiple-choice scores correlate more highly with vocabulary and less highly with personality dimensions, and rate-the-extent scores correlate more highly with personality and less highly with vocabulary. An example item from the STEM (MacCann & Roberts, 2008) follows: *"Clayton has been overseas for a long time and returns to visit his family. So much has changed that Clayton feels left out. What action would be the most effective for Clayton? Option 1: Nothing, it will sort itself out soon enough. Option 2: Tell his family he feels left out. Option 3: Spend time listening and getting involved again. Option 4: Reflect that relationships can change over time.*

3. *Intrapersonal and Interpersonal Abilities*. Freudenthaler and Neubauer (2005) developed two multiple-choice measures of emotion management: (1) self-management (intrapersonal abilities) and (2) the management of others (interpersonal abilities). Responses were generated by distilling open-ended responses to various scenarios, and scored according to a panel of experts (psychologists and psychotherapists). Freudenthaler and Neubauer (2007) compared the correlates of their measures under "would do" (i.e., what the test-taker would do in that situation) versus "should do" (what the test-taker thought the best response was) instructions. Compared to the "should do" instruction, the "would do" condition showed stronger correlations with

personality, and weaker correlations with intelligence. An example item from the Interpersonal Abilities Test (Freudenthaler & Neubauer, 2005) follows: *"Your father is very scared of a complicated operation which is absolutely necessary. Option (1 of 4): To calm him down I advise him to talk to the doctor once more."*

Research on these three SJT-based measures of EI shows the importance of examining the effects of different response formats, instructions, and test modalities. It is clear from this research that such characteristics of test items change the constructs assessed. This multi-method focus is a feature of emerging research using SJTs and other methodologies. While the systematization of test development practices afforded by the SJT approach appears useful, SJTs are not free from scoring problems. It is still difficult to be certain that any SJT is going to have a response set that can be unambiguously scored by experts: There are simply not any sufficiently developed models to allow for this. Despite this limitation, SJTs have seen widespread use in industrial/organizational psychology for purposes of selection and promotion.

Future Directions for SJT Measures of EI

There are some clear concerns for text-based SJTs: Both the ecological validity and dependence on text comprehension are less than ideal. Weis and Süß's (2007) work with different modalities in social intelligence highlights this point to some extent – text-based items were more difficult than video- or audio-based items, and correlated more strongly with cognitive abilities. What is still needed is a rationally-developed video-based SJT assessing EI. Although Weis and Süß's tests can be considered to be SJTs, the culling of incidents from real (social) life meant that less control could be exercised over the content dimensions of the test. Furthermore, the content emphasized in their tests was social relations; where emotions may be important but do not necessarily function as the main aspect to determine correct responses. The development of a video-based SJT assessing emotion management, using MacCann and Roberts' (2008) STEM as a starting point, and the classic three-step SJT approach as a methodology, is one of the ongoing projects of the current group of collaborators. Using scripts developed on the basis of interview data, and professional actors and film crew to act out the scenarios allows content specification and control as well as ecological validity and independence from reading ability.

With regard to concerns about expert scoring, MacCann and Roberts (2008) also developed a test of emotional understanding (the Situational Test of Emotional Understanding, or STEU) that used information from Roseman's (1984) appraisal theory as the basis for scoring test items according to explicit and verbalizable standards rather than expert opinions. Although reliability of this test was low in a non-university sample, correlations with other expert-scored EI tests indicate that such a method has potential to be included among these new assessment approaches.

Assessing Emotional Intelligence Through Implicit Beliefs: The Conditional Reasoning Paradigm

James and collaborators have assessed aggression, achievement motivation, and other traits using the "Conditional Reasoning" paradigm (James, 1998; James, McIntyre, Glisson, Bowler, & Mitchell, 2004; James et al., 2005). The basis behind conditional reasoning is that test-takers who hold a particular implicit belief about the world (e.g., "Everyone is out to get me") will interpret an ambiguous situation differently from people who do not hold this belief (e.g., "A person who bumps into me is being deliberately cruel, rather than accidentally clumsy"). Items consisting of such ambiguous situations might then discriminate between people who do and who do not hold such sets of implicit beliefs (known as justification mechanisms). Research so far has indicated that this is a valid way to assess aggression and achievement motivation. If people with low EI also hold a particular set of implicit beliefs about the world, then this measurement paradigm might usefully be extended to EI.

Interestingly, conditional reasoning bears some resemblance to both IAT measures (because of the targeting of implicit beliefs and ideas) and the SJT methodology (because of its reliance on vignettes and response options). Unlike a SJT, however, the conditional reasoning tasks rely on having two logically plausible response options, only one of which would be chosen by people holding the implicit belief of interest. In the example below (James et al., 2005), options B and D are both logical, but the logic of option D requires that the test-taker believes in the "powerful others" bias (that people will always inflict harm on those less powerful than themselves): "*The old saying, 'an eye for an eye,' means that if someone hurts you, then you should hurt that person back. If you are hit, then you should hit back. If someone burns your house, then you should burn that person's house. Which of the following is the biggest problem with the 'eye for an eye' plan? Option A: It tells people to 'turn the other cheek' (illogical). Option B: It offers no way to settle a conflict in a friendly manner (logical, no aggression). Option C: It can be used only at certain times of the year (illogical). Option D: People have to wait until they are attacked before they can strike (logical, aggression).*"

Transferring this methodology to EI assessment would require the identification of implicit biases relating to high or low levels of EI. For example, individuals who are poor at emotional expression may believe that the expression of negative emotions is shameful, is a burden to other people, is a sign of weakness, or is a characteristic of children rather than adults. Test items catering to these biases might be developed according to the Conditional Reasoning paradigm. Developing tests using this method would require some conceptual and theoretical work at the outset, which might prove useful for advancing the EI field quite apart from test development per se.

An Emotion-Based Adaptation of the Principal-Agent Paradigm

The principal-agent paradigm (PAP) assesses the ability of an agent to evaluate the preferences of a principal, based on known values that the principal holds for different features of the decision event. To take a trivially simple example, if the agent knows that the principal likes ice-cream a lot, but does not like cheesecake much, the agent will be able to predict the principal's dessert choice and place an order for the principal at a restaurant (i.e., act on his or her behalf). The PAP originated in the economics literature, to assess how well an agent can learn how much value the principal attaches to different attributes of a set of objects. The agent observes several examples of the principal's choices between exemplars of the set of objects in complex situations, and then must decide what the principal's preferences would be in a new complex situation (Huber, Ariely, & Fischer, 2002).

In transferring this methodology to psychological test development, we can consider the "agent" to be the test-taker, and the "principal" to be the protagonist in a vignette test item. An example of a complex situation might be selecting which type of island cruise vacation to go on. For simplicity's sake, let us assume that there are five relevant attributes of the cruise, each with three levels of quality (poor, fair, and good). These aspects might be: (1) *Cost* ($3000 = poor, $2000 = fair, $1000 = good); (2) *Accommodation* (poor, fair, good); (3) *Likelihood of major storm* (90% = poor, 60% = fair, 30% = good); (4) *Shipboard entertainment quality* (poor, fair, good); and (5) *Cruise length* (3 days = poor, 6 days = fair, 9 days = good). A principal who values saving money more than any of the other attributes might choose the $1000 package even if the other four attributes were poor. In contrast, a principal for whom money is less important in decision making might select the most expensive cruise, even if the other four attributes were only marginally better for the $3000 versus the cheaper cruises. That is, the *values of the principal* would affect the *relative weight of each attribute* in making a choice. This is the key to the PAP: The agent must account for the principal's value structure in predicting the choices the principal would make.

Applying the PAP to EI research may provide an assessment of understanding emotions. Just like the agent in economic applications needs a good understanding of the principal's value or attitudinal structure to make appropriate choices on his or her behalf, the agent in an EI setting would require a high level of emotional understanding (or empathy) to comprehend the principal's emotional functioning. More specifically, in order to correctly predict what the principal would feel and do in a certain situation (including emotion-based decision making), the agent would need to learn or understand the principals' event-emotion, emotion-emotion, and emotion-behavior contingencies. That is, the agent needs to acquire knowledge and make valid inferences about: (a) emotions that typically follow certain events or event classes, (b) a potential chain of emotional reactions,

and (c) the action that most likely will result from the existence of a certain emotional state. In this context, the emotional reactions to events, the sequences of emotions, and the subsequent behavioral consequences may be either conscious and deliberate or automatic reactions of the principal. The process components and their interactions compose what is called the principal's emotional functioning or emotional structure.

Depending on the circumstances under which emotional knowledge acquisition takes place, the ability to perceive emotions may be an influential factor for assessing understanding emotions with the PAP. In addition, understanding the emotions of a particular principal may be enhanced if general knowledge about emotion contingencies is available and accessible (e.g., knowledge consistent with appraisal theories), as well as applicable to the emotional structure of a particular principal. The potential influences of emotion perception and emotion knowledge on EI measurement procedures are not unique for PAP measurement procedures but apply to most other measurement approaches of understanding emotions as well (e.g., the SJT approach).

When using the PAP in EI research, the decision making and prediction tasks would need to be framed appropriately with different emotions instead of values and utilities as the content structure to be acquired and used by the agent. For example, instead of a decision on which vacation package to choose, an emotion-based PAP (or EPAP) might ask which potential partner would be dated, which approach to an unjust accusation from a co-worker would be taken, or which method of expressing condolences to a friend would be made, based on the principal's emotional "preferences" and automatic emotional reactions. Examples for such preferences or reactions might include the need for confrontation, security, adventure, affection, or intellectual stimulation; or the tendency towards joy, sadness, frustration, jealousy, or anger.

In an implementation of an EPAP, the agent/test-taker would be presented with a profile of the principal's typical emotional reactions. This presentation can take many forms, from observation of the principal's behavior to explicit descriptions (e.g., verbal or graphical) and definitions of the contingencies to be learned. The behavior that is described can: (a) be overt or covert, (b) include event-emotion, emotion-emotion, as well as emotion-behavior contingencies, and (c) be video-based, computer-animated, text-based, etc. The more explicit this step, the less influence can be exerted by emotion perception components at this stage.

In a subsequent step, the acquired emotional structure can be assessed with learning-type tasks to estimate the test-taker's capability to learn this type of emotional knowledge. For example, after receiving information about the principal's emotional structure, the test-taker is presented with a vignette along with the principal's potential reactions. The vignette and the potential reactions would allow direct application (i.e., without any transfer) of the information gathered in the previous step. The agent's task is to rate the

strength of the principal's emotional reactions in the situation. Emotional reactions may include mood states, behaviors indicative of certain emotions, and the like.

Next, a new situation would be described that is emotion-laden. Several possible reactions (e.g., behavioral choices) are offered. The reactions represent different results from different emotional structures, only one of which most likely follows from the structure to be learned in the previous step. In this prediction-type task, the agent's job is to predict the response that the principal would most likely show. The responses offered cannot be directly derived from the knowledge about the emotional structure but require inferences and transfer to the new situation. As is usually done as part of the PAP, the agent is asked to act on behalf of the principal, as if the agent would actually be the principal. This highlights the fact that a core component of this approach to assess understanding emotions is the ability to be empathetic.

Theoretically this method provides more information than the standard instructions from a SJT (asking what the test taker *would* do or what the person in the vignette *should* feel) as it both recognizes that individuals with different emotional structures prefer different courses of action. In addition, this method allows for construction of theoretically "correct" answers, although care would be needed to avoid multiple viable answers.

The EPAP approach to measuring EI is a far more accurate simulation of social and emotional knowledge applied outside of a test room than many other approaches, as it acknowledges that different people have different emotional reactions, and that learning these reactions is an important skill. However, there are several concerns with this approach, first of which is that it has yet to be developed into a usable measure of EI, which places a heavy burden of development on any researcher interested in testing the validity of this approach. Another concern is that it may be difficult for individuals to learn any but the simplest emotional response contingency if only short vignettes are used.

Affective Forecasting and Emotional Intelligence

Affective forecasting (AF) is the ability to accurately forecast one's emotional state at some point in the future, typically in response to a specific emotion-inducing event (for a review of the AF literature, see Hsee & Hastie, 2006). While the research on AF as a relevant measure of EI is limited, high-EI individuals should be able to better predict their future emotions, both because of increased understanding and increased control of their emotions. The AF paradigm shares some similarities with the EPAP: In both cases the test-taker must make predictions based on event-emotion contingencies. In the case of AF, however, the principal and the agent are the same individual.

Dunn, Brackett, Ashton-James, Schneiderman, and Salovey (2007) recently published an article showing a relation between errors in AF and MSCEIT scores: ß = –.22 for total scores and ß = –.31 for Management scores (i.e., smaller errors in forecasting are associated with higher levels of EI, and particularly Management). Dunn et al. argue that AF constitutes a stable trait, as AF accuracy scores on two different tasks (a presidential election and a term paper) correlated at .28 (cf. however, Orchard, 2005). If it can be demonstrated that AF accuracy is indeed a stable individual differences variable (or ability), then it should be a useful tool in assessing EI, either as a part of the assessment process or in validating a measure of EI as a dependent variable. In either case, this is an area of research that deserves further attention.

Conclusion

In the light of the potential of this last group of measures, let us reconsider the test-developer struggling with the task of creating a valid assessment tool to assess EI. Certainly, the plethora of possibilities has not simplified her task, since there are now a number of ways to move forward. Although there is still no one clear path to follow, there are at least two clear principles. Firstly, the self-report methodology does not result in a measure of emotional *intelligence*. Secondly, no single test measures all aspects of EI: Each individual scale assesses one sub-construct (e.g., recognition, understanding or management of emotions, empathy, or emotional expressiveness). As a corollary to this second principle, we suggest that the test developer would need to select the development paradigm most appropriate for the construct of interest. For example, inspection time measures seem to be best for assessing simple information processing-type constructs such as emotion recognition, while the SJT paradigm might best be used to assess emotion management. Given the dependence of the EPAP on reading another person's emotions and values, this might best be used to assess understanding emotions and empathy. In any case, developing a test that purports to measure "EI" as a general factor makes little sense, given that different branches or sub-constructs show different relationships to different criteria.

In comparing the strengths and weaknesses of the different approaches, some generalizations can be made. Advantages of the information processing and emotion recognition tasks include easy-to-understand instructions, low verbal load (making this nuisance factor less problematic), and an obvious (and uncontroversial) scoring key. However, these simple information-processing tools do not offer the rich context, ecological validity, or cognitive complexity of the situation-based assessments (i.e., SJT, EPAP, AF, and Conditional Reasoning paradigms).

Overall, the potential research questions suggested by this chapter could easily occupy the time of numerous researchers for years to come. For example,

research is clearly needed on each specific measure, particularly the accumulation of validity evidence. Over time, this would allow for the development of even more accurate and valuable assessments of EI, and a taxonomic model that maps respective subcomponents of EI to outcomes that are valued by society. The results of such a cumulative program of research would silence the critics of EI research and provide great insight into individual differences in emotions and how they play out in every day life.

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Notes

1. Resolving the efficacy of these four criteria is no trivial undertaking, as correlational evidence needs, for example, to take into account corrections for statistical artifacts and may be sample dependent. Meta-analyses aimed at these issues are appearing in the literature (see e.g., Roberts et al., 2008), as are studies where both corrected and uncorrected correlation coefficients are reported.
2. Emotional intelligence shares much conceptual overlap with the "social intelligence" domain, and we treat emotional and social intelligence as largely overlapping constructs in the following account. Indeed, the term *social intelligence*, when traced to its likely progenitor John Dewey (1909; see Landy, 2006), does share close conceptual parallels with the definition of EI: "Ultimate moral motives and forces are nothing more or less than social *intelligence* (italics in the original) – the power of observing and comprehending social situations – and *social power* (italics in the original) – trained capacities of control – at work in the service of social interests and aims" (p. 43). Ultimately, social and emotional intelligence will need to be disentangled, but for present purposes we are agnostic on this point.

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Index

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