

THE PSYCHOMETRIC PROPERTIES OF THE SCHUTTE EMOTIONAL INTELLIGENCE SCALE

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ABSTRACT

The objective of this study was to investigate the psychometric properties of the Schutte Emotional Intelligence Scale (SEIS). The psychometric soundness of the SEIS was tested. A cross-sectional survey design was used for this study. A sample (n = 341) was taken from Economical Science students from a higher-education institution. The results obtained using the cross-sectional design supported a six-dimensional factor structure of the SEIS. The six factors are Positive Affect, Emotion-Others, Happy Emotions, Emotions-Own, Non-verbal Emotions and Emotional Management. A multi-analysis of variance (MANOVA) was used to determine differences in terms of biographical data. The results indicated significant differences between gender and language groups.

Keywords: Psychometric properties, emotional intelligence scale, gender groups, language groups, SEIS

The scientific study of emotional intelligence (EI) in organisations has gained considerable research activity over recent years (Ashkanasy, 2002; Brown, 2003; Chan, 2006; Donaldson-Feilder & Bond, 2004; Fisher & Ashkanasy, 2000; Fulmer & Barry, 2004). Simultaneously researchers have investigated and raised concerns about the appropriate way to measure EI in various studies (Bradberry & Su, 2006; Dawda & Hart, 2000; MacCann, Matthews, Zeidner & Roberts, 2003; Sjöberg, 2001; Watkin, 2000). Although EI has been the subject of much attention at both popular and academic level, only now are answers provided to some of the fundamental questions posed about the construct (Pérez, Petrides & Furnham, 2005). Dulewicz, Higgs and Slaski (2003) confirm that in literature there appears to be some debate about what constitutes the domain of EI, about terminology used to describe the construct and about methods used to measure it.

One method that has been used widely in research to measure EI is the Schutte Emotional Intelligence Scale (SEIS) (1998) (e.g. Carmeli, 2003; Dimitriadis, 2007; Grant & Cavanagh, 2007; Hakanen, 2004). An important issue raised by Petrides and Furnham (2000) is whether this scale can be used in research as a face valid, unidimensional measure of EI in organisations. Investigating the psychometric properties of the SEIS would therefore help to answer this question and add to research knowledge on the measurement of EI in a South African setting (using a university student sample).

In the remainder of the background to the study the construct of EI will be further explored, EI measurement issues will be addressed, different approaches to EI will be highlighted and a summary of different measurement instruments will be given.

The purpose of this paper is to explore the construct of EI (including its measurement) from a theoretical viewpoint and to establish the psychometric properties of the SEIS (1998).

Emotional intelligence

Dulewicz *et al.* (2003) state that EI is not a new concept. Mayer, Salovey and Caruso (2004) define the concept of EI as the capacity to reason about emotions, and of emotions to enhance thinking. EI includes the abilities to accurately perceive emotions, to access and generate emotions in order to assist

thoughts, to understand emotions and emotional knowledge, and to reflectively regulate emotions in order to promote emotional and intellectual growth (Mayer *et al.*, 2004).

Dulewicz and Higgs (1999) define EI as being concerned with being aware of and managing one's own feelings and emotions; being sensitive to and influencing others; sustaining one's motivation; and balancing one's motivation and drive with intuitive, conscientious and ethical behaviour.

It is apparent that from this theoretical perspective EI refers specifically to the co-operative combination of intelligence and emotion (Ciarrochi, Chan, & Caputi, 2000; Mayer & Salovey, 1997; Roberts, Zeidner & Matthews, 2001). EI emphasises the importance of self-awareness and understanding, redressing a perceived imbalance between intellect and emotion in the life of the collective Western mind (Zeidner, Matthews & Roberts, 2004). Zeidner *et al.* (2004) further state that EI also connects with several cutting-edge areas of psychological science, including the neuroscience of emotion, self-regulation theory, studies of meta-cognition, and the search for human cognitive abilities beyond 'traditional' academic intelligence. Given the core proposition that it is a combination of IQ and EI that determines life success (Goleman, 1996), a question arises as to whether or not it is feasible to measure EI (Dulewicz & Higgs, 2000).

Dulewicz and Higgs (2000) state that in exploring the issue of whether it is possible to measure EI or not, the literature tends to polarise. According to Dulewicz and Higgs (2000), there appears to be a dominant view that the somewhat complex and diverse nature of EI works against its effective measurement. Goleman stated in 1996 that no pencil and paper test existed that measures EI. Other authors tend to endorse this view, for example Steiner (1997) claims that EI is a marketing term that is impossible to measure. According to Dulewicz and Higgs (2000), the complex nature of EI and its assessment may not be appropriate for measurement by means of a pencil and paper test.

The assessment of EI is therefore still a topic of considerable interest and debate (Austin, Saklofske, Huang & McKenney, 2004). The reason for this is that much has been written about EI, but less about how to measure it or develop employees in

it or what an emotionally intelligent organisation looks like (Watkin, 2000). Schutte *et al.* (1998) state that the assessment of EI has not kept pace with the interest in the construct in general. Pfeiffer (2001) and Petrides and Furnham (2003) confirm this by saying that the development of EI measures has not nearly kept pace with the theory and popular interest in the EI construct.

According to Pfeiffer (2001), in 2001 no brief, objective, theoretically grounded measure of EI that enjoyed acceptable reliability or validity was evident. Pfeiffer (2001) states that a major weakness with the extant EI research literature is the lack of scientifically sound, objective measures of the EI construct. Pfeiffer (2001) explains that unlike the many carefully developed cognitive ability measures, measures of EI are almost all based on self-report instruments, lack norms or a standardisation group, and if measures exist at all, have unacceptable levels of internal consistency or stability. Pfeiffer (2001) concludes that almost none of the EI measures provide any data to support the particular interpretations that the test developers claim they can make by using a test score.

Davies, Stankov and Roberts (1998) examined the relationship among various measures of EI and personality. They concluded that objective measures of EI are unreliable and that self-report measures show considerable overlap with traditional measures of personality (in Newsome, Day & Catano, 2000). This does not necessarily mean that EI may not eventually prove to be a valid or useful psychological construct. Rather, it simply means that Pfeiffer, Soldivera and Norton (1992) were of the opinion that no scientifically acceptable instruments were available in 1992 to measure EI constructs. Only recently are researchers beginning to identify valid EI measures (Ciarrochi, Deane & Anderson, 2002; Ciarrochi *et al.*, 2000; Mayer, Caruso & Salovey, 1999; Schutte *et al.*, 1998). However, in 2003, Saklofske, Austin and Minski (2003) stated that research on the psychometrics of EI was still in its early stages, leaving a number of unresolved research issues that needed to be addressed. Conte (2005) therefore states that serious concerns still remain for EI measures, ranging from scoring concerns for ability-based EI measures to discriminant validity concerns for self-report EI measures.

While the criticism of a scientifically acceptable method for assessing EI is widely acknowledged by Goleman (1996) and Kreitner and Kinicki (2001), there is a continuing search for a measure of EI (Cartwright & Pappas, 2008; Dulewicz & Higgs, 2000).

The latter is evident in the number of EI measures that give the impression that the construction of psychometrically sound questionnaires is easy (Pérez *et al.*, 2005). Conte (2005) emphasises that EI measures cannot be applied in the organisation unless more rigorous, predictive and incremental validity evidence for EI measures is shown. EI has been characterised by some researchers as a cognitive ability (involving the cognitive processing of emotional information), which should be measured by ability-type tests (Saklofske *et al.*, 2003). An alternative approach to EI proposes that it is a dispositional tendency, which can therefore be measured by a self-report questionnaire (Saklofske *et al.*, 2003).

The process of validating an EI measure requires convincing empirical evidence that a measure of EI predicts career success or other important on-the-job criteria. The most basic task for validation research is to show that EI measures reliably differentiate between low- and high-performing groups on particular work-related criteria. Such studies should focus on predicting success both across and within jobs, identifying the occupations for which EI is more and less important (e.g. social workers versus financial analysts). The use of EI component sub-tests also needs to be validated, using large-scale trait-performance validation designs. It is highly plausible that

effective performance in different occupations involves different patterns of emotional (or social) characteristics (Zeidner *et al.*, 2004).

Schutte and Malouff (1998) state that reliable and valid measures of EI and its components are important efforts to make theoretical advances in the area of EI; explore the nature and development of EI; predict the future functioning of individuals, for example in training, programmes, job or marriages; identify individuals likely to experience problems because of deficits in emotional skills and evaluate the effectiveness designed to increase EI.

Trait EI versus ability EI

Pérez *et al.* (2005) report that in the rush to create EI measures, researchers and theorists (for example Ackerman & Heggstad, 1997; Hofstee, 2001) have overlooked the fundamental difference between typical versus maximal performance. Thus, while some researchers developed and used self-report questionnaires, others embarked on the development of maximum-performance tests of EI (Pérez *et al.*, 2005). According to Pérez *et al.* (2005), all these researchers assumed that they were operationalising the same construct (Pérez *et al.*, 2005).

Pérez *et al.* (2005) state that the method used to measure individual difference variables (self-report versus maximum performance) has a direct impact on their operationalisation. In recognition of this basic fact, Petrides and Furnham (2000; 2001) distinguish between trait EI (or emotional self-efficacy) and ability EI (or cognitive-emotional ability). Petrides and Furnham (2001) propose that these two types of measures should be termed trait and ability EI respectively (in Austin *et al.*, 2004).

According to Pérez *et al.* (2005), it is important to understand that trait EI and ability EI are two different constructs. The former is measured through self-report questionnaires, whereas the latter ought to be measured through tests of maximal performance. This measurement distinction has far-reaching theoretical and practical implications. For example, trait EI would not be expected to correlate strongly with measures of general cognitive ability or proxies thereof, whereas ability EI should be unequivocally related to such measures (Pérez *et al.*, 2005).

Mixed versus ability models of EI

The former distinction between trait EI and ability EI is predicated according to Mayer, Salovey and Caruso (2000) with regard to the method used to measure the construct and not the elements that the various models are hypothesised to encompass. As such, it is unrelated to the distinction between mixed and ability models of EI (Mayer *et al.*, 2000), which are based on whether or not a theoretical model mixes cognitive abilities and personality traits (Pérez *et al.*, 2005).

The distinction between mixed and ability models pays no attention to the most crucial aspect of construct operationalisation (i.e. the method of measurement) and is compatible with the idea of assessing cognitive ability variables via self-report procedures, which is not the case when differentiating between trait EI and ability EI. Indeed, correlations between actual and self-estimated scores tend to hover around $r = 0.30$ (Furnham, 2001).

The distinction of Mayer *et al.* (2000) between mixed versus ability models is at variance with both established psychometric theories. This is because it neglects the issue of the measurement method as well as with all available empirical evidence, which clearly shows that self-report measures of EI tend to intercorrelate strongly, irrespective of whether or not these measures are based on mixed or ability models

(Pérez *et al.*, 2005). All recent research highlights the need to distinguish between two EI constructs, namely trait and ability EI (O'Connor & Little, 2003; Warwick & Nettelbeck, 2004).

O'Connor and Little (2003) focus on the difference between self-report and ability-based measures of EI. In recent years, a debate has emerged in the EI literature regarding whether or not self-report measures, such as the Bar-On EQ-i, provide an accurate assessment of one's standing on this construct. Some authors (e.g. Mayer *et al.*, 1999; Mayer & Salovey, 1997; Mayer *et al.*, 2000) argue that EI could be more accurately conceptualised as an ability than as a conglomeration of traits and characteristics.

Zeidner *et al.* (2004) state that although there are currently several models of EI in the literature, they can be roughly classified under two distinct frameworks.

The first approach, which tends to rely on self-report techniques, suggests that EI is primarily dispositional (i.e. representing a conglomerate of cognitive, personality, motivational and affective attributes). Examples of measurement approaches subscribing to this framework include the EQ-i (Bar-On, 1997), the EQ-map (Cooper, 1997), and the Schutte Self-Report Index (SEIS) (Schutte *et al.*, 1998).

The second approach upholds a cognitive view of EI, which in turn suggests that its measurement should conform to ability modes. Examples of this approach include the four-branch hierarchical structure of EI, measured empirically by the Emotional Accuracy Research Scale (EARS) (Geher, Warner & Brown, 2001), the Multi-factor Emotional Intelligence Scale (MEIS) (Mayer *et al.*, 1999) and its successor, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, Caruso & Sitarenios, 2003).

Mayer and Salovey (1997) formulated a hierarchical model of EI, which they subsequently amended. The original model postulated that EI is an umbrella concept comprising three distinct components, namely appraisal and expression of emotions, regulation of emotions and utilisation of emotional information in thinking and acting (Petrides & Furnham, 2000).

Petrides and Furnham (2000) state that Mayer *et al.* (2000) differentiate between mixed and ability models of EI on the basis of Mayer and Salovey's (1997) model and further theoretical development that was vague. According to Mayer *et al.* (2000), mixed models incorporate a wide range of personality variables,

as opposed to Mayer and Salovey's (1997) ability model, which is a strongly cognitive definition of EI.

An even broader differentiation is that between trait EI and information-processing EI. This took into account the different measurement approaches and operational definitions adopted by mixed and ability mode theorists (Petrides & Furnham, 2000).

In fact, Petrides and Furnham (2000) propose that it is the type of measurement rather than the theory *per se* that determines the nature of the model. Trait EI is concerned with cross-situational consistencies in behaviour (manifest in specific traits or behaviours such as empathy, assertiveness, optimism) as opposed to information-processing EI, which concerns abilities (e.g. able to identify, express and label emotions) (Petrides & Furnham, 2000). Trait EI is embedded within the personality framework and is assessed via validated self-report inventories that measure typical behaviour (e.g. Bar-On, 1997; Salovey, Mayer, Goldman, Turvey & Palfai, 1995: in Petrides & Furnham, 2000) this approach to EI research draws heavily on personality variables such as empathy, optimism and impulsivity, but often includes many other, somewhat more vague constructs that seem to be potential correlates (e.g. motivation, self-awareness, happiness) rather than essential elements of EI. By contrast, the information-processing approach is much more focused and explicit as the constituent parts of EI and its relationship to traditional intelligence (Petrides & Furnham, 2000).

Petrides and Furnham (2000) further state that much like traditional intelligence, information-processing EI can be best assessed through measures of maximal (not typical) performance. While there are some trait EI inventories available, for example Bar-On (1997) and Salovey *et al.* (1995), the only measure information-processing EI is the Multifactor Emotional Intelligence Scale (MEIS) developed by Mayer *et al.* (1999). Schutte *et al.* (1998) developed and validated a self-report scale within the trait EI framework that allegedly measures a homogeneous construct of EI (Petrides & Furnham, 2000). Austin *et al.* (2004) state that EI has been characterised by some researchers (for instance Mayer *et al.*, 2000) as a cognitive ability that should be assessed by using problem-solving exercises, while other researchers (e.g. Petrides & Furnham, 2000; 2001) have developed an approach to EI assessment based on self-report questionnaires.

According to Pfeifer (2001), there are a dozen or more self-report instruments that purport to measure EI, and a smaller number

TABLE 1
Summary of ability EI measures

MEASURE	AUTHORS	ALPHA	CONVERGENT /DISCRIMINANT VALIDITY	STRUCTURE
EARS (Emotional Accuracy Research Scale)	Mayer & Geher (1996)	Low (0.24 for target scoring and 0.53 for consensus scoring)	Small and unstable correlations with self-report empathy	Unclear (4 factors?)
EISC (Emotional Intelligence Scale for Children)	Sullivan (1999)	Low to moderate	Unclear	Unclear
MEIS (Multifactor Emotional Intelligence Scale)	Mayer, Caruso & Salovey (1999)	Good for global ability EI (0.70–0.80), but low (0.35–0.66) for branches 3 and 4 (better to consensus than for expert scoring)	Small to moderate correlation with crystallised intelligence (Gc). Low correlations with the Big Five.	Unclear (3 factors?)
MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence Test)	Mayer, Salovey & Caruso (1997; 2002)	Better for Version 2 than Version 1 (0.68–0.71)	Convergence between general consensus and expert consensus scoring. Very low correlations (< 0.30) with trait EI measures	Unclear (4 factors?)
FNEIPT (Freudenthaler & Neubauer Emotional Intelligence Performance Test)	Freudenthaler & Neubauer (2003)	Moderate: 0.69 for "managing own emotions" and 0.64 for "managing others' emotions"	"Managing own emotions" correlated with self-reported intrapersonal EI (0.51) and "managing others' emotions" correlated with self-report interpersonal EI (0.25). Both subscales correlated with the Big Five (0.18 to -0.51)	Unclear (2 factors?)

Note. Information in this table is necessarily succinct and readers are encouraged to consult the original sources for specific details. Entries designated "unclear" do not necessarily indicate conflicting evidence, as they may also refer to lack of adequate data. Question marks indicate that Pérez *et al.* (2005) have been unable to obtain data from the relevant entry. α = Reliability estimate Cronbach's α , Conv./ Discr. Val. = Convergent/ discriminant validity, Structure = Factor structure. Adapted from Pérez *et al.* (2005, pp. 127–128).

TABLE 2
Summary of trait EI measures

MEASURE	AUTHORS	ALPHA	CONV. /DISCR. VAL.	STRUCTURE
TMMS (Trait Meta Mood Scale)	Salovey, Mayer, Goldman, Turvey & Palfai (1995)	0.70–0.85	Moderate correlations with the Big Five	3 factors, but no global score
EQ-i (Emotional Quotient Inventory)	Bar-On (1997)	Generally good (about 0.85)	Moderate to high correlations with the Big Five	Unclear
SEIS (Schutte Emotional Intelligence Scales)	Schutte <i>et al.</i> (1998)	0.70–0.85	Medium to high correlations with the Big Five	Unclear (3 or 4 factors?) global score
ECI (Emotional Competence Inventory)	Boyatzis, Goleman & Hay/McBer (1999)	0.70–0.85 for global score > 0.85 for social skills	Unclear (small samples); uncorrelated with critical thinking and analytical reasoning	Unclear (4 factors?)
EI-IPIP (Emotional Intelligence-based IPIP Scales)	Barchard (2001)	0.70–0.85	?	?
EISRS (Emotional Intelligence Self-Regulation Scale)	Martinez-Pons (2000)	0.75–0.94	Unclear	Unclear (1 factor?)
DHEIQ (Dulewicz & Higgs Emotional Intelligence Questionnaire)	Dulewicz & Higgs (2001)	Low to moderate (0.54–0.71)	Unclear	Unclear
TEIQue (Trait Emotional Intelligence Questionnaire)	Petrides, Pérez & Furnham (2003)	Generally good (about 0.85)	The TEIQue can be isolated in Giant Three- and Five-Factor space (Petrides, 2001)	4 factors, global score
SPTB (Sjöberg Personality Test Battery (EI Scale))	Sjöberg (2001)	0.70–0.85	Moderate correlations with extraversion (0.37) and Neuroticism (-0.50)	?
TEII (Tapia Emotional Intelligence Inventory)	Tapia (2001)	0.70–0.85	?	4 factors, global scale
SUEIT (Swinburne University Emotional Intelligence Test)	Palmer & Stough (2002)	Generally good (about 0.85)	Moderate correlations with neuroticism (-0.41), Extra-version (0.44), openness (0.27)	?
WEIP-3 (Workgroup Emotional Intelligence Profile (Version 3))	Jordan, Ashkanasy, Härtel & Hooper (2002)	0.70–0.85	Small to moderate correlations with TMMS	Unclear (7 factors?)
EIS (Emotional Intelligence Scale)	Van der Zee, Schakel & Thijs (2002)	Adequate for "other ratings" (0.70–0.85) Low for self-rating (< 0.60)	Low correlations with IQ. Moderate to high correlations with the Big Five	Unclear (3 factors)
WLEIS (Wong & Law. Emotional Intelligence Scales)	Wong & Law (2002)	0.70–0.85	Small negative correlations with IQ	4 factors, global score
LEIQ (Lioussine Emotional Intelligence Questionnaire)	Lioussine (2003)	0.70–0.85	Moderate correlations with the Big Five	Unclear (7 factors?)

Note. Information in this table is necessarily succinct and readers are encouraged to consult the original sources for specific details. Entries designated "unclear" do not necessarily indicate conflicting evidence, as they may also refer to lack of adequate data. Question marks indicate that Pérez *et al.* (2005) have been unable to obtain data from the relevant entry. Alpha = Reliability estimate Cronbach's α , Conv./Discr. Val. = Convergent/ discriminant validity, Structure = Factor structure. (Adapted from Pérez *et al.*, 2005, pp. 130–133).

of EI measures that are not in a self-report format. The following presentation serves to introduce different instruments that purport to measure the elusive EI construct:

Measurement of ability emotional intelligence

Table 1 presents a summary of ability EI measures, along with basic information about their reliability, validity and factor structure provided by Pérez *et al.* (2005, pp. 127–128).

Measurement of trait emotional intelligence

Pérez *et al.* (2005) state that only a few trait EI measures have been developed within a clear theoretical framework and even less have a sturdy empirical foundation. Indicative of the confusion in the field is that most self-report questionnaires purport to measure EI as a cognitive ability (Pérez *et al.*, 2005).

Table 2 presents a summary of trait EI measures along with basic information about their reliability, validity and factor structure provided by Pérez *et al.* (2005, pp. 130–133). The entries have been organised by year of publication and principal authors.

It is evident from Tables 1 and 2 that a number of researchers (Bar-On, 1997; Goleman, 1995; Salovey & Mayer, 1990; Schutte *et al.*, 1998) have attempted to develop self-report measures of EI or EI-related constructs (Ciarrochi *et al.*, 2002). However, in recent studies Davies *et al.* (1998) uncovered problems with these measures: First, some of them have poor reliabilities. Second, the more reliable self-report measures had salient loadings on the well-established personality factors of Neuroticism, Extraversion, Psychoticism, Agreeableness and Openness. Third, although there is factor-analytic evidence supporting the discriminant validity of the two EI factors (emotional awareness and clarity), these factors no longer emerge when unreliable measures are dropped from factor analysis.

As previously indicated, a wide variety of EI measures have been developed. Since there has been difficulty in measuring EI (Rozell, Pettijohn & Parker, 2002), it seems that it would be desirable to use one of the most comprehensive measures available and a scale that can be used in a variety of contexts.

The SEIS devised by Schutte *et al.* (1998) has subsequently been used in a number of studies (Ciarrochi, Chan & Bajgar, 2001; Petrides & Furnham, 2000; Saklofske *et al.*, 2003; Schutte *et al.*, 2001). Interest in this scale has been in part motivated by its relative brevity compared with the main commercial trait EI instrument, the Bar-On (1996), which comprises 133 items. Findings from studies of the SEIS suggest that it provides a reliable and valid trait EI measure. Test-retest and internal reliabilities are good, and group differences in score and correlations with other measures have generally been found to be in accordance with theoretical expectations (Ciarrochi *et al.*, 2001; Saklofske *et al.*, 2003; Schutte *et al.*, 1998; Schutte *et al.*, 2001). Nonetheless, this scale has been criticised for a lack of reverse-keyed items (Petrides & Furnham, 2000; Saklofske *et al.*, 2003), which could potentially lead to a confounding of SEIS score with acquiescent responding (Austin *et al.*, 2004). Pérez *et al.* (2005) state that the SEIS has been used extensively in the literature and can be employed as a short measure of global trait EI.

The SEIS comprises 33 self-referencing statements and requires subjects to rate the extent to which they agree or disagree with each statement on a five-point scale (1 = strongly disagree; 5 = strongly agree) (Ciarrochi *et al.*, 2000). Participants reply on a Likert scale and a total score is derived by summing up the item responses (Petrides & Furnham, 2000). The SEIS assesses perception, understanding, expression, regulating and harnessing of emotion in the self and others (Schutte *et al.*, 1998). The brevity of the scale and its accumulating reliability and validity evidence makes this scale a reasonable choice for

those that are seeking a brief self-report measure of global EI. Potential uses of the scale in theoretical research involve exploring the nature of EI, the effect of EI and whether EI could be enhanced (Schutte *et al.*, 1998). Schutte *et al.* (1998) developed a self-report measure of EI based on the subcategories of Salovey and Mayer's original EI model (Petrides & Furnham, 2000). The evidence suggests that this measure may be both reliable and distinct from the big five personality factors (Schutte *et al.*, 1998), which is an improvement on many of the old measures (Ciarrochi *et al.*, 2002). According to Ciarrochi *et al.* (2002), the SEIS shows some discriminant and criterion validity.

In terms of South African studies, no evidence of the validity, reliability and established norms of the SEIS for future employees or different occupational groups were found. A lack of research in terms of the EI of future employees and in different occupational settings necessitates the current study. In a culturally diverse setting such as South Africa, the understanding of differences in the experience of EI in various groups will contribute to the effective measurement and the well-needed implementation of EI development programmes in the country. The current study focuses on the investigation of the psychometric properties of the SEIS for future employees in the Economic and Business Sciences as a first attempt in validating the instrument within South Africa.

RESEARCH DESIGN

Research approach

The research objectives were achieved by employing a survey design. The specific design selected was the cross-sectional design. In this design, information is collected from the sample population at a given point in time (Shaughnessy & Zechmeister, 1997). The information garnered was used to describe the population at that point in time.

The cross-sectional design was used to examine groups of subjects in various stages of development simultaneously, while the survey describes a technique of data collection in which questionnaires were used to gather data about an identified population (Burns & Grove, 1993). The design can also be used to assess interrelationships. According to Shaughnessy and Zechmeister (1997), this design is ideal to address the descriptive functions with correlational research.

Participants

A sample ($n = 341$) was taken from Economical Science students from a higher-education institution. The participants consisted of university students in the North-West and Gauteng Province. Only 324 of the responses could be utilised (95%).

Descriptive information of the sample is given in Table 3.

TABLE 3
Characteristics of the population ($n = 341$)

ITEM	CATEGORY	FREQUENCY (PERCENTAGE)
Age	16–18 years	174 (53.7%)
	19–21 years	128 (39.5%)
	22–25 years	9 (2.7%)
Gender	Male	155 (47.8%)
	Female	169 (52.2%)
Language	Afrikaans	201 (62.0%)
	English	17 (5.2%)
	African languages	106 (32.7%)
Campus	North-West Campus	207 (63.9%)
	Gauteng Campus	117 (36.1%)
Degree	Accountancy	236 (73.1%)
	Economics	52 (15.9%)
	Business economics, tourism and marketing	14 (4.3%)

The sample consisted mainly of Afrikaans-speaking (62.00%) female students (52.20%) registered at a higher-education institution (63.90%) studying Accountancy (72.80%). Most of the participants fell in the 16 to 18-year category.

Measuring instrument

The SEIS comprises 33 items, three of which (5, 28 and 33) are reverse-scored. Participants reply on a Likert scale and a total score was derived by summing up the item responses. Validation studies included correlations with theoretically related constructs (e.g. alexythymia, pessimism and depression), t-tests between various groups (e.g. therapists, prisoners, clients in a substance abuse programme) and correlations with each of the Big 5 higher-order factors (Petrides & Furnham, 2000).

Data analysis

The data analysis was carried out with the SPSS programme (SPSS, 2003). The dataset was studied to identify bivariate and multivariate outliers. To identify bivariate outliers, the data was standardised (to z-scores). Values higher than 2.58 were inspected to decide whether they should be deleted from the dataset. An inspection was also made of the anti-image scores of the different items. Items with scores lower than 0.6 are problematic and may therefore be excluded from the rest of the statistical analysis.

Furthermore, missing values were analysed and replaced where possible. Principal factor extraction with oblique rotation was performed on the measuring instrument to determine the factor structure. Principal component extraction was used prior to principal factor extraction to estimate the number of factors, presence of outliers and factorability of the correlation matrices. The eigen values and scree plot were studied to determine the number of factors underlying the specific measuring instrument.

Descriptive statistics (e.g. means, standard deviations, range, skewness and kurtosis) and inferential statistics were used to analyse the data. In terms of statistical significance, it was decided to set the value at a 95% confidence interval level ($p \leq 0.05$). Effect size (Steyn, 1999) was used to decide on the practical significance of the findings. Pearson product-moment correlation coefficients were used to specify the relationship between the variables. A cut-off point of 0.30 (medium effect) (Cohen, 1988) was set for the practical significance or correlation coefficients. A MANOVA was used to determine the differences between groups.

Cronbach alpha coefficients were used to determine the internal consistency, homogeneity and unidimensionality of the measuring instrument (Clark & Watson, 1995). Coefficient alpha contains important information regarding the proportion of variance of the items of a scale in terms of the total variance explained by the particular scale.

RESULTS

Principal factor extraction with oblique rotation was performed on the SEIS to determine the factor structure. After investigating the anti-image scores of the items, Item 33 was found to be problematic with a score lower than the recommended 0.60. It was therefore decided that this item would be left out in the rest of the statistical analysis.

A simple factor analysis was done on the SEIS. Six factors (with eigen values higher than 1) were extracted, explaining 45.24% of the variance. The results of the factor analysis of the SEIS are shown in Table 2. Loading of variables on factors, communalities and per cent of variance and covariance are shown. Variables are ordered and grouped by size of loading to facilitate interpretation. Labels for each factor are suggested in a footnote.

Six internally consistent factors were extracted. Three of the 32 variables did not load on the factors: Item seven loaded on factor one and two; Item 11 loaded on factor three and four and Item 16 loaded on factor one and six.

The first factor was labelled Positive Affect. Items loading on this factor relate to positive affect in personal experiences. It involves mainly the respondents' tendency to have a positive outlook on life in general, but more specifically when facing problems. The second factor was labelled Emotion-Others and included the respondents' experience of other people's emotions. The third factor was labelled Happy Emotions. The items that loaded on this factor include aspects such as good

mood, positive emotions, happiness and joy. The fourth factor was labelled Emotions-Own and included the respondents' perception of their own emotions. The fifth factor was labelled Non-verbal Emotions. The items that loaded on this factor included aspects such as non-verbal messages that the person send and receive from others, and how the person interprets these non-verbal emotions. The sixth factor was labelled Emotional Management, reflecting respondents' indication that they can control their emotions or fail to manage their emotions.

A second-order factor analysis was done on the six factors that were extracted. The results indicated that one factor (with

TABLE 4
Factor loadings, eigen values, communalities (h^2), percentage variance and covariance for principal factors extraction and oblique rotation on SEIS items

ITEM	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	H ²
Eigen Values	6.52	2.11	1.70	1.50	1.37	1.29	
17. When I am in a positive mood, solving problems is easy for me	0.66	0.09	0.00	-0.13	0.06	-0.17	0.53
3. I expect that I will do well in most things I try	0.62	-0.20	0.07	0.06	0.08	0.18	0.50
6. Some of the major events of my life have led me to re-evaluate what is important and not important	0.54	-0.02	-0.02	-0.02	0.31	-0.19	0.42
2. When I am faced with obstacles, I remember times when I faced similar obstacles and overcame them	0.53	0.11	0.02	-0.09	-0.01	0.14	0.44
23. I motivate myself by imagining a good outcome to tasks I take on	0.49	-0.11	0.04	-0.10	-0.11	0.30	0.43
20. When I am in a positive mood, I am able to come up with new ideas	0.45	0.18	0.16	-0.01	-0.04	0.04	0.34
10. I expect good things to happen	0.42	-0.13	0.12	-0.27	-0.03	0.11	0.37
29. I know what other people are feeling just by looking at them	-0.28	0.68	0.08	-0.05	0.06	-0.06	0.52
30. I help other people feel better when they are down	0.06	0.62	-0.18	-0.12	0.11	-0.12	0.48
32. I can tell how people are feeling by listening to the tone of their voice	0.22	0.54	0.07	0.21	0.05	0.23	0.49
4. Other people find it easy to confide in me	-0.10	0.44	0.21	-0.13	-0.01	0.05	0.32
27. When I feel a change in emotions, I tend to come up with new ideas	0.09	0.41	0.32	-0.08	-0.35	0.18	0.57
18. By looking at their facial expressions, I recognise the emotions people are experiencing	0.19	0.40	0.04	-0.32	0.06	-0.23	0.44
26. When another person tells me about an important event in his or her life, I almost feel as though I have experienced this event myself	0.19	0.35	0.20	0.00	0.10	0.00	0.30
14. I seek out activities that make me happy	0.34	0.00	0.59	0.05	-0.05	-0.14	0.49
31. I use good moods to help myself keep trying in the face of obstacles	0.22	0.19	0.54	0.14	-0.00	0.17	0.52
12. When I experience a positive emotion, I know how to make it last	0.00	-0.06	0.52	-0.34	-0.01	0.25	0.56
13. I arrange events that others enjoy	-0.08	0.27	0.50	0.02	0.04	0.07	0.37
9. I am aware of my emotions as I experience them	0.18	-0.01	-0.08	-0.69	0.12	-0.05	0.58
8. Emotions are one of the things that make my life worth living	0.03	0.07	-0.03	-0.63	-0.14	-0.02	0.42
22. I easily recognise my emotions as I experience them	0.01	0.04	-0.03	-0.58	0.12	0.28	0.52
19. I know my emotions change	0.00	0.11	0.05	-0.40	0.12	0.17	0.31
15. I am aware of the non-verbal messages I send to others	0.07	-0.11	0.45	-0.08	0.51	-0.12	0.53
5. I find it hard to understand the non-verbal messages of other people	0.01	0.06	-0.10	0.05	0.67	0.08	0.48
25. I am aware of the non-verbal messages other people send	-0.03	0.13	0.20	-0.09	0.64	0.06	0.58
21. I have control over my emotions	-0.10	-0.18	0.14	-0.23	-0.01	0.65	0.54
28. When I am faced with a challenge, I give up because I believe I will fail	0.36	-0.01	0.00	0.20	0.06	0.54	0.51
24. I compliment others when they have done something well	0.08	0.32	-0.21	-0.01	0.19	0.50	0.47
1. I know when to speak about my personal problems to others	0.08	0.07	-0.02	-0.18	0.33	0.38	0.40
Variance Explained	20,30%	6,60%	5,30%	4,70%	4,30%	4,00%	
Total Variance Explained							45,20%

F1 Positive Affect; F2 Emotion-Others; F3 Happy Emotions; F4 Emotions-Own; F5 Non-verbal Emotions; F6 Emotional Management

TABLE 5
Descriptive statistics and Cronbach alpha coefficients of the SEIS

ITEM	MEAN	SD	SKEWNESS	KURTOSIS	A
Positive Affect	33.64	4.91	-0.94	1.13	0.73
Emotion-Others	28.28	5.47	-0.25	0.04	0.67
Happy Emotions	17.41	3.37	-0.54	0.16	0.63
Emotions-Own	20.72	4.52	-0.73	0.51	0.63
Non-verbal Emotions	11.43	3.11	-0.12	-0.47	0.56
Emotional Management	18.20	3.57	-0.87	1.11	0.54

TABLE 6
Product-moment correlation coefficients between the SEIS dimensions

DIMENSION	1	2	3	4	5
1. Positive Affect
2. Emotion-Others	0.35**
3. Happy Emotions	0.42**	0.43**	.	.	.
4. Emotions-Own	0.43**	0.43**	0.38**	.	.
5. Non-verbal Emotions	0.31**	0.29*	0.32**	0.33**	.
6. Emotional Management	0.49**	0.24*	0.38**	0.34**	0.31**

*p ≤ 0.05 – statistically significant
 **r > 0.30 – practically significant (medium effect)
 ***r > 0.50 – practically significant (large effect)

TABLE 7
MANOVAs of emotional intelligence of language and gender groups

VARIABLE	VALUE	F	Df	ERROR df	p	PARTIAL ETA SQUARED
Language	0.82	11.53	6	317	0.00*	0.18
Gender	0.94	3.64	6	317	0.00*	0.07

* Statistically significant (p ≤ 0.01)

an eigen value higher than 1) could be extracted, explaining 47.18% of the total variance. This factor refers to the total EI dimension.

The descriptive statistics and Cronbach alpha coefficients of the factors of the SEIS are given in Table 5.

Table 5 shows that acceptable Cronbach alpha coefficients were obtained that compare reasonably well with the guideline of 0.70 (0.55 in basic research), demonstrating that a large portion of the variance is explained by the dimensions (internal consistency of the dimensions) (Nunnally & Bernstein, 1994), except for Emotional Management. It is evident from Table 5 that most of the scales of the measuring instruments have relatively normal distributions, with low skewness and kurtosis.

The product-moment correlation coefficients between Positive Affect, Emotion-Others, Happy Emotions, Emotions-Own, Non-verbal Emotions and Emotional Management are given in Table 6.

Inspection of Table 6 indicated that Positive Affect is significantly positively related (medium effect) to Emotion-Others, Happy Emotions, Emotions-Own, Non-verbal Emotions and Emotional Management. Emotion-Others is significantly positively related (medium effect) to Happy Emotions and Emotions-Own. Happy Emotions is significantly positively related (medium effect) to Emotions Own, Non-verbal Emotions and Emotional Management. Emotions-Own are significantly positively related (medium effect) to Non-verbal Emotions and Emotional Management. Non-verbal Emotions is positively related (medium effect) to Emotional Management.

Next, the MANOVA of the differences between the EI of language and gender groups are presented in Table 7.

Table 7 shows that language impacted significantly on the combined dependent variable Emotional Intelligence ($F_{(6,317)} = 11.53, p < 0.01$; Wilk's Lambda = 0.82; partial eta squared = 0.18). This effect was large (18% of the variance explained). Analysis of each dependent variable, using a Bonferroni adjusted alpha level of 0.002, showed that language groups differed in terms of the intensity of Positive Affect ($F_{(1,00)} = 14.64, p < 0.01$, partial eta squared = 0.04) and Emotion-Others ($F_{(1,00)} = 22.03, p < 0.01$, partial eta squared = 0.06). African-language groups (compared with Afrikaans- and English-language groups) experienced higher levels of positive affect. Afrikaans- and English-language groups (compared with African-language groups) experienced higher levels of understanding of the emotions of other people.

Table 7 also shows that gender impacted significantly on the combined dependent variable Emotional Intelligence ($F_{(6,317)} = 3.64, p < 0.01$; Wilk's Lambda = 0.94; partial eta squared = 0.07). This effect was moderate (7% of the variance explained). Analysis of each dependent variable, using a Bonferroni adjusted alpha level of 0.002, showed that gender groups differed in terms of Emotion-Others ($F_{(1,00)} = 16.99, p < 0.01$, partial eta squared = 0.05). Females (compared to males) experienced higher levels of understanding the emotions of other people.

DISCUSSION

The objective of this study was to investigate the psychometric properties of the SEIS for Economic Science students from a higher-education institution in the North-West Province, South Africa. The psychometric soundness of the SEIS was tested. Firstly, the results obtained using the cross-sectional design supported a six-dimensional factor structure of the SEIS explaining 45.24% of the variance. The six factors are Positive Affect, Emotion-Others, Happy Emotions, Emotions-Own, Non-verbal Emotions and Emotional Management. In contrast, Petrides and Furnham (2000) identified a four-dimensional factor structure of the SEIS, namely Optimism/Mood Regulation, Appraisal of Emotions, Social Skills and Utilisation of Emotions. Research by Saklofske *et al.* (2003) provides a replication of the four-factor structure obtained by Petrides and Furnham (2000). Austin *et al.*'s (2004) findings differed from those found in the two previously mentioned studies of Petrides and Furnham (2000) and Saklofske *et al.* (2003) with only three factors identified: Optimism/Mood Regulation, Utilisation of Emotions and Appraisal of Emotions. Secondly, reliability analysis confirmed sufficient internal consistency of the SEIS. Research by Petrides and Furnham (2000) confirmed evidence of construct, predictive and discriminant validities.

Based on both conceptual and empirical grounds, item 33 ("It is difficult for me to understand why people feel the way they do") was eliminated from the original SEIS, resulting in a 32-item scale being fitted to the data in the post hoc analysis. These problems might be caused by the ambivalent nature of this item. On the one hand, a high score may indicate disengagement and social isolation by closing oneself off from contacts with others.

In examining the factor structure, some undesirable psychometric characteristics were found to be associated with several items of the SEIS. Principal factor extraction with oblique rotation was performed on the SEIS to determine the factor structure. After investigating the anti-image scores of the items, Item 33 was found to be problematic with a score lower than the recommended 0.60. It was therefore decided to omit this item from the rest of the statistical analysis. These findings suggest that the item may require either deletion or content modification, in which instance the latter must rather be considered. The particular item may be problematic because it does not correspond with the conceptual domain of the

particular dimension. However, it is more likely that the item is somewhat ambiguous, or that it is either sample- or country-specific.

The deletion of the item from the SEIS for reasons of bias and model-fit improvement resulted in the sacrifice of model parsimony, in other words, relationships have been eliminated that could be viewed as an erosion in meaning of the EI construct. Also, it is possible, due to the relatively small sample size and sampling procedure (sub-group representation), that these findings could have been obtained by pure chance.

Also, the problems of some of the items may be related to words that some of the participants could have found difficult to understand and/or interpret (e.g. vigorous, immersed and resilient).

It is believed that this confusing state of affairs regarding the SEIS does not reflect weaknesses inherent in the instrument, but is rather due to more general factors. First, the SEIS is a recently constructed measuring instrument. Therefore, relatively few studies have critically reviewed its psychometric properties. Secondly, the SEIS is an instrument that was originally constructed from data based on 346 participants in the south-eastern United States of America. Participants included university students and individuals from diverse community settings (Schutte *et al.*, 1998). The results obtained in this study were based on a homogeneous group of 341 participants (Economic Science students from a higher-education institution in the North-West Province, South Africa). Thirdly, in the original data obtained by Schutte *et al.* (1998), the average age of the participants was 29 years and in this study most of the participants were between 16 and 18 years old. And lastly, in the original research by Schutte *et al.* (1998), it could be assumed that the first language of the participants was English, while in this study the questionnaires were completed by multi-language groups. A few studies of the SEIS have been done in Canada (e.g. Saklofske *et al.*, 2003; Austin *et al.*, 2004) and Europe (e.g. Petrides & Furnham, 2000), but no research has ever been conducted regarding the SEIS in South Africa. Therefore, more research regarding the SEIS is required. The hypothesised six-factor model of EI identified in this study contradicted the evidence found invariantly across Canadian and British samples. Furthermore, the dimensionality of the SEIS could have been influenced because of the high reported correlations between the six dimensions. Explicit theory indicating exactly how the six scales relate to one another and to other variables must be developed before one could thoroughly evaluate the theoretical validity of a six-component conceptualisation.

In conclusion, the results of this study could serve as a standard for measuring the EI of Economic Science students in a higher-educational institution. The six-factor structure of the SEIS is largely confirmed with suitable internal consistency of its factors Positive Affect, Emotion-Others, Happy Emotions, Emotions-Own, Non-verbal Emotions and Emotional Management. The results further show that the SEIS is a suitable instrument for measuring the EI of Economic Science students in higher education. Further possibilities in terms of research are made possible along similar lines.

A MANOVA was used to determine group differences in EI regarding biographical data. The data shows significant differences between language groups (African-language versus Afrikaans- and English-language groups) and gender groups (male versus female). African-language groups experienced higher levels of positive affect than the Afrikaans- and English-language groups. Afrikaans- and English-language groups experienced higher levels of understanding of the emotions of other people than the African-language groups. Although the first language of most of the respondents was not English, the questionnaires were available only in English. Therefore a

possible explanation for the differences between the language groups could be related to words that some of the participants could have found difficult to understand and/or interpret (e.g. vigorous, immersed and resilient). Due to semantic differences, the SEIS may therefore need to be rewritten in a more acceptable South African language format. The data also indicated that gender differences impacted significantly on EI. Females compared to males experienced higher levels of understanding of emotions of other people. Roothman, Kirsten and Wissing (2003) found that males scored significantly higher on cognitive, physical and self aspects, while females scored significantly higher on somatic symptoms, the expression of affect and spiritual aspects. This could provide an explanation for the higher levels of understanding of emotions of other people among females. Previous research by Cakan and Altun (2005) found no significant gender differences in terms of EI among Turkish educators. Cakan and Altun (2005) explain that gender differences have been observed in EI in previous results from studies conducted on individuals living in Western cultures, for example research by Schutte *et al.* (1998) and Saklofske *et al.* (2003).

This study had several limitations. First, self-report measures were exclusively relied upon. Future studies conducted in this manner would confirm whether bias and equivalence do indeed exist for the different language groups. Another limitation is the size of the sample, specifically the distribution of language groups and the sampling procedure in the present study, which has significant limitations in terms of the generalisation of the findings applied to the total study population. Future studies could benefit hugely in terms of a stratified random-sample design, which would ensure sufficient representation of the different groups in the total population of students in higher education.

According to the results obtained in this study, the use of the SEIS is recommended to assess the EI of Economic Science students at higher-education institutions. Due to semantic differences, the SEIS may need to be rewritten in a more acceptable South African language format.

It is suggested that future research should focus on the reliability and validity of the SEIS for other occupational settings, as the SEIS was found to be reliable and valid for this sample specifically. It is also important to determine norm levels for other occupations in South Africa for both questionnaires respectively. It is recommended that larger samples with a more powerful sampling method be utilised to enable generalisation of the findings to other similar groups. Also, the use of adequate statistical methods, such as structural equation modelling, equivalence and bias analysis is recommended. It might also be necessary to translate the SEIS into other languages used in South Africa.

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