A COMPARISON OF THE EMOTIONAL INTELLIGENCE AND THINKING STYLES OF STUDENTS IN DIFFERENT UNIVERSITY STUDY FIELDS

by

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ABSTRACT

An exploratory study was undertaken to investigate the relationship between emotional intelligence based on Mayer and Salovey's (1990) trait model of emotional intelligence and cognitive thinking styles based on the theory of mental self-government. Emphasis was placed on the influence of emotional intelligence and thinking styles on choice of study field. Participants were 309 students from a Gauteng university. Students registered with the humanities (n=99), management (n=41), sciences (n=131) and engineering (n=38) faculties were compared on the Schutte Self-Report Inventory for emotional intelligence (Schutte *et al.,* 1998) and on the Thinking Styles Inventory (Sternberg & Wagner, 1992). A relationship was found between complex and creative thinking styles and high emotional intelligence. Results from the stepwise multiple regression analysis procedures indicated that the subscales of thinking styles could be significant predictors of emotional intelligence. Students from different faculties were found to have the same level of emotional intelligence and similar thinking styles.

Key Terms

Emotional intelligence; thinking styles, Schutte Self-Report Inventory (SSRI); Thinking Styles Inventory (TSI); study fields; trait emotional intelligence; reliability; Principal Axis Factor Analysis; students.

Declaration

Student no: **3518-819-7**

I declare that "A comparison of the emotional intelligence and thinking styles of students in different university study fields" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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SIGNATURE   DATE

(MISS A MURPHY)

Acknowledgements

LIST OF ABBREVIATIONS

EI	Emotional intelligence
TSI	Thinking Styles Inventory
SSRI	Schutte Self-Report Inventory, also known as
EIS	Emotional Intelligence Scale, also known as
SEI	Self-Report Emotional Intelligence
TMMS	Trait Meta Mood Scale
MEIS	Multifactor Emotional Intelligence Scale
MSCEIT	Mayer-Salovey-Caruso Emotional Intelligence Test
EQ-i	Emotional Quotient Inventory
ECI	Emotional Competence Inventory
Trait EI	Trait emotional intelligence
Ability EI	Ability emotional intelligence

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CHAPTER 1
GENERAL OVERVIEW

1.1. INTRODUCTION

There are many milestones that a person has to cross from the time that an occupational choice is made until success in the chosen career is obtained. Career success is unfortunately based on a great deal more than interest and ability. Even success within a certain study field is due to a large number of variables such as fitting in with a company culture, skills in interacting with peers and superiors and the ability to effectively manage employees or subordinates.

Many students enter tertiary education either not knowing which career direction to follow, or finding that they do not have the abilities required for the career that interests them. What complicates the matter further is that often expectations of a certain career or study field differ drastically from the initial skills requirements as the learner proceeds through the different stages of the study field or occupation. The entrance level as a first year student or junior employee may differ a great deal from positions that involve problem solving skills such as post-graduate research or positions that entail the management of people. For example, a computer science graduate who enters a career as a software developer may have all the initial requirements, such as an appropriate degree and knowledge of IT. As the person is promoted into positions which involve fewer skills in computer programming and greater knowledge of how to manage employees of the company, interact with clients and manage projects according to strict timeframes, the person may suddenly find that he or she does not have the skills of social interaction demanded from a manager in a software development firm. Often learning institutions provide students with the

analytical skills and theoretical knowledge required to enter into career fields, but less time is spent on learning important skills such as social interaction and management of people.

Career environments are no longer solely focused on a set of narrowly defined skills suited specifically to an occupation, such as analytical abilities, knowledge of the content domain and the ability to carry out the function of the position. Rather more and more employers are demanding a greater range of interpersonal and adaptive skills such as team work, communication and critical thinking. Employees are increasingly expected to do a great deal more than just the work expected of them. Performance and innovation have become leading goals in modern organisations and employees are expected to develop innovative solutions to projects, interact effectively in team work situations and perform optimally in high pressure environments (Bar-On, Brown, Kirkcaldy & Thome, 2000). Accompanying these situations is an increasing need for employees to have good social skills, to be able to manage conflict effectively and to cope with stress and tension appropriately in the workplace. Learning institutions are as a result faced with an increased challenge to devise a way to impart these skills not only to students in fields orientated towards dealing with people, but to students in all career fields (Cilliers & Sternberg, 2001; Horak & Du Toit, 2002; Sternberg, 1997a).

Emotional intelligence or EI is being increasingly referred to as an explanation for why some people are more successful than others in positions of leadership (Day, Newsome & Catano, 2002) or aspects of workplace functioning, such as coping in high pressure work environments (Caruso, 1999). For the purpose of this study, EI is defined as a set of verbal and non-verbal abilities to recognise, express, understand and evaluate one's own emotions as well as the emotions of others, to use emotions to direct reasoning and to manage one's own emotions and the emotions of others, in order to guide thinking and action to assist with successful adaptation to environmental demands and pressures (Palmer, 2003; Van Rooy & Viswesvaran, 2004). In the context of this study EI is interpreted as a trait or skill that assists people

in adjusting and adapting successfully to their environments in a manner that allows them to effectively interpret, manage and use their emotions and the emotions of others, to solve problems in a productive manner.

Theories on cognitive thinking styles were developed to explain why people differ in their approaches to solving problems. A 'cognitive thinking style' can be defined as a person's preference for a certain thinking process (Sternberg, 1997a). Thinking styles are seen in the context of this study as specific reasoning and problem solving strategies that help to elucidate why people respond in different ways to problems that need to be solved in the context of studies or work, or respond differently in social interactions with other people.

1.1.1. Personality, intelligence and emotion

The terms personality, intelligence and emotion are three of the core constructs used to explain human functioning. Numerous theories exist that explain how these constructs relate or don't relate to each other and how they interact to allow us to perform. Personality will be explained in the context of this study as a hierarchical trait model, made up of a number of behavioural tendencies, dispositions or characteristics which impart consistency to behaviour (Eysench, 1994; Sternberg, 1998). The most widely accepted core traits identified in personality are referred to as extraversion, neuroticism, openness, agreeableness and conscientiousness (Eysench, 1994; Sternberg, 1998). This theory of personality is referred to as the Big Five theory of personality traits. Traits are defined as "stable sources of individual differences that characterize a persona and that may originate in the person's nature (heredity characteristics) or the person's nurture (environmental influences)" (Sternberg, 1998, p. 583).

Contemporary theories maintain that the term intelligence consists of three major meanings; biological intelligence, psychometric intelligence and social intelligence. Biological intelligence refers to the physiological basis of intelligence involving the neural networks and anatomic structure of the brain. Psychometric intelligence refers to cognitive ability and constitutes factors such as Spearman's g (general intelligence) which can be measured by intelligence tests (IQ). Cognitive ability is influenced by education, culture and upbringing and is the form of intelligence that will be referred to most frequently in the context of this study. Social or practical intelligence is defined as the application of IQ to adaptation in life and includes aspects such as the use of emotion in facilitating success and the role of personality in mediating the use of cognitive intelligence (Eysench, 1994).

Humans are innately predisposed to experience emotions which are generated by neural patterns in the brain (Damasio, 1994). The association between emotions and environmental situations or reactions is further socialised during development. Emotions have been described as an evolutionary adaptive function, which assists humans in adapting to changing environments both in terms of their needs and circumstances. Emotions are defined as a feeling comprising physiological, behavioural and cognitive reactions to internal and external events. Emotions are a crucial aspect of social interaction that allows people to communicate feelings and regulate interactions in social situations (Sternberg, 1998).

Emotions are theorised as influencing and directing thinking activity (Smirnov, 1994). Differences in emotional expression have been related to variations in intelligence and thinking, for example emotion has been directly related to the solving of intellectual tasks (Tikhomirov cited in Smirnov, 1994, p. 242). The tendency to experience negative emotion over positive emotion has been related to a high performance IQ and a low verbal IQ as measured by the Wechsler scales (Kepalaite cited in Smirnov, 1994, p. 242).

The term social intelligence was first devised by E.L. Thorndike (cited in Kihlstrom & Cantor, 2000) to refer to the ability that people have to understand and manage other people and engage in adaptive social interactions. Social cognition refers to the thought processes which occur in social situations, specifically with regard to how people perceive and interpret information from themselves and other people whom they are in interaction with. Social cognition draws on emotion, motivation, personality and thought processes. Emerging theories on the relationship between cognition and emotion are moving away from the traditional belief that the mind acts like a computer and logical processing is uninfluenced by emotion. New theories such as those proposed by Damasio (1994), describe emotions as essential to rational decision-making processes.

Damasio's (1994) theory maintains that emotional experiences leave markers in the mind that allows it to simulate physiological emotional reactions in split-second decision making. In effect the body can be bypassed as the brain is exposed to the psychosomatic responses of emotional situations and learns to mimic these responses to aid in the making of speedy decisions in similar situations (Damasio, 1994). Research into this theory has reported that the process of feeling emotions requires the participation of certain brain regions such as the limbic system and particularly the amygdala (Damasio, Grabowski, Bechara, Damasio, Ponto, Parvizi & Hichwa, 2000) and that there are discernable neural systems responsible for recognising emotions (Adolphs, Tranel & Damasio, 2002). Adolphs *et al.*, (2002) found that the recognition of emotions was controlled by separate brain regions, depending on whether the emotional stimulus which the person was exposed to was static or explicitly conveyed information regarding actions.

There is an increasing frequency of theories that seek to combine the concepts of intelligence, personality and the influence of emotions to develop a more holistic understanding of successful adaptation to the environment. Theories of intelligence in isolation have been unable to explain individual differences in personal success such as psychological well-being, life satisfaction, the quality of interpersonal relationships

and occupational success (Schutte, Malouff, Hall, Haggerty, Cooper, Golden & Dornheim, 1998). David Wechsler, who assisted in developing the concept of a general measure of intelligence, stated that as soon as intelligence test ratings are considered in terms of their global applicability, it is impossible not to notice that the picture provided by these tests of a person's capacity for intellectual behaviour is incomplete (Wechsler, 1940, 1943).

Howard Gardner developed a theory of multiple intelligences which provided a more holistic and integrated explanation of intelligence that moved beyond the traditional focus on general intelligence (Gardner, 1993). Gardner (1993) maintained that cognitive ability consists of several autonomous mental abilities that work in combination with each other. The range of abilities described in Gardner's theory includes a social intelligence that assists people in maintaining relationships, negotiating solutions to conflict and allows people to have insight into their own feelings and the feelings of other people.

Emotional intelligence or EI has been argued to be the link between emotion and intelligence which facilitates success within a number of life domains including work, study and personal relationships (Goleman, 1995; Mayer, Salovey & Caruso, 2000a). EI is viewed as the reason why individuals differ in the extent to which they attend to, process and use emotional information from within themselves and from others during interaction (Petrides & Furnham, 2003). Theories of EI were thus developed to explain some of the non-cognitive contributions to intelligence (Salovey & Mayer, 1990) and to fill some of the gaps in contemporary understanding of intelligence.

Theories of cognitive thinking styles have been developed as a link between personality trait theory and cognitive ability. Theories of thinking styles attempt to explain why people approach solving problems in different ways and provide an understanding of individual preferences for different thinking styles (Sternberg, 1997a). Both the theories of EI and theories of thinking styles are aimed at a similar goal, which is to assist in explaining the individual differences in performance which

measures of intellectual ability cannot explain (Goleman, 1995; Mayer *et al.,* 2000a; Sternberg, 1997a).

1.2. PROBLEM STATEMENT AND RESEARCH AIMS

1.2.1. The potential influence of emotional intelligence on study fields

EI research has increased in popularity in relation to elements of workplace functioning as the theories centre around the integration of intelligence, personality and emotion in reasoning. A major postulation of EI research is that the effective regulation of emotions in stressful situations and resultant adaptive coping is primary to EI (Zeidner, Matthews & Roberts, 2000). EI therefore provides the individual with an advantage within an occupational environment as people with high EI have been found to be more self aware and more likely to monitor their emotions and reactions (Schutte, Malouff, Bobik, Coston, Greeson, Jedlicka, Rhodes & Wendorf, 2001) and therefore better equipped to adapt to complicated environments. Mayer, Salovey and Caruso (2000b) have found that individuals who are high in EI are expert at identifying and responding appropriately to the emotions of co-workers, customers and superiors.

Caruso (1999) found that EI results in people being more effective in the workplace environment largely because those people are more aware of their emotions and the emotions of others, which is the key to working with people. Creative ideas also result from the ability to generate a mood or an emotion for oneself or for other people (Caruso, 1999). Understanding emotions provides another advantage as people are able to understand the point of view of others and handle team interaction better.

Good management of emotions assists people in being aware of their emotions and using them to guide problem solving.

In order to facilitate the learning of EI amongst employees in the workplace there needs to be a greater understanding of the relationship between EI and various types of careers and workplace environments. Research has indicated that levels of EI may be related to different career fields depending on the emotional requirements of the career environment. It has been theorised that careers which require greater interpersonal interactions and emotional reactions attract people who have high EI and are able to manage the emotions of themselves and those of others. Schutte and Malouff (1999) for example, found that psychologists generally have higher levels of EI than prison inmates. Healthcare practitioners were also found to have different levels of EI to police officers (Bar-On *et al.*, 2000).

As the benefits of possessing high EI become more apparent, it becomes more important to begin incorporating training at university level to equip students with skills beyond the core requirements of the career field. This study was aimed at exploring the potential relationship between EI and career fields at university level to determine whether there is a relationship between EI and various study fields.

1.2.2. The potential influence of thinking styles on career fields

Thinking styles have been evaluated extensively in the educational context especially with regard to impact on career interest, self-esteem, personality and learning (Zhang, 2000, 2004; Zhang & Sternberg, 2000, 2002). It has been found that the match between the thinking style of the individual and the requirements of the environment have an impact on the successful adaptation of the individual to that environment.

There is however limited understanding of the impact of thinking styles within specific career fields beyond the focus on practical, academic and creative learning styles. Certain study fields and careers have been thought to have stereotypical ways of presenting information and evaluating performance (Sternberg, 1997a). It would therefore be beneficial for both the employer and the student who is attempting to enter a career field, to have an understanding of how preferences for certain styles of thinking vary between careers and which thinking styles would best assist a learner in a certain study field. This study was aimed at identifying potential relationships between thinking styles and various study fields.

A further aim of this dissertation was to investigate the possible relationship that EI has to cognitive thinking styles. The focus was therefore on understanding whether there is a relationship between various thinking styles and the ability to effectively employ EI. This would then provide insight into the relationship between EI and similar personality traits.

1.3. MOTIVATION FOR CONDUCTING THE STUDY

Understanding how and why people interact in certain ways or approach tasks in a certain manner is of considerable interest not only in the academic domain, but also to potential employers, educators, learning institutions and people themselves. The debates surrounding EI and its key assumptions have reached many areas of daily life including those of educational styles, academic achievement, life satisfaction, personal happiness and career and occupational success. EI contributes a great deal to the manner in which people react to situations and interactions with other people, not only in occupational settings but also in every component of daily living.

With increasing emphasis being placed on the importance of emotional health, employee satisfaction and interpersonal interaction both within and outside the

company, there is a greater need to provide people with the skills required to function adaptively within their chosen career environment. EI has been widely advertised as a self-help tool with a number of websites and EI organisations offering EI testing and workshops to measure and improve EI. As EI is being increasingly discussed in the public domain it is important that research is conducted on the claims made to prevent potential abuse of the construct.

EI is not by itself a strong predictor of job performance, but provides a person with certain competencies that are necessary for job success. Possessing a high EI results in the ability to competently process emotion laden information and use this information to guide cognitive activities and focus energy of the behaviour required in the problem situation (Salovey, 2000). A high level of EI can be a beneficial asset in creative problem solving and task management. The level of EI a person has would also determine the ability to successfully respond to conflict and emotionally trying situations.

EI is not the sole property of careers which require a great deal of interpersonal interaction such as human resources or psychology. EI is an important ability in any career due to the increasing importance of adaptive interpersonal skills and effective management of people on all levels of a company and is a key to working with people. With increasing diversity present in the workplace, EI should also assist individuals in these environments and enhance the ability to work in teams (Van Rooy & Viswesvaran, 2004). EI could therefore be seen as one of the key components to successfully managing the 'human element' of an organisation.

For a person to have a high EI means that the person knows how to manipulate his or her own emotions adaptively or in such a way as to avoid counter-productive outcomes to situations (Salovey, Mayer & Caruso, 2002). EI concerns the controlling of emotions thereby indicating a relationship between cognitive control and emotional reactions. It is also believed that EI is a construct that can be learnt or taught (Palmer, 2003). As a result understanding the cognitive contributions to EI could enable the

learning of how to implement EI in complex situations even in individuals who have previously been found to have a low EI.

As there is some controversy about EI assessment and validity, additional work on its psychometric properties and predictive validity is required. Any research which therefore examines the relationships that EI has to various facets of human life is important as it increases the understanding of the influence of EI on human functioning. Research on the nature of the relationship between thinking styles and EI assists the ongoing assessment of the predictive validity of EI. The factorial validity of the EI measure used should also be assessed to dispel concerns regarding the validity of the EI measure.

Understanding the relationship between EI and similar measures of personality trait assessment is important in order to develop programs that could guide the learning and development of EI in individuals. In this way it would be possible to develop training and remedial programs that could assist people in improving various dimensions of personal success such as life-satisfaction, interpersonal relationships and career satisfaction.

Further understanding is required regarding the relationship that EI has to emotions and thought. The way in which people think has been found to be a similarly crucial determinant of personal success especially with regard to career choice and occupational satisfaction (Sternberg, 1997a). An investigation into the interaction between styles of thought and the ability to adaptively use and respond to emotions could offer insight into the relationship between thought and emotion, as well as assist in explaining the relationship between flexibility in thinking styles and EI. Insights into the relationship between EI and thought could therefore assist in career guidance and provide students with information regarding the expectations of certain career fields in terms of preferences for thinking styles and EI.

Students could possibly use the results of this study to assist with career decisions. Although this study was only conducted on study fields and did not examine the role requirements of careers within occupational environments, it nevertheless provides a

basis for further studies to examine EI within actual occupational settings. This study did not address the relationship between EI and academic success within the various career fields but it may stimulate further research into whether training in EI and flexibility of thinking styles could assist students in succeeding academically within certain study fields. This would provide beneficial information to guide the implementation of skills enhancement programs.

An additional benefit of this study is that it has assisted in the development of theoretical knowledge of EI and thinking styles amongst university students. Differences in thinking styles between various study fields were analysed and EI scores were compared between the various study fields. The relationship between EI and thinking styles was also assessed. The results from this study could therefore be used to develop theory on EI as a trait.

1.4. OUTLINE OF CHAPTERS

This study is reported in five chapters. Chapter 1 provided an introduction to the topic to be studied, an overview of the problem, the research aims and the significance and motivation for conducting the study. Chapter 2 provides an introduction to and a review of the theories of EI and thinking styles. This chapter outlines the origin of the respective theories, provides an overview of the alternative models and measurements, critically reviews the corresponding research findings to date and details the hypotheses of the study. Chapter 3 outlines the research methodology used and discusses the research design, the sample, the measuring instruments, method of data-collection and the statistical methods used. Chapter 4 provides an overview of the results of the study. Chapter 5 provides a discussion of the results, a summary of the research conducted, the conclusions and limitations of the study as well as recommendations for future research.

CHAPTER 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Recent theories of academic achievement have begun to merge with current theories of life achievement regarding the role of additional variables such as EI and cognitive thinking styles in facilitating occupational and academic success (Cilliers & Sternberg, 2001; Goleman, 1998; Horak & Du Toit, 2002; Sternberg, 1997a). These theories address the processes involved in academic learning and styles of thought more holistically, incorporating more than simply intelligence.

EI is an adaptive ability that allows an individual to signal and respond to changes in relationships within the environment in which he or she functions (Mayer *et al.*, 2000a). Theories of EI maintain that people who have an enhanced awareness and understanding of their emotional states and the reasons for their emotional reactions to situations are able to use this information to solve problems more effectively. As a result emotionally intelligent people may be more adaptable in complex social and interpersonal situations (Austin, Saklofske & Egan, 2005) and therefore better able to function optimally in demanding environments. EI could therefore be a large contributor to a person's ability to adapt their goals and thinking styles to the requirements of the environment, especially within a study or occupational environment. Concerns regarding the application of EI centre mainly on the difficulty in accurately defining and assessing the measurement, largely because of the varying definitions of the construct and the difficulty created in attempting to measure subjective abilities (Petrides & Furnham, 2003).

Previous studies have correlated emotional literacy with academic achievement (Qualter, Whiteley & Ould, 2004), however there is a lack of understanding regarding how emotional awareness influences the way in which people think. Although certain theorists have defined EI as a cognitive intelligence (Mayer *et al.*, 2000a), there are

currently no conclusive studies that strongly correlate EI and intelligence, or that have examined the relationship between styles of thinking and EI. Theories of cognitive thinking styles provide an understanding of individual preferences in using certain abilities, including abilities such as EI.

The ability to respond adaptively to changing environments has been theorised as a core component of intelligence (Sternberg, 2003a). Whether these environments involve interpersonal relationships or demands within varying academic or occupational settings, EI is seen as a variable that would assist people in adapting interpersonally. A possible relationship exists between being able to adapt emotions to changing situations and at the same time adapt the perspective from which problems are solved.

Both EI and flexibility in cognitive thinking styles are traits with a degree of flexibility and are considered as traits that can be taught (Petrides & Furnham, 2000a; Sternberg, 1997a). Understanding the possible relationship between these two traits would therefore facilitate the acquisition of the adaptive skills required for organisational success. By obtaining an increased understanding of the relationship between certain styles of thought and levels of EI in various career fields, learning institutions would be able to better facilitate the adaptation of their students to their chosen career environments.

This chapter will focus on a brief overview of the history and underlying principles of EI and cognitive thinking styles and offer a critical discussion of how the contributions of past and current research relates to the present study. The chapter will begin with a discussion of theoretical viewpoints which added to the debate that non-intellective factors contribute as much, if not more to the intelligence equation than cognitive intelligence. Sternberg's (1999) theory of successful intelligence will be reviewed as this theory applies directly to the relationship between the two constructs being researched in this study.

The varying models of EI will be critically discussed and explored in relation to the current research. A critical overview of the paradigm on which the theory of thinking styles is based will be provided and the potential theoretical relationship between EI and thinking styles will be explored by examining empirical research that has already been completed. The chapter will conclude with a theoretical viewpoint of this investigation as a basis for the choice of measurement instruments as well as the research question and hypothesis to be tested.

2.1. A BROADER VIEW OF INTELLIGENCE

Intelligence has been defined in a number of different ways, yet is widely accepted as being a generalised adaptation to the environment (Sternberg, 1997a). Theorists are generally in agreement that intelligence consists of a hierarchy of abilities needed to solve abstract reasoning problems (Brody, 2000) and is largely represented through verbal and performance IQ as well as academic abilities. Cognitive intelligence has long been credited with being predicative of career and life success, however many theorists will readily admit that the traditional narrow definitions of intelligence may not be the whole story.

The idea that intelligence involves a great deal more than a single cognitive construct or general intelligence, is not a new theory. The importance of non-cognitive factors in intelligence has been discussed often by theorists including David Wechsler, who in his early writings referred to intellective as well as non-intellective elements as contributors to intelligence. Wechsler argued that these non-intellective factors extend beyond cognition to include emotional, social and personal factors. Wechsler further argued that these non-intellective abilities are essential for predicting a person's ability to succeed in life (Wechsler, 1943).

As early as in 1920, E.L. Thorndike (cited in Kihlstrom & Cantor, 2000) proposed that humans possess a personal or social intelligence above that of general intelligence. Thorndike (cited in Van Staaden, 2001) defined social intelligence as the ability to perceive your own internal states, motives and behaviour as well as those of others and to use this information to act toward others in an optimal way.

Howard Gardner in 1983 introduced a more comprehensive theory of multiple intelligences, which challenged the traditional view of intelligence as based singularly on the capacity for logical reasoning. Gardner viewed intelligence as consisting of the ability to adapt and solve problems within a large number of contexts and maintained that human intelligence should be defined as a set of abilities rather than as a single construct (Gardner, 1993). Gardner included a social intelligence in his theory of multiple intelligences that served to integrate the cognitive and non-cognitive intelligence factors involved in everyday functioning.

Gardner laid the foundation for later theories of EI by describing an intrapersonal intelligence which refers to a person's ability to access his or her own range of emotions, to discriminate these feelings, label them and to transform them into symbolism. In this way a person would be able to understand and guide his or her own behaviour thereby effectively regulating his or her life. Gardner also referred to an interpersonal intelligence that involved the ability to interpret the intentions, motivations and desires of others and to react accordingly by using this knowledge to work effectively with them.

It is necessary to critically examine the implications for education generated by the gap in the ability of cognitive intelligence to completely explain the variations in success. Continued theorisation into possible alternatives to contemporary intelligence testing and increased understanding of the implications created for traditional forms of teaching in educational institutions is required. Sternberg (1985) first challenged contemporary beliefs regarding intelligence in 1985 by calling for researchers to pay more attention to the creative and practical facets that accompany

intelligence. Sternberg (1988) maintains that intellectual abilities cannot be fully understood unless there is also an understanding of how individuals apply them in adapting to the demands of their environment. He therefore argues that conventional theories of intelligence are incomplete and inadequate and has since developed a model known as the theory of successful intelligence which views intelligence as a broader adaptation to the environment (Sternberg, 1999, 2003a).

2.2. STERNBERG'S THEORY OF SUCCESSFUL INTELLIGENCE

Sternberg (2004) developed a theory of successful intelligence to attempt to explain why students who display high intelligence or cognitive abilities often do not perform successfully in academic situations. The theory holds that definitions of success are largely dependant on the community, subgroups and even individuals and that in order to be successfully intelligent an individual must be able to effectively adapt to environments, as well as shape the environment to his or her abilities and select environments that are appropriate.

Sternberg (2004) views successful intelligence as a basis not only for academic achievement but for life achievement as it refers to an individual's ability to succeed in life, within his or her own goals and environmental context. Within this theory, intelligence is defined as the ability to achieve success in life in terms of one's personal standards and within one's own socio-cultural context (Sternberg, 1999, 2003a). Sternberg maintains that the ability to achieve success depends on "capitalizing on one's strengths and correcting or compensating for one's weaknesses through a balance of analytical, creative and practical abilities to adapt to, shape and select environments" (Sternberg, 1999, p. 293). In this way, success is viewed not only as the ability to adapt to an environment, but also to change that environment to

suit a person's needs and if necessary, finding a new environment that better fits a person's abilities or needs (Sternberg, 1999).

Successful intelligence is therefore a person's ability to recognise strengths and weaknesses and use these to adapt successfully to his or her environment. Success in this manner pushes beyond the boundaries of academic or school achievement to include all facets of a person's life from relationships to self-fulfilment (Sternberg, 2003a). Supplementing analytical ability with social interaction and management skills will for example assist an engineer in successfully managing team interactions and interpersonal interactions with clients.

The theory maintains that definitions of success differ between communities, social classes and people and that while one person's idea of success involves academic prestige, another persons idea of success may involve successfully raising a family (Sternberg, 1997a). Success is therefore dependent on the expectations of the socio-economic context as well as the person's own criteria for success. For example, it was found in previous studies that in African and Asian cultures the ability to maintain stable and harmonious social relationships are viewed as superior to the speed of mental processing which defines western conceptions of intelligence (Sternberg & Grigorenko, 1996).

This explanation can also be applied to a career environment, for instance when a new employee attempts to adapt to a new occupation, it is an attempt to modify oneself to fit the environment. Where a manager implements a new system to improve communication in the workplace it is an attempt to modify the environment to suit the person's needs. Resigning one career to begin a different career more suited to a person's abilities is an example of selecting a new environment when the attempts to adapt to or shape the current environment are not successful (Sternberg, 2004).

2.2.1. Relevance of the theory of successful intelligence to the present study

Sternberg's theory of successful intelligence provides an integrated approach to intelligence that combines elements in daily functioning, such as interpersonal functioning and the creative solving of problems, which relies on more than just IQ. Success is viewed as a culmination of practical, creative and analytical skills and the individual holds the responsibility to define for himself or herself what his or her own personal success means and what the benchmarks are for that success.

Sternberg (1997a) states that success in life requires one not only to analyse your own ideas and the ideas of others, but to generate ideas and persuade others of their value. Relating this theory to EI provides a doorway for viewing intelligence as including adaptive abilities that assist people in coping effectively in many situations beyond that of academic application. Social functioning is a key aspect to humanity that has often been viewed as inferior to intellectual enhancements (Sternberg, 1997a), but by examining theories such as this one it is evident that there are a number of facets that interact in coping with our environments. By examining the relationships between these facets we are able to gain insight into how the various elements of intelligence work together when we attempt to analyse situations and respond in the most effective manner.

The theory of successful intelligence states that in order to be successful, an individual needs to be able to adapt either oneself, or the environment to suit the situation in much the same way as EI has been theorised to assist a person in adapting interpersonally to difficult environments. The type of environmental awareness and manipulation proposed by the theory of successful intelligence implies a level of understanding of the self and environmental influences that are very similar to the principles of EI involved in understanding one's own emotions and the

emotions of others and managing these emotions to facilitate optimal adaptation to the situation.

Successful intelligence implies that the making of effective choices within an environment is the equivalent to adapting effectively to that environment. The theory again presents similar processes to EI theory in that an individual needs to be able to recognise and capitalise on their strengths and compensate for their weaknesses. It is self awareness and the ability to effectively manage oneself that underlies both theories. The theory of successful intelligence can therefore be applied to EI by viewing it as a Meta theory that explains how a person is able to manage their emotions to best facilitate a successful situation.

The limitation of this theory is that it doesn't explain why some people are able to adapt effectively in this way and why some people are not. As learning within the boundaries of an educational setting is not the only influence responsible for the manner in which a person responds to his or her environment, there is a possibility that further dimensions of intelligence are responsible for the awareness an individual has of the limitations of his or her environment. As high levels of EI have been found to contribute to success in important facets of life such as education, work and relationships, EI theory could provide insight into why some people are better able to synthesise cues from the environment and use those cues to adapt effectively to it.

2.3. EMOTIONAL INTELLIGENCE

Theories of EI have emerged in recent years as a topic of debate. From first conceptualisation, EI has received a great deal of media support and academic attention, appearing in a number of articles and newspapers. EI first appeared on the cover of Time magazine (Gibbs, 1995) which claimed emotions to be the 'True'

measure of intelligence. Corporate organisations have hailed the term as the new solution to personnel selection and the media has heralded EI as a mode to explain social and emotional competence. Claims have been made that people who are emotionally aware have a competitive edge both within their personal as well as their professional lives and are as a consequence happier and more successful. It has even been suggested that EI is a better predictor of academic and occupational achievement than general intelligence or cognitive abilities (Goleman, 1995).

It is important when investigating EI theory, to keep in mind that similarly to personality theory, EI is a construct that is difficult to measure and define due to the variability involved in defining subjective abilities (Pérez, Petrides & Furnham, 2005) Although studies have found correlations between EI and real life criteria, these correlations have been found to be moderate (Petrides, Furnham & Frederickson, 2004a). As a result media hype often results in a distorted picture of the true influence of EI. Before extreme claims can be made regarding the influence of EI on occupational and academic success, a great deal more research needs to be conducted on not only the validity of the measurement instruments but of the core definitions of the varying theories as well. This research is formulated to add to the growing body of work evaluating EI in order to determine whether there is validity in the claims made.

2.3.1. Origins of emotional intelligence

Salovey and Mayer (1990, p.189) first formulated a model of EI in 1990 by defining EI as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide ones thinking and actions". This model of EI was viewed as a subset of social intelligence and incorporated the three hierarchical components outlined in the definition.

EI is an adaptive ability that allows an individual to signal and respond to changes in relationships within the environment in which he or she functions (Mayer *et al.*, 2000a). The assumption that EI research makes is that an enhanced awareness and understanding of emotional states and the reasons for emotional reactions results in more effective problem solving. As a result emotionally intelligent people may be more adaptable in complex social and interpersonal situations (Austin *et al.,* 2005) and therefore better able to function optimally in demanding environments. EI could therefore be a large contributor to a person's ability to adapt their goals and thinking styles to the requirements of the environment, especially within a study or occupational environment.

EI is not considered as a replacement for ability or competence, rather EI is thought to interact with a number of components in determining personal success in life. High levels of EI could however enhance a person's likelihood of succeeding both occupationally and interpersonally (Caruso, 1999) in a number of environments.

As the theory of EI progressed, a number of models based on alternative theoretical perspectives emerged. These models do not contradict, but rather complement each other (Ciarrochi, Chan & Caputi, 2000; Schutte *et al.,* 1998) and potentially present alternatives of the same construct from different viewpoints. All models, allowing for deviations, generally represent four areas; emotional perception, regulation, understanding and utilisation (Ciarrochi *et al.*, 2000).

EI is perceived by some researchers to be an ability, involving cognitive processing of emotional information, whereas other theorists view EI as a dispositional tendency such as personality. There is some difference in consensus as to how to group the varying theories. Mayer *et al.,* (2000a) draws a distinction between mixed models, which include a range of personality variables and ability models, which define EI solely on a cognitive basis.

Mixed models of EI view the construct as a complex interaction of cognition, metacognition, mood, emotions and personality that is applied in both interpersonal and intrapersonal contexts (Matthews, Zeidner & Roberts, 2003). The models of EI were all mixed models because even though EI was described in the initial definitions as an ability, accompanying personality characteristics were often included such as warmth, outgoingness and persistence (Mayer *et al.*, 2000a).

Petrides and Furnham (2000a, 2003) maintain that because the theoretical perspectives of the two domains overlap, the distinction between the models should be made on a functional basis. Petrides and Furnham differentiate between trait EI which can be measured by a self-report questionnaire and ability EI which requires a performance test with correct and incorrect answers. These theorists propose that it is the type of measurement that determines the nature of the model, rather than the underlying theory.

Petrides and Furnham (2000a) view trait EI as cross-situational consistencies in behaviour that are part of the personality and assessed with self-report inventories that measure typical behaviour. Trait EI, otherwise known as emotional self-efficacy, is defined as "a constellation of behavioural dispositions and self-perceptions concerning one's ability to recognize, process and utilise emotion-laden information" (Petrides, Frederickson & Furnham, 2004b, p. 278). Trait EI is therefore seen as combining elements of personality theory such as empathy, impulsivity and assertiveness as well as combining elements of Thorndike's social intelligence and Gardner's personal intelligences (Petrides *et al.,* 2004b).

Ability EI is seen as a cognitive-emotional ability (Petrides & Furnham, 2003) or a form of information processing EI that is related more to traditional intelligence and thereby measures maximal behaviour using tests of ability (Petrides & Furnham, 2000a). Ability EI is defined as "one's actual ability to recognize, process and utilise emotion-laden information (Petrides *et al.,* 2004b, p. 278).

2.3.2. Core models of emotional intelligence

There are currently three major groups of theorists who have built the initial definitions of EI into three major branches. Mayer *et al.,* (2000a) are a group of theorists that view EI as a mental ability, skill or capacity and were the first theorists to publish EI research in peer-reviewed journals (Matthews *et al.*, 2003). Reuven Bar-On and Daniel Goleman have developed two varying trait models of EI. These models treat a variety of other characteristics such as motivation, states of consciousness and social ability as a part of EI (Mayer *et al.*, 2000a). The models of EI are summarised in Figure 1.

Bar-On views 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 cited in Matthews *et al.*, 2003, p. 15). This model includes clusters of well-established personality traits with a mental ability conception of EI. Bar-On developed the Emotional Quotient Inventory (EQ-i) that measures abilities and the potential for performance (Matthews *et al.*, 2003). Critique of Bar-On's definition of EI is that the construct is too broad and contains too many aspects of personality (Zeng & Miller, 2003). Mayer *et al.,* (2000a) have criticised this theory for lacking internal consistency and being difficult to evaluate.

Goleman (1995) defines EI as including "abilities such as being able to motivate oneself and persist in the face of frustrations, to control impulse and delay gratification, to regulate one's moods and keep distress from swamping the ability to think, to empathise and to hope" (Goleman 1995*,* p. 34). This theory is described by Goleman as a theory of performance (Goleman 1998) and defined as having direct applicability to the domain of work and organisational effectiveness. Goleman developed the Emotional Competence Inventory (ECI) in order to measure his version of EI. Goleman made strong claims about the contribution of EI to interpersonal and

occupational success, stating that cognitive ability only accounts for 20% of success, with EI accounting for the further 80% of the variance (Goleman, 1998).

Goleman has been criticised as being over inclusive and incorporating many of the well-established concerns of personality theorists such as empathy, motivation, warmth and social skills (Matthews *et al.*, 2003). The definition and the categories have been criticised for not being related to each other, problematic and as "simply being a journalist distilling scientific information for the consumption of the populist rather than a legitimate scientific theory" (Matthews *et al.*, 2003, p. 14).

Mayer and Salovey (1997) formulated a revised ability model of EI which places more emphasis on the cognitive components of EI and views EI in terms of potential for intellectual and emotional growth. This model of EI views EI as a form of a cognitive ability, which is subjected to the same laws that govern traditional conceptions of intelligence (Matthews *et al.*, 2003). The model states that in the same way as traditional intelligence, mental problems have right or wrong answers, measured skills correlate with other measures of mental ability and ability level increases with age (Mayer *et al.,* 2000a).

Although Salovey and Mayer (1990) originally defined EI as a trait, the theorists later argued that other ideas of EI are misleading and that the use of the term implies an intelligence that processes and benefits from emotions (Mayer *et al.,* 2000a). Mayer *et al.,* (2000a) view EI as an ability to recognise the meanings of emotional patterns in social interactions and to reason and solve problems on the basis of them.

This model of EI is hierarchical with the levels being seen as a series of developmental stages that a person passes through successively. The perception, appraisal and expression of emotion are viewed as the most basic processes, whereas the reflective regulation of emotions is seen as the highest developmental stage and requires the most complex processing (Mayer *et al.,* 2000a).

Figure 1: Core models of emotional intelligence

Trait EI Models	Ability EI Models
- Viewed as a dimension of personality (personality trait) - Typical performance - Measured via self-report scales	- Related to cognitive intelligence - Maximal performance - Measured using task performance
Salovey & Mayer (1990)	**Mayer & Salovey (1997)**

3 Levels:
  - Monitor emotions
  - Discriminate between emotions
  - Use emotions to guide thinking and actions.
Instrument: TMMS (Salovey *et al.,* 1995), SSRI (Schutte *et al.,* 1998)
	4 Hierarchical levels:
	  - Appraisal
	  - Understanding
	  - Regulation
	  - Utilisation
	Instrument: MEIS (Mayer & Salovey, 1997), MSCEIT (Mayer *et al.,* 2002), MSCEIT v2 (Mayer *et al.,* 2003)

Emotional Quotient, Bar-On (1997)	

5 Broad areas of functioning and 15 factors:
  - **Intrapersonal intelligence** (Emotional self-awareness, Assertiveness, Self-regard, Self-actualisation, Independence)
  - **Interpersonal intelligence** (Empathy, Interpersonal relationships, Social responsibility)
  - **Adaptability** (Problem solving, Reality testing, Flexibility)
  - **Stress management** (Stress tolerance, Impulse control)
  - **General mood** (Happiness, Optimism)
Instrument: EQ-i (Bar-On, 1997)	

Emotional Competence Inventory, Goleman (1995)	

5 Competencies:
  - Self-Awareness
  - Self-Control
  - Motivation
  - Empathy
  - Social Skills
Instrument: ECI (Goleman, 1995)	

Initially the authors developed an objective measure of EI called the Multifactor Emotional Intelligence Scale (MEIS; Mayer & Salovey, 1997). Later the test was revised into the MSCEIT (Mayer, Salovey & Caruso, 2002) and the MSCEIT v2 (Mayer, Salovey, Caruso & Sitarenios, 2003).

2.4. THINKING STYLES

A great deal of research has been conducted to develop theories on cognition, thinking and learning styles so as to provide reasons for the discrepancy between intelligence and success by pairing certain styles of thinking with certain methods of communicating information (Sternberg, 1994a, 1997a). There are a number of alternative theories of thinking and learning styles which all attempt to explain individual differences in performance that are not explained by abilities.

Styles have been criticised for being too closely related to personality. It can be argued however, that an understanding of thinking styles will assist in explaining the interaction between cognition and personality (Sternberg, 1994a). Riding and Wigley (1997) examined potential relationships between personality and cognitive styles and concluded that there is no significant relationship between the two constructs, but that personality is moderated by styles in the effect on behaviour. These researchers further concluded that styles should be seen as higher-order personality traits which assist in explaining trends displayed by people when dealing with and solving cognitive problems.

The difference in personality traits and thinking styles have been attributed to a matter of scope, with personality traits influencing daily actions and cognitive styles influencing the manner in which people approach and solve cognitive problems (Fjell & Walhovd, 2004) both academically and in other facets of everyday functioning. The

theory of thinking styles was formed by Sternberg (1988) in 1988 and was based on the theory of mental self-government which attempts to explain how individuals use their patterns of thought to adapt to their environment and select the type of environment that best suits their abilities and needs. Sternberg (1994a) defines thinking styles as a personality attribute that guides the utilisation of abilities.

A style of thinking is defined as a preference for a certain way of cognitive processing, or the process used to solve a problem (Sternberg, 1990). People vary in the ways that they prefer to use their abilities and are often more comfortable using a certain style or strategy across a variation of situations (Sternberg, 1990). Theories of cognitive thinking styles pair certain styles of thinking with certain methods of communicating information. Thinking styles are not fixed but are largely flexible and people can alternate to adapt to varying situations. Altering styles of thinking to suit the situation or problem at hand are abilities that can be learned (Sternberg, 1994a, 1997a).

Styles also differ with age and can change as a person gets older. Styles are not considered as right or wrong, what determines whether a style is effective is the match between the style and the situation to which it is being applied (Sternberg, 1997a; Cilliers & Sternberg, 2001; Sternberg & Grigorenko, 1995a).

2.4.1. The theory of mental self-government

Robert Sternberg's theory of mental self-government was motivated primarily by a need to develop the limited theories of thinking styles available (Zhang, 2001) and to combine the different threads of research on styles into one comprehensive theory (Sternberg & Grigorenko, 1995b). This theory is the basis for Sternberg's views on thinking styles.

Sternberg states that success in life does not just depend on how well we think, but also on how we think (Sternberg, 1997a). Sternberg's (1997a) theory of mental self-government maintains that cognitive styles are an interface between intelligence and personality. The theory states that people like societies need to organise or govern themselves (Sternberg & Grigorenko, 1995a) and addresses the manner in which people manage themselves in their everyday cognitive activities, using an analogy of the various dimensions of government. The theory proposes 13 thinking styles that fall along five dimensions. These are **functions** (including the legislative, executive and judicial thinking styles), **forms** (including the hierarchical, oligarchic, monarchic and anarchic styles), **levels** (including the liberal and conservative styles), **scopes** (including the internal and external styles) and **leaning** (including the liberal and conservative styles). Figure 2 outlines the 13 thinking style categories and provides explanations of each style.

2.4.2. Explanation of the categories of thinking styles

A brief overview of the categories of each of the thinking styles follows (Sternberg, 1997a):

2.4.2.1. Functions of thinking styles

The **legislative style** characterises people who enjoy creating and formulating new ideas. Individuals who prefer the legislative style like to do things their own way and make their own rules. These people prefer problems that are not pre-structured for them, but rather that they can structure for themselves. Legislative people also prefer creative and constructive planning-based activities, such as writing papers, designing projects and creating new business or educational systems. In many environments legislative people are often viewed as not fitting in, they want to do things their own

Figure 2: Thinking styles categories and explanations

FUNCTIONS	
Legislative style	The person prefers tasks requiring creative strategies.
Executive style	The person is more concerned with the implementation of tasks with set guidelines.
Judicial style	The person focuses attention on evaluating the products of other's activities.
FORMS	
Monarchic style	The person prefers tasks that allow complete focus on one thing at a time.
Hierarchical style	The person prefers to distribute attention across several tasks that are prioritised.
Oligarchic style	The person prefers to work toward multiple objectives during the same period of time, but without setting clear priorities.
Anarchic style	The person prefers working on tasks that require no system at all.
LEVELS	
Local style	The person prefers tasks requiring working with details.
Global style	The person pays more attention to the overall picture regarding an issue and to abstract ideas.
SCOPE	
Internal style	The person prefers being engaged in tasks that allow working independently.
External style	The person prefers being engaged in tasks that provide opportunities for developing interpersonal relationships.
LEANINGS	
Liberal style	The person prefers novelty and ambiguity.
Conservative style	The person adheres to existing rules and procedures in performing tasks.

way and therefore do not do very well in environments that have a fixed way of doing things and expect their members to do things in the same way.

The **executive style** characterises people who are implementers. Executive people prefer to follow rules and prefer to be given guidance and structure. Executive people also like to enforce rules and laws and rely on existing methods to complete tasks or master a situation. Executive people will tend to be valued by organisations that want people to do things in a way that appeals to a set of rules or guidelines.

The **judicial style** characterises people who like to evaluate rules and procedures and to judge things. Judicial people prefer problems in which they can analyse and evaluate existing rules, ways and ideas. They like to judge both structure and content. Types of activities that judicial people prefer include delivering critiques, giving opinions, judging people and their work and evaluating programs.

2.4.2.2. Forms of thinking styles

The **monarchic style** characterises people who tend to be motivated by a single goal or need at a time. Monarchic people focus single-mindedly on one task or aspect of a task until it is completed. Monarchic people perform better in areas that match their interests but less well in areas that do not.

The **hierarchical style** characterises people who tend to be motivated by a hierarchy of goals, with the recognition that not all of the goals can be fulfilled equally well and that some goals are more important than others. Hierarchical people tend to be priority setters who allocate resources carefully. They tend to be systematic and organised in their solutions to problems and in their decision making.

The **oligarchic style** characterises people who tend to be motivated by several, often competitive goals of equal perceived importance. Oligarchic people have trouble deciding which goals to give priority to. The result is that they may have trouble

allocating resources. When there is sufficient time to complete tasks this may not show through, however if there is a lack of resources these people often need guidance or assistance to effectively complete tasks. Oligarchic people are often flexible and can adapt quickly to changing circumstances.

The **anarchic style** characterises people who tend to be motivated by a wide assortment of needs and goals and do not like to be tied down to systems, rules or particular approaches to problems. They tend to be not so much asystematic as antisystematic. Anarchic people often challenge systems not on principle but for the sake of challenging authority figures. Anarchic people use a random approach to solving problems and have trouble setting priorities because they do not have firm sets of rules upon which to base these priorities. Anarchic people have a potential for creativity that is rare in others as they are not constrained by boundaries of thought and action that people usually succumb to.

2.4.2.3. Levels of thinking styles

The **global style** characterises people who prefer to deal with general problems and often abstract issues or the big picture. Global people tend to conceptualise and work in the world of ideas. Global people struggle to deal with tasks that involve fine detail.

The **local style** characterises people who prefer to deal with specific, concrete details that often require precision to complete.

2.4.2.4. Scope of thinking styles

The **internal style** characterises people who prefer tasks that allow them to work independently of others. People with an internal style tend to be introverted, task-oriented, sometimes aloof and socially less sensitive than other people. At times they

also lack interpersonal awareness, if only because they do not focus on it. Internal people do not like group work.

The **external style** characterises people who prefer tasks that allow them to work with people through interaction. External people tend to be more extroverted, people-oriented, outgoing, socially more sensitive and interpersonally more aware.

2.4.2.5. Leanings of thinking styles

The **liberal style** characterises individuals who like to go beyond existing rules and procedures and seek to maximise change. Liberal people seek or are comfortable with ambiguous situations and prefer some degree of unfamiliarity in life and work. They tend to be receptive to new ways of thinking.

The **conservative style** characterises individuals who prefer to adhere to existing rules and procedures, minimise change, avoid ambiguous situations where possible and prefer familiarity in life and work. Conservative people follow traditions and although they may come up with their own ideas these ideas are grounded in existing and accepted customs. They tend to resist new ways of doing things.

2.4.3. Properties of thinking styles

The theory of mental self government states that people choose styles of managing themselves within which they are most comfortable to manage their everyday interaction. People are seen as flexible and often attempting to adapt their styles of thinking to the demands of the situations in which they find themselves (Sternberg, 1988, 1990, 1994a, 1997a). Styles are also socialised and can therefore be modified by the environment (Zhang, 2005a) and often change with time and life demands.

The flexible use of the mind, outlined by the theory of mental self-government, accounts for the variety in thinking styles (Sternberg, 1997a). Styles are defined as continuous rather than dichotomous and are not considered as good or bad, rather the effectiveness of the style depends on the task that is being performed and the situation in which that task is being performed (Sternberg, 1994a).

Sternberg and Grigorenko (1995a) found that thinking styles were predictive of school success amongst scholars. Sternberg repeatedly emphasises in his work on thinking styles that styles are as important as abilities and although abilities indicate whether a student has the potential to succeed in a career, his or her thinking style is indicative of whether the student will be able to adapt to the resulting career environment (Sternberg, 1990, 1997a, 2003a).

A source of great disparity between occupational and academic goals is that of academic performance. Often the core focus of academic institutions such as a university or school is that of academic prestige, frequently at the cost of creative or alternative thinking. Academic institutions have previously been criticised for not promoting the skills that would allow an individual to be successful within an occupational environment (Sternberg, 1997a). Institutions that hire employees are usually not concerned about academic grades, but rather are focussed on employing the person with the best possible potential of succeeding in the specific occupational environment (Sternberg, 1997a). It is therefore essential to understand the differences between a person's ability to perform well and a person's preference for a certain style of thinking.

Research into thinking styles has indicated that the majority of the thinking styles can be classified into three categories (Zhang, 2000, 2001, 2002a, 2002b; Zhang & Sternberg, 2000). The first category (type I thinking styles) involves thinking styles that generate creativity and utilise higher levels of cognitive complexity. The styles in this group include the legislative, judicial, hierarchical, global and liberal styles. The second category (type II thinking styles) includes styles that are norm-favouring and simplistic. The styles in this group are the executive, local, monarchic and

conservative styles. The third combination of styles (type III thinking styles) draws on characteristics of both of the previous two types depending on the situation wherein the styles are used. These styles include the anarchic, oligarchic, internal and external styles.

2.5. CRITICAL ASSESSMENT OF PAST RESEARCH

The literature on EI has been populated with criticism against the construct, however many of the arguments employed, especially with regard to predictive validity, have ignored the construct differences between trait and ability EI, resulting in a great deal of confusion and mistrust in the construct (Pérez *et al.*, 2005). EI has been shown to be both reliable and valid in a number of studies which will be discussed, however it cannot be ignored that there are two different measurement trends and as a result they need to be handled and assessed differently depending on the nature of the study.

Previous research has investigated trait EI and ability EI as if they were the same construct and researchers were previously evaluating a personality trait as if it were a cognitive ability which according to Petrides *et al.,* (2004a) is erroneous. As a result researchers attempted to force trait EI, measured through self-report instruments, into complying with the strict objective rules held by intelligence measurement. Trait EI according to Petrides *et al.,* (2004a) is by nature not a construct that can be measured objectively due to the interpersonal components. People's internal emotional states cannot be measured objectively as they are dependent on the individual's personal experiences and perceptions. Research as a result has revealed very low correlations between measures of ability and trait EI (O'Connor & Little, 2003; Warwick & Nettelbeck, 2004). This research will therefore present the literature review on EI as two separate constructs.

2.5.1. An overview of emotional intelligence assessment measures

As the popularity of EI increased so did the number of EI measures available. The tests can be divided into two categories, performance measures that are based on the ability model and self-report measures based on trait models of EI. This investigation will not attempt to discuss the properties of all the emotional tests that have been developed but rather provide a brief overview of the most well known tests for each of the categories.

Self-report based measures are differentiated from performance measures as these scales are concerned more with cross-situational consistencies in behaviour manifested in specific traits or behaviours such as empathy, assertiveness and optimism and thereby rely more on an internal appraisal of performance that measures typical behaviour (Matthews *et al.,* 2003; Petrides & Furnham, 2001).

The main difference between performance and self-report measures is that self-report measures seem to be more related to well-established personality traits, largely due to the tendency for personality measures to be based on self-report techniques. Performance measures are more related to traditional intelligence measures and are scored objectively in the same manner as traditional ability testing (Zeng & Miller, 2003).

2.5.1.1. Self-report measures of emotional intelligence

A number of researchers have attempted to develop accurate self-report measures of EI or EI related constructs. The Schutte Self-Report Inventory or SSRI (which has been used in this research and will be discussed extensively in Chapter 3) developed by Schutte *et al.,* (1998) and the Trait-Meta-Mood Scale or TMMS developed by

Salovey, Mayer, Goldman, Turvey and Palfai (1995) are both based on Salovey and Mayer's (1990) original model of EI.

The SSRI was developed to measure the original four branches of the EI model developed by Salovey and Mayer (1990) and has been used reliably in a number of studies (Ciarrochi, Chan & Bajgar, 2001; Petrides & Furnham, 2000a; Saklofske, Austin & Minski, 2003; Schutte *et al.,* 2001). The TMMS is a 30 item scale that measures the three trait-related dimensions of the Salovey and Mayer (1990) model; attention to emotion, which is the extent to which people report attendance to and valuation of their feelings, emotional clarity, which is feeling clear rather than confused about emotions and emotional repair, which is using positive thinking to repair negative moods. The scales were found to possess adequate reliability and internal consistency. The emotional clarity scale also successfully predicted ruminative thinking after controlling for measures such as neuroticism and depression, indicating that the scale has convergent and discriminant validity (Salovey *et al.,* 1995). The TMMS was not developed to provide an overall score of EI (Pérez *et al.,* 2005).

The Emotional Quotient Inventory or EQ-i was developed by Bar-On and is a commercially sold 133-item inventory consisting of 15 clinical subscales and two validity subscales. The clinical subscales measure emotional self-awareness, assertiveness, self-regard, self-actualisation, independence, empathy, interpersonal relationships, social responsibility, problem solving, reality testing, flexibility, stress tolerance, impulse control, happiness and optimism. The validity subscales are referred to as positive impression and negative impression (Schutte & Malouff, 1999) and measure the extent to which people respond randomly, or distort their responses in order to appear favourably or unfavourably. The response bias indexes have however been criticised as insufficient as these scales have been found to be unreliable in ascertaining whether a respondent is distorting his or her responses because of false perceptions regarding their own emotional abilities (Matthews *et al.,* 2003). The EQ-i also contains an overall measure of general EI.

Austin, Saklofske, Huang and McKenney (2004) report internal reliability values (Cronbach's alpha) for the total scale of the EQ-i of 0.87 which is consistent with previous reports and good reliabilities for all the subscales were found except for the positive impression scale (r=0.61). The other Cronbach's alpha values found for the scales used in the study were reported as follows; interpersonal r=0.79, intrapersonal r=0.78, adaptability r=0.79, stress management r=0.79 and general mood r=0.83. Pérez *et al.,* (2005) criticise the EQ-i for having a vague background as the measure was converted from a measure of well-being to an EI questionnaire. Problems have also been reported with the loading of the factors, as Petrides and Furnham (2001) found the questionnaire to be unifactoral and Palmer, Manocha, Gignac and Stough (2003) found six factors instead of 15.

Goleman (1995) developed the Emotional Competence Inventory or ECI, to measure the components of his theory of EI. The original ECI model (version 1) had 110 items on a 7 point Likert scale measuring 25 competencies arranged in 5 higher-order clusters: self-awareness, self-regulation, motivation, empathy and social skills. After further factor analysis, the scale was collapsed into 20 competencies and four domains: self-awareness, self-management (a mix of self-regulation and motivation), social awareness (a mix of motivation and empathy) and social skills (which is a mix of motivation, empathy and social skills) (Matthews *et al.*, 2003; Wolff, 2006). This version (version 2) consisted of 72 items measured on a 6 point Likert scale (Pérez *et al.,* 2005). Matthews *et al.,* (2003) criticise Goleman's updated version of the ECI for not measuring the same competence-based model described in his published theoretical framework. Pérez *et al.,* (2005) state that although the ECI has been promoted as a human resource tool, there is little information about the psychometric properties in scientific literature.

Matthews *et al.,* (2003) report the recorded Cronbach's alpha values of the ECI as marginal ranging from 0.59 to 0.82. These researchers express concern about the reliability of the measure especially considering that the ECI is marketed as a tool for organisational high-stakes decision-making. The test manual (Wolff, 2006) provides

reliability scores that are higher than those reported by Matthews *et al.,* (2003) for the four dimensions, however only one dimension has sufficient reliability to justify commercial use. The reported Cronbach's alpha values are as follows; self-awareness r=0.61, social awareness r=0.71, self-management r=0.79 and social skills r =0.92 (Wolff, 2006).

2.5.1.2. Performance based measures of emotional intelligence

Performance models of EI are concerned with the abilities to identify, express and label emotions and are therefore based primarily on external appraisals of performance (Matthews *et al.,* 2003; Petrides & Furnham, 2001). The ability model states that for EI to be justified as an intelligence, it must be measured based on an individuals performance, rather than through self-reported questionnaires (Matthews *et al.*, 2003).

The performance measures that have been developed are the Multifactor Emotional Intelligence Scale (MEIS; Mayer & Salovey, 1997), the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer *et al.,* 2002) and the updated version, MSCEIT v2 (Mayer *et al.,* 2003). These measures attempt to measure EI as distinct from existing personality dimensions (Matthews *et al.*, 2003).

The MEIS is the original instrument created by Mayer and Salovey (1997) to measure how well people solve emotional problems on performance tasks rather than relying on people's subjective assessment of their emotional skills. The test consists of 12 ability measures divided into the four dimensions of EI (Mayer *et al.,* 2000a). The dimensions include identifying emotions, facilitating emotions, understanding emotions and managing emotions. The test uses stories, music, faces and designs to score tasks based on emotional problems. The MEIS is scored using both consensus and expert scoring. The consensus scores are based on the pooled responses of a large normative sample. The expert panel consists of the judgement of the authors as

to which questions are right or wrong (Matthews *et al.,* 2003). Analysis of the data provides five scores, one for each branch and one for total EI.

The MSCEIT and MSCEIT v2 are 141-item updated versions of the MEIS which were developed successively to improve on the low reliabilities of the previous measures. The scales differ from the MEIS in that certain items and subtests have been revised and replaced and the subtests are comprised of fewer items. The expert panel of the MSCEIT was also updated to include 21 members of the International Society of Research on Emotions, which was intended to lend greater credibility to the reliability of the measure (Matthews *et al.,* 2003).

2.5.2. A critical evaluation of the reliability and validity of emotional intelligence and related instruments

Although a number of theorists have found significant correlations with not only theoretically related constructs, but also elements of life success such as leadership (Charbonneau & Nicol, 2002; Day *et al.*, 2002; Sosik & Megerian, 1999), life satisfaction (Ciarrochi *et al.,* 2000; Mayer *et al.,* 2000b; Palmer, Donaldson & Stough, 2002) academic scores (Petrides *et al.,* 2004b, Schutte *et al.,* 1998), occupational success (Cooper, 1997) and quality of interpersonal relationships (Austin *et al.,* 2005, Lopes, Salovey & Straus, 2003), the reliability and validity of EI as a distinct construct has been questioned (Ciarrochi *et al.*, 2000; Matthews *et al.*, 2003).

EI is seen by a number of theorists as media hype and a fad (Matthews *et al.*, 2003). A few critics see EI as a further means of controlling the actions of people and dictating a norm for how emotions should be managed. Other researchers warn that as a result of media frenzy, it is often forgotten that many of the EI measures may be neither reliable nor valid (Ciarrochi *et al.*, 2000). Within the field of EI research there is

also controversy as to whether EI is to be considered as a cognitive ability, or as a personality trait, or whether it is distinct enough to be considered a construct at all.

2.5.2.1. Concerns regarding the use of self-report measures versus ability measures

The validity and reliability of many of the self-report measures of EI have been criticised (Ciarrochi *et al.*, 2000). The definitions for EI in this category of testing are often similar and the properties of the tests fall along very similar lines. Critics argue that these tests are only new forms of personality testing and do not in actual fact present something new.

Self-report tests are sensitive to response bias as very few of these instruments have measures built in to detect this. Critics state that self-report measures are not good indicators of actual ability, but rather present only an indication of a person's perception of their abilities and are therefore highly reliant on the test-taker's honesty and accurate self-knowledge (Ciarrochi *et al.*, 2000). Dulewicz & Higgs (1999) have stated that measuring self-awareness is especially difficult as most people are unaware of how they are presented to other people.

Self-report assessment measures require people to have insight into their own perceived level of EI. These measures have however been criticised as being filtered through a person's self-concept and impression management motives (Mayer *et al.*, 2000a). Ciarrochi, Deane and Anderson (2002) found that self reported emotional perception is unrelated to how people actually perform in recognising emotions.

These measures are often subject to deliberate or unconscious social desirability response bias. People are able to distort their responses in order to appear better or worse than they really are. The scoring methods however are more concrete than those used by the ability measures, as the qualities of EI are specified in advance and scoring simply depends on a match between self-report and target qualities

(Matthews *et al.,* 2003). Ability measures have an advantage over self-report measures as they represent an individual's performance level on a task (Mayer *et al.,* 2000a). Ability measures are therefore more difficult to fake than performance based measures.

Pérez *et al.,* (2005) state that the greatest problem with ability tests is the difficulty in measuring the inherent subjectivity of emotional experience through objective scoring and at the same time addressing the uncertainty over how to achieve genuinely objective item scoring. A performance test requires responses that can be evaluated against objective, predetermined scoring criteria. These tests are different to conventional IQ tests in that they are based on consensus scoring rather than on expert opinion of what answers are right or wrong. This method therefore rests on the assumption that the pooled responses of a large normative sample are accurate. Petrides and Furnham (2003) state that EI items based on objective scoring are unable to cover the domain of EI adequately. Pérez *et al.,* (2005) maintain that EI cannot be objectively scored as there cannot be clear cut criteria for that which constitutes a correct response. Zeng and Miller (2003) have also raised concerns regarding the technical difficulties in objectively measuring EI as they found that only one branch of MSCEIT correlated with cognitive ability.

Austin *et al.,* (2004) state that self-report measures do have construct validity as EI has been associated with a number of theoretically related constructs which would be expected to be related to high EI. Trait EI measures have been found to have a strong, negative correlation with alexithymia which is expected theoretically as alexithymia is defined as difficulty in describing and identifying feelings and externally oriented thinking (Dawda & Hart, 2000; Schutte *et al.,* 1998).

Ability measures of EI have been criticised mostly for the potential conformity bias measured by the instruments. As the method of scoring used is consensus scoring, results are likely to reflect adjustment to social norms rather than EI, resulting in people who truly may reflect high levels of EI not being recognised as they do not

conform to the normative results (Roberts, Zeidner & Matthews, 2001). Although the authors counteract that there is a high degree of agreement between the consensus and expert scoring methods used (Mayer, Salovey, Caruso & Sitarenios, 2001), use of expert scoring has been criticised as there is no means to externally identify a true 'expert' or genius in EI (Roberts *et al.*, 2001).

Ability methods of scoring are easily influenced by the values and trends relative to certain cultures, genders, time periods or contexts. As a result of the multicultural nature of modern society, social norms do not only vary across countries but across settings as well, therefore the impact of context may be a significant confounding variable. The use of experts could also result be detrimental to people from cultures and subgroups that the experts do not represent, resulting in the difficulty of generalising the analysis of the results across all settings (Van Rooy & Viswesvaran, 2004).

Regardless of the criticism these tests have received, self-report measures are still the most popular method used to assess EI in research for a number of reasons; the tests are less complicated to administer and score than the ability measurements because the development principles for these measures follow the structured principles of psychometric test construction. The instruments are freely available and are not controlled by external corporations which require large fees to use these instruments. Researchers therefore have more access to these instruments and are not restricted by rigid procedures in the administering of the tests. The instruments are more straightforward than ability measures and can be administered without supervision (Austin, *et al.,* 2004). The self-report questionnaires are also less time consuming than the ability instruments which require a reasonable amount of time to administer. Based on these reasons a self-report measure of EI was determined to be a more suitable measure for understanding EI than an ability measure in the context of the present study.

2.5.2.3. Emotional intelligence as a personality trait

Personality has been measured in a number of ways, but the more popular model describes personality in terms of five basic factors labelled the 'Big Five'. These are referred to as extraversion, agreeableness, conscientiousness, emotional stability and autonomy (openness to experience). Studies conducted on the validity of EI have found that EI has a stronger relationship to personality than to general intelligence (Ciarrochi *et al.*, 2000) and significant correlations have been found with personality variables based on the Big Five model such as agreeableness, extraversion (Davies, Stankov & Roberts, 1998; Warwick & Nettelbeck, 2004), conscientiousness and emotional stability (Davies *et al.,* 1998).

EI theories that are based on self-report measures have been criticised (Matthews *et al.*, 2003; Mayer *et al.,* 2000a; Petrides & Furnham, 2000a) for not being sufficiently distinct from personality theory to warrant being recognised as a separate construct and thereby lacking discriminant validity. This area of EI research has been seen as being merely a mirror for the research on the Big five theory of personality. Concern has been raised about the predictive validity of self-report measures of EI, especially due to the perceived overlap with personality. It has been suggested that the correlations found with theoretically related variables are because these instruments are measuring personality traits known to predict these criteria, rather than a distinct construct (Matthews *et al.*, 2003; Mayer, Salovey & Caruso, 2000c; Newsome, Day & Catano, 2000; Petrides & Furnham, 2000a). Davies *et al.,* (1998) concluded that there is little that is unique to EI after controlling for personality. The magnitude of the correlations between these tests and personality characteristics is therefore a concern for many researchers.

Research has found evidence that EI does have construct validity over personality. Self-report EI was found to be distinct from personality by examining the incremental validity of EI over personality measures in the prediction of variables such as loneliness and the tendency to experience depression (Saklofske, *et al.*, 2003).

Palmer *et al.*, (2002) were able to present support for the predictive validity of self-report measures of EI by finding that EI accounts for variance in theoretically related life criteria, specifically life satisfaction, not accounted for by intelligence and personality.

Austin *et al.,* (2005) provided evidence of discriminant validity by finding that EI is a significant predictor of social network size over measures of personality. Schutte *et al.,* (1998) maintain that EI is a construct distinct from other personality constructs as the SSRI was found to be distinct from four of the Big Five personality dimensions. Petrides and Furnham (2001) provided evidence of discriminant validity for self-report EI in relation to personality by locating a distinct EI factor in the factor space of the Eysenckian measure of personality as well as in the Big Five Factor model of personality in two separate studies using two different samples.

Petrides and Furnham (2003) found evidence for the discriminant validity of trait EI by finding that EI is related to mood sensitivity after partialling out variance from the Big Five personality characteristics, thereby providing evidence for trait EI as a distinct personality trait. The study further provided evidence for the construct validity of trait EI by using two differing measures of trait EI to reliably link trait EI to perceptions of emotions. Saklofske *et al.,* (2003) found evidence of discriminant validity of trait EI over the Big Five personality characteristics for associations between EI and life satisfaction, loneliness and depression.

2.5.2.4. Emotional intelligence as a predictor of cognitive ability

The lack of significant correlations of EI with existing cognitive abilities has resulted in concern regarding whether theories that view EI as a cognitive intelligence have sufficient validity (Matthews *et al.*, 2003). Although the theory of Mayer and Salovey (1997) maintains that EI measured as an objective construct indicates a cognitive ability distinct from personality (Day & Carroll, 2004), research has not provided

consistent results that the four branches in the model all measure EI as an intelligence.

In a study conducted by Davies *et al.*, (1998) it was found that only the emotional perception branch was found to be distinctive from personality and cognitive ability, the remaining three branches correlate highly with either cognitive ability or personality. Mayer, Caruso and Salovey (2000d) found only a weak to moderate positive correlation between the MEIS and verbal intelligence. Schulte, Ree and Carretta (2004) found only a moderate relationship between a measure of cognitive ability and MSCEIT v.2.

EI was not found to have incremental validity over general mental ability when examining ability measures and ability was found to predict performance significantly beyond that explained by EI (Van Rooy & Viswesvaran, 2004), raising doubt that EI is a better predictor than cognitive ability as previously claimed (Goleman, 1995).

Zeng and Miller (2003) conducted a study to determine whether the self-report EI measures and the ability or objective performance EI measures differed in correlations with cognitive ability and personality. The study found that only one branch, emotional perception, of the ability measure had low but significant correlations with cognitive abilities as measured by the Wonderlic Personal Test (WPT). Self-report measures did not correlate with the WPT. It was also found that self-report measures of EI do have a low but significant correlation with all the factors in the Big Five personality model; extraversion, agreeableness, conscientiousness, emotional stability and autonomy, but that the branches of the ability measures do not correlate (Zeng & Miller, 2003). This does however not provide support for ability measures as superior measures to self-report, as only one branch of the MSCEIT correlated with cognitive ability, indicating that the other branches do not tap either intelligence or personality traits.

2.5.2.5. On separating the constructs

As EI tests claim to measure one underlying construct, different measures of EI need to be highly correlated with each other, otherwise they cannot be said to be measuring the same construct (Matthews *et al.,* 2003). Self-report measures of EI appear to be more strongly related to personality than objective measures (Davies *et al.,* 1998; Day & Carroll, 2004; Newsome *et al.,* 2000; Schutte *et al.,* 1998;), objective ability measures appear to be more strongly related to cognitive ability (Day & Carroll, 2004; Matthews *et al.*, 2003).

This has resulted in some theorists believing that the two measures should be seen as measuring different constructs altogether (Petrides & Furnham, 2000a). Petrides and Furnham maintain that by separating EI into two constructs defined by the boundaries of the assessment measure, many of the concerns regarding the validity of EI can be resolved. These theorists agree that self-report measures correlate highly with personality, but state that this is to be expected as personality is by definition a construct best measured through self-report means. Petrides and Furnham (2001, p. 442) further describe trait EI is a "distinguishable, lower order, composite, personality construct".

Further support for separating the constructs is provided by Schutte *et al.,* (1998) who found that self-report measures of EI were unrelated to cognitive ability as measured by the mathematical and verbal scores on SAT tests. Warwick and Nettelbeck (2004) concurred that the lack of significant relationships found between a self-report and an ability measure of EI (r=0.19) provides support for measurement of two distinct forms of EI. Roberts *et al.,* (2001) criticise the distinction based solely on measurement instrument due to the lack of evidence supporting EI as an intelligence, stating that this distinction is premature.

2.5.2.6. The construct validity of emotional intelligence: group differentiation

Construct validity for self-report measured in terms of group differentiation, especially with regard to gender differences have been found in a number of studies (Brackett, Mayer & Warner, 2004; Ciarrochi *et al.,* 2000; Day & Carroll, 2004; Petrides & Furnham, 2000b). Brackett *et al.,* (2004) found that female EI scores were significantly higher than overall male scores on the Bar-On EQ-i measure. They found these same differences using the MSCEIT. Further studies that provide evidence for validity on the basis of group identification have found that trait EI differentiates between students with and without learning difficulties (Reiff, Hatzes, Bramel & Gibbon, 2001) healthcare practitioners and police officers (Bar-On *et al.,* 2000), prison inmates and psychologists (Schutte & Malouff, 1999) and prison inmates and controls (Bar-On, 1997).

Brackett *et al.,* (2004) found that EI predicted life-space criteria for males such as low EI as a predictor of negative outcomes such as maladjustment, negative behaviour and deviance in college students, with no predictions for females. This could be due to the error variance caused by the small number of males used (n=89) in relation to the large number of females (n=241).

2.5.3. Implications for the current study

There are a number of measurement instruments which claim to assess general measures of EI and many which address sub-components of EI. It is due to the complexity of the construct that it is difficult to find a measure which has adequate validity and reliability. Debates surrounding the nature of EI are similar to the debates

surrounding the nature of personality and therefore this study accepts the complexity of the construct and focuses rather on a definition suited to the nature of the study.

The analysis of the instruments discussed previously indicates that although there is debate regarding which of the two measures is superior, both ability and self-report measures of EI are not perfect and require more research and refinement. There is no single measure that stands out as the most effective measure to use and it is therefore necessary to examine the nature of the study at hand before deciding on which type of measure to use.

What makes the measurement of EI so difficult is that EI concerns reactions to problems in the environment that can be interpreted in many different ways, depending on the perception of the observer. Unlike cognitive intelligence, EI does not have the luxury of objective solutions and a number of differing responses could lead to the required outcome (Jones & Day, 1997). There are also no independent standards to which the behaviour can be evaluated, as the degree to which the behaviour is emotionally intelligent is determined by the environment at hand (Jones & Day, 1997).

There is a great deal of support (Petrides & Furnham, 2000a, 2001; Van Rooy & Viswesvaran, 2004; Warwick & Nettelbeck, 2004) for separating the theories focusing on ability and on self-report into two different models that measure two different constructs, that of EI as a cognitive ability and EI as a personality trait. Until one of the two models emerges as the dominant paradigm, further separate lines of enquiry are required on both methods. As this study is focusing on EI as a personality trait that can be modified or learned, a self-report measure of EI is considered to be the best option for investigating this topic.

Petrides and Furnham (2001) state that due to the vastly differing properties of the two measurement styles, ability and trait measures of EI should not be expected to yield similar results, even if the underlying construct is the same. A self-report

instrument would by its nature present different results than those of a measure based on correct or incorrect responses, as the self-report measure assesses behavioural tendencies and self-perceived abilities in contrast to the measurement of abilities by the other. As a result measures of trait EI are expected to correlate with personality variables and not with ability factors (Petrides & Furnham, 2001); however ability EI should be related to cognitive ability as well as personality dimensions that have a strong emotive basis. A great deal of the problems found with the incremental validity of EI could therefore be explained as the result of attempting to force EI research into the space created by one construct.

By examining EI as two differing constructs it could be argued that the two branches of EI theory are equally valuable as potential constructs to explain variance in real life behaviour and provide evidence of the relationships expected within the confines of their definitions. The distinction between them however needs to expressed and care needs to be taken to use the correct measurement for the domain under investigation, whether it is research into ability or into behavioural trait.

The incremental validity of EI has been raised as a concern in previous research. Petrides *et al.,* (2004a) state however that trait EI should be examined on the basis of what it explains rather than what it predicts, as EI may have great value as an explanatory variable. The reason for this is that although EI may not have a direct influence on variables such as occupational and academic success it may be able to explain why certain people are able to manipulate certain situations to their advantage.

2.5.4. The relationship of emotional intelligence to academic and occupational success

Despite claims that EI predicts success occupationally and academically, there are very few published studies that have demonstrated these relationships (Mayer *et al.,* 2000b). Tests such as those of Newsome *et al.,* (2000) who found that neither the EQ-i subscales nor the total score predicted academic grade point averages of students, imply that EI, especially EI defined as a trait may have very little direct influence on success. Day and Carroll (2004) found that the scales of the MSCEIT did not predict performance on a decision making task and a number of other studies have failed to find a relationship between EI and academic intelligence (Davies *et al.,* 1998; Van der Zee, Thijs & Schakel, 2002).

In a meta-analysis of the EI construct, Van Rooy and Viswesvaran (2004) found that EI does have predictive validity for relevant life space criteria. They found EI to have predicative validity in employment and life settings, but that the ability to predict academic performance was limited. Although the level of performance prediction measured was not as high as often claimed, the levels were found to be higher than those of other selection methods used such as letters of reference. It was also found that 4% of the variance in performance and 5% of the variance in work performance can be explained by EI (Van Rooy & Viswesvaran, 2004).

Petrides *et al.,* (2004b) found that although trait EI did not have any influence on mathematical or scientific performance, it did moderate the effect of IQ on a scholastic measure of English and overall performance. A relationship was found between students with low IQ's and high EI who performed well, however no effect was found for children with high IQ's. Petrides *et al.,* (2004b) theorised that the reason for this effect was due to high trait EI providing a stabilising force through aspects such as positive self-perceptions before testing in situations where the intellectual demands outweigh the resources of the student. This provided support for

the ability of individuals who have high EI to convert stress and anxiety into positive performance.

Van Staaden (2001) found support for the validity of the MSCEIT in predicting academic success by correlating EI with higher academic scores in university students. Day and Carroll (2004) also found that the MSCEIT did have predictive validity in terms of the ability to predict group performance.

Research has revealed that EI is able to predict various functions related to occupational success. EI has been found to be positively related to success in the area of leadership, specifically leadership potential, in a sample of senior managers (Higgs & Aitken, 2003). Palmer, Gardner and Stough (2003) discovered that EI measured with a self-report scale was correlated with transformational leadership and Gardner and Stough (2002) found that EI accounted for the majority of the variance in transformational leadership when compared to other personality measures. Dulewicz and Higgs (1999) developed a self-report measure and used this measure to examine leadership effectiveness from the perspective of progression in an organisation, finding that EI was able to explain a greater proportion of advancement than cognitive intelligence or personality traits. Using an ability measure of EI, Rosette and Ciarrochi (2005) found that managers with high EI were more likely to be viewed as effective leaders and achieve business outcomes.

Martinez-Pons (1998, 1999) found that high EI was predictive of the ability to carry out task-oriented behaviours. When Warwick and Nettelbeck (2004) however, attempted to replicate the findings it was found that self-report measures only correlate significantly if personality is not controlled for and that ability based measures of EI do not correlate with task-performance at all. Roberts *et al.,* (2001) state that although there are higher correlations observed between self-report measures of EI and criteria used to evaluate job performance than ability tests, this could be largely due to correlations of self-report measures with personality.

Previous research has found that EI can predict important life outcomes as discussed above yet not to the extent claimed by theorists such as Daniel Goldman. The findings are however significant enough to consider further investigation. It must therefore be kept in mind that EI is not the sole contributor, but rather one of a number of variables, including personality and cognitive ability that predict career success. More research is required within organisational contexts before EI measures can be used as decision-making tools in organisational settings.

2.5.5. Relationships of thinking styles to aspects of academic success

Zhang (2002a, 2002b) investigated the relationship between thinking styles and academic performance and found that there is a significant relationship between thinking styles that are more norm-conforming and simplistic and analytical modes of thinking and styles that are more creativity-generating and more complex are related to holistic modes of thinking.

Zhang & Sternberg (2000) Investigated the relationship between thinking styles and the theory of learning styles proposed by Biggs (1995) and found that students who utilise mainly a deep approach to learning or attempt to employ a real understanding of study material, use type I thinking styles and that students who use mainly a surface approach or the use of rote-learning approaches to learning use predominantly type II thinking styles.

Park, Park and Choe (2005) found that students who were defined as gifted had a preference towards using legislative, global, judicial and liberal thinking styles (type I styles), whereas students that were not defined as gifted were more inclined to use executive, oligarchic and conservative thinking styles (type II styles).

Gender differences were also found in the relationship between achievement and thinking styles. Thinking styles that were found to be positively associated with academic achievement included conservative, hierarchal and internal styles. Styles such as legislative, liberal and external styles were found to be negatively associated with academic achievement (Zhang & Sternberg, 1998) Male respondents were found to display significant correlations between academic achievement and the judicial style and analytical styles, whereas for female respondents legislative and liberal thinking styles were negatively related to academic achievement (Zhang & Sternberg, 1998).

2.6. OVERVIEW OF THE THEORETICAL VIEWPOINT ADOPTED IN THE PRESENT STUDY

The theoretical viewpoint adopted in this study is that of the original model of Salovey and Mayer (1990). The research will also adopt a self-report instrument in the measurement of EI, specifically the Schutte Self-Report Inventory (SSRI) (Schutte *et al.,* 1998).

As research indicates that the different measures of EI have different correlations with intelligence and personality, it appears as though the ability and self-report measures actually measure differing constructs. The focus of this dissertation is not to refute or to prove this claim; therefore it will be advised that this be taken into consideration for future research. As thinking styles are not viewed as a cognitive ability, viewing EI from the perspective of a trait would be the most appropriate when attempting to understand potential relationships between the two constructs. This research will assume therefore that although the EI model chosen for this research offers great similarity to personality research, the field is complementary to personality theory rather than identical to it.

2.7. RESEARCH QUESTION

In the present study the relations between the SSRI and the 13 categories of the Thinking Styles Inventory will be explored in order to expand on the current literature on EI and the abilities that EI predicts, thereby contributing to the construct validity of EI. Evidence of group differences can assist in establishing construct validity (Matthews *et al.,* 2003). In the present study four groups of career fields, namely humanities, management, engineering and sciences, will be used as criterion groups.

EI comprises the ability to adaptively understand and regulate emotions. People who have high levels of EI should therefore be drawn to careers that require interaction with people on a more emotive level. It is hypothesised that people majoring in study fields requiring emotional skills such as humanities and management will have higher levels of EI than people who major in study fields that do not require in depth interpersonal interaction such as mathematics, engineering and sciences.

Research into the relationship between various careers and EI is limited; however there are a number of careers or study fields that have been correlated with high levels of EI. Van Staaden (2001) found that psychology students were found to exhibit higher levels of EI than engineering students. Caruso (1999) found that EI was related to people with intensive career fields such as the mental health field as well as management. Further support for this hypothesis is provided by studies that found a relationship between EI and performance ratings in an undergraduate psychology internship (Schutte & Malouff, 1999).

Petrides *et al.,* (2004b) maintain that trait EI is an advantage in subjects that require consideration of affect-related issues. These findings are important for the current study as a similar hypothesis could be concluded for career choice. It is possible that individuals higher in trait EI would be able to attain more benefit from these abilities in careers that deal continuously with affect-laden information and may involve

ambiguous situations requiring emotional problem solving such as psychology or management for instance. Trait EI may however be less beneficial in careers that require primarily mathematical and scientific skills such as financial or engineering fields. It is therefore an important point to consider that although a high EI may not have a direct effect on intellectual ability in academic or occupational situations it may have a moderating effect by allowing individuals to use social cues in situations to facilitate positive outcomes.

Hypothesis 1

Students in the fields of humanities and management studies will display higher levels of EI than students in the fields of engineering and sciences.

Research into thinking styles have found that individuals who have a preference for a particular thinking style will function more optimally in a situation that matches that thinking style, than a person using a different thinking style (Sternberg, 1997a, 2003b). In many educational as well as occupational settings certain ways of thinking are valued more than others and people who do not use those ways of thinking cannot thrive in those situations (Sternberg, 2003b).

Certain study fields and careers have stereotypical ways of presenting information and evaluating performance. A study field and occupation that would for example require a more logical and mathematical approach such as accounting or statistics may be better suited to a person who thinks primarily in an analytical manner. Similarly it would be expected that there would be a lesser need for people with a high level of EI in an engineering field, but that it would be absolutely crucial in a management or human resources position. The person who is successful at human resources may fail miserably in an accounting field, not because that person is any less intelligent, but rather because the abilities and preferences of the person do not match the expectations of the work environment.

Sternberg and Grigorenko (1995b) found that the liberal style was more associated with humanities teachers than science teachers and that science teachers were more inclined to use a conservative style than humanities teachers. They also found that science teachers were more inclined towards using a local style than humanities teachers who were more inclined to use a global style. Cilliers and Sternberg (2001) found that students in natural sciences faculties showed a stronger preference for executive, global and conservative styles than education students. Arts students showed a stronger preference for legislative and internal styles than education students. The relationship with more creative and external styles in the faculty of education was thought to be due to the collaborative and people-centred demands of the study field. It was also found that students in the fields of natural sciences and technology scored significantly higher on the global thinking style than students in social sciences and humanities fields (Zhang & Sternberg, 1998). The relationship found in the faculty of natural science was thought to be due to the more analytical, structured, logical and empirical nature of the field. Three styles, judicial, global and liberal were found to correlate significantly with mathematical ability (as measured by SAT scores) (Sternberg, 1994b).

A study comparing thinking styles to vocational interests (Zhang, 2001) found that the external and judicial thinking styles were significantly related to people who were social and enterprising. A negative correlation was found between people who are artistic and the conservative, executive and local thinking styles.

It appears from previous research that there is an inclination for people in study and career fields that are more collaborative and people centred such as education and humanities to prefer more creative and interactive styles such as the liberal, hierarchical, global, legislative and external styles. It also appears that people in study and career fields that are more empirical, analytical and structured such as mathematics and sciences are more inclined towards styles such as the conservative, local and executive styles. There is some overlap in previous research as to whether there is a greater preference for the judicial, global and liberal styles in the

predominantly people centred fields such as humanities or in the more empirical fields such as sciences or mathematics. As these styles have been described as correlating highly with the legislative and hierarchical styles (Zhang, 2000), these styles will be considered in the hypotheses as belonging to the same typology.

The typology identified in previous research that classifies the 13 categories of thinking styles into 3 types will be adopted for this study. The types are described as being highly correlated with each other and cluster logically together (Zhang, 2000, 2001, 2002a, 2002b, Zhang & Sternberg, 2000). The first category (type I thinking styles) involves thinking styles that generate creativity and utilise higher levels of cognitive complexity. The styles in this group include the legislative, judicial, hierarchical, global and liberal styles. The second category (type II thinking styles) includes styles that are structured, norm-favouring and simplistic. The styles in this group are the executive, local, monarchic and conservative styles. The third combination of styles (type III thinking styles) draws on characteristics of both of the previous two types depending on the situation wherein the styles are used. These styles include the anarchic, oligarchic, internal and external styles.

Hypothesis 2
Students in the fields of humanities and management studies will be more likely to display predominately type I thinking styles (including the legislative, judicial, hierarchical, global and liberal styles) and external thinking styles (type III) than students in the engineering and sciences departments. Students in the fields of engineering and sciences will be more likely to display predominately type II thinking styles (executive, local, monarchic and conservative styles) and internal thinking styles (type III) than students in the humanities and management departments.

Both cognitive thinking styles and trait EI have been described as higher order personality traits (Petrides & Furnham, 2000a, 2001; Riding & Wigley, 1997) and have been closely related to measures of personality (Day & Carroll, 2004; Schutte *et*

al., 1998; Zhang, 2001; Zhang & Huang, 2001). The expectation is therefore that there would be a relationship between EI and thinking styles. The assumption made in this research is that the more complex and creative thinking styles (type II thinking styles) would be more positively associated with high levels of EI and the more norm-favouring and simplistic styles would be related to low levels of EI.

Hypothesis 3

Type I thinking styles (including the legislative, judicial, hierarchical, global and liberal styles) and external thinking styles (type III) will correlate positively with the overall score of the SSRI assessment measure.

Hypothesis 4

Type II thinking styles (executive, local, monarchic and conservative styles) and internal thinking styles (type III) will correlate negatively with the SSRI assessment measure.

CHAPTER 3
METHODOLOGY

This chapter provides details of the research design, the sampling process and the test materials used in the study. A short discussion and justification of the data analysis procedures employed are also provided.

3.1. RESEARCH DESIGN

The purpose of this study was to explore the relationship between EI, thinking styles and career fields of students registered at a university in Gauteng, South Africa. The present study was conducted using a quantitative survey research design. A survey design was considered to be the most appropriate design as the research aimed to draw statistical inferences about a large sample that is representative of the intended population, which would be difficult to attain with the use of any other design (Babbie & Mouton, 2004).

The study is correlational by design in order to analyse the strength of the relationship between the variables. The variables examined in the study include EI, the 13 thinking styles categories, the study fields to which the participants belong and demographic characteristics of the participants. A limitation of correlational research is that errors of causality often arise. Inferences that one event causes another event could often result in misleading conclusions as the impact could be the result of intervening variables. A further limitation of a correlational study is that the relationship between two variables could be the result of an artefact, such as a false

positive relationship between two scales because the scales themselves contain similar items and not because their items are causally related (Babbie & Mouton, 2004). Considering that only an experimental research design with random sampling, which has not been used in this study, can prove a definitive cause-and-effect relationship, this research will only attempt to measure the degree of relationship between the variables and explore possible causal factors (Babbie & Mouton, 2004).

3.2. SAMPLE SELECTION

University students enrolled in final year courses at a South African university formed the population from which this sample was recruited. A university sample was used due to the focus of the study on thinking styles and EI within different academic study fields. Questionnaires were issued to 800 students from a university in Gauteng and 400 questionnaires were returned. Questionnaires that contained ratings on the English language proficiency question of less than good (rating of 4 or less) were removed from the study. Questionnaires that appeared to have been completed erratically, for example all the questions were given the same answer, or had large numbers of unanswered questions such as entire pages or sections that were unanswered were also removed from the study. A sample consisting of 309 questionnaires was retained.

Students were sampled from four faculties namely the humanities, management, sciences and engineering faculties. A total of 99 respondents were collected from the humanities department, 41 respondents were collected from the management department, 38 from the engineering department and 131 were collected from the sciences department.

These courses were chosen based on the assumption that courses in the humanities and management departments focus specifically on interactions between people which is often not a primary concern in typical engineering and science-based university courses. It is therefore assumed that EI is more developed in the humanities and management fields. Conducting the research amongst students in different study fields will allow for analysis by intended occupation as well as present a more balanced sample in terms of total results.

The sample was collected using non-probability purposive sampling methods in order to obtain the greatest number of participants for the study. Purposive sampling involves collecting any cases that contain the most representative attributes of the population (De Vos, Strydom, Fouche & Delport, 2002). Permission was obtained from the relevant departments to approach students during lecture periods. In order to obtain a diverse sample across the various career fields within each of the four faculties, six to eight classes were used for data collection within each of the faculties. Participants were used from the full time lecture periods as well as the part time lecture periods which took place in the evenings. After explaining the purpose of the study, students were requested to participate. The majority of the students in each class were prepared to participate. Due to the use of a sample consisting of students, the results of this study will not be generalisable to other groups.

Swart (1997) found significant differences between participants who belonged to Afrikaans and English language groups and participants who belonged to an African language group on seven of the subscales of the EQ-i. To control for the effect of language on the understanding of the instrument items the sample was collected from English and Afrikaans speaking classes. Students were requested to rate their English proficiency on a scale from 1, very poor to 7, excellent. Students who rated themselves as less than good (rating of 4 or less) were removed from the study. As both the TSI (Cilliers & Sternberg, 2001) and the SSRI (Palmer, 2003) have been found to be reliable in cultures different to those used to develop the measure, culture

was not controlled for but was assessed in the present study to determine the impact on the final results.

The sample was restricted to students in final years of undergraduate study or students enrolled for postgraduate study in the various faculties to ensure that students were relatively fixed in their career choices, or had been members of their study field for a sufficient amount of time to experience a good fit between their own thinking styles and the requirement of the field. It is assumed that students who are in the final years of their studies would have more established career goals and their thinking styles would be more consistent with the requirements of their chosen career.

3.3. RESEARCH INSTRUMENTS

The Schutte Self-Report Inventory (Schutte *et al.,* 1998) (see Appendix A) was selected for the purposes of measuring EI (defined as a trait). The Thinking Styles Inventory (Sternberg & Wagner, 1992) (see Appendix B) was selected to measure thinking styles. In addition to this, a biographical information sheet (see Appendix C) was also completed by each of the respondents.

3.3.1. The Schutte Self-Report Inventory

The Schutte Self-Report Inventory (SSRI) is a self-report measure of EI that was developed by Schutte, *et al.,* (1998) in an attempt to provide a brief measure of EI, based on a comprehensive model. The SSRI was based on a combination of the original model developed by Salovey and Mayer (1990) and the revised model (Mayer & Salovey, 1997).

The SSRI, otherwise known as the EIS (Emotional Intelligence Scale), the SEI (Self-Report Emotional Intelligence) and the Schutte Emotional Intelligence Scale (SEIS) assesses EI based on self-report responses. The scale has a single factor with 33 items that assesses the appraisal and expression of emotion in the self and others, regulation of emotion in the self and others and utilisation of emotion in solving problems. Previous research with the SSRI has reported that the instrument consists of more than one factor. Research has found the presence of three (Ciarrochi *et al.,* 2002) and four (Palmer, 2003; Petrides & Furnham, 2000a) additional factors that measure similar dimensions to those defined by Salovey and Mayer (1990). The SSRI was developed to measure the extent to which respondents are able to identify, understand, harness and regulate emotions in themselves and in others (Schutte & Malouff, 1999).

3.3.1.1. Description and scoring of the Schutte Self-Report Inventory

The SSRI was developed by generating 62 items from Salovey and Mayer's (1990) model of EI. Using a principal component factor analysis followed by a varimax rotation on the 62 items, four components were extracted but only one strong factor was retained. On the basis of this the 33 scale items, which were the items with the highest loading on the first factor, were selected. These items, according to the authors, represented all dimensions of the original Salovey and Mayer model (Schutte & Malouff, 1999).

The instrument consists of a 5-point Likert scale on which a score of 1 represents *strongly disagree* and a score of 5 represents *strongly agree* which the respondent uses to indicate the extent to which each item describes him or her. On completion, items 5, 28 and 3 are reverse coded. The sum of all the items results in a total score which can range from 33 to 165. Higher scores on the scale indicate a greater level of EI (Schutte *et al.*, 1998).

Schutte *et al.,* (1998) collected the sample on which the questionnaire was standardised from a community sample of 328 respondents. Females obtained an average score of 130.94 (SD=15.09) and males had a mean score of 124.78 (SD=20.25). Schutte and Malouff (1999) provided further group scores against which results can be compared. These included a group of psychotherapists with a mean of 134.92 (SD=20.25), prisoners who had a mean score of 120.08 (SD=17.71) and substance abuse clients with a mean of 122.23 (SD=14.08).

Other than the limited normative data supplied by the authors there is little further normative data available on this scale. Normative data for the SSRI has also been established by Palmer (2003) on an Australian general population sample.

3.3.1.2. Reliability of the Schutte Self-Report Inventory

For a measure of EI to be considered as reliable the measure needs to measure accurately and consistently in repeated administrations (Owen, 1996). Anastasi and Urbina (1997) state that desirable or satisfactory reliability coefficients should fall between 0.8 and 0.9 if important decisions have to be made about an individual. Cicchetti (cited in Schutte and Malouff, 1999) states that the minimum acceptable level of reliability is 0.7 for measures that are difficult to concretely define such as personality assessments.

The SSRI has demonstrated high internal consistency. In a sample made up of community members, the scale was found to have a Cronbach's alpha of 0.9 and for college students the Cronbach's alpha was found to be 0.87 (Schutte *et al.,* 1998). The scale has also been reported as having a good two-week test-retest reliability (r=0.78) (Schutte *et al.*, 1998; Schutte, Malouff, Simunek, McKenley & Hollander, 2002) and group differences in scores 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.*, 2001). The SSRI has also been found

to be reliable for measuring both adolescents and adults (Ciarrochi *et al.,* 2001; Matthews *et al.,* 2003; Palmer, 2003).

3.3.1.3. Validity of the Schutte Self-Report Inventory

The validity of a scale is defined as the extent to which a scale measures the construct it claims to measure (Schutte & Malouff, 1999). The validity of a test therefore indicates whether the items used in the test reflect the variables in the theoretical framework on which the test is based (Owen, 1996). Construct validity is the process of testing whether or not a test actually measures a theoretical construct or trait (Anastasi & Urbina, 1997). Construct validity is seen as a never-ending process. Matthews *et al.*, (2003) state that all studies should continue to provide evidence of construct validity and only when studies of a test consistently lead to negative outcomes should the test be rejected.

Construct validity can be established in a number of ways. Convergent validity assesses whether the instrument correlates with external measures believed to tap the same or similar constructs (Anastasi & Urbina, 1997). An EI test should correlate highly with other variables specified by the theoretical framework as relating to the underlying construct. Other methods of demonstrating construct validity include examining a measure's face validity, factor structure, discriminant validity and the extent to which it differentiates amongst groups (Anastasi & Urbina, 1997).

Petrides and Furnham (2000a) conducted an exploratory factor analysis on the SSRI and found evidence of construct validity by discovering that the items which loaded on the four located factors were closely related to the components of the model on which the test is based. Evidence of convergent validity has been provided by research which has found significant correlations to theoretically similar constructs, such as measures of attention to feelings, clarity of feelings, improved mood repair, optimism, greater impulse control, lack of depressed affect, less alexithymia (Schutte *et al.*, 1998), empathic perspective taking, self-monitoring in social situations, closeness and

warmth of relationship, marital satisfaction (Schutte *et al.,* 2001), emotional well-being, positive mood states and self-esteem (Schutte *et al.*, 2002).

Discriminant validity can be established by showing that a test does not correlate with variables considered as theoretically unrelated, otherwise the test may be measuring a construct other than EI (Matthews *et al.,* 2003). Evidence of discriminant validity was found in that the scale scores were shown to be distinct from measures of the Big Five dimensions of personality and cognitive ability (Schutte *et al.,* 1998). Ciarrochi *et al.*, (2002) found evidence of discriminant validity by demonstrating that the SSRI moderated the relationship between stress and mental health after controlling for related constructs such as personality. Saklofske *et al.,* (2003) found that the SSRI does have discriminant validity as it does not correlate significantly with cognitive ability and accounts for variance in measures of well-being not accounted for by personality.

Factorial validity represents the extent to which a scale structure is empirically and theoretically justified. For a measure to demonstrate construct validity, its factor structure should comprise the theorised number and pattern of factors (Matthews *et al.,* 2003). In the original study Schutte *et al.*, (1998) recommend that although subscales have been found to exist in the SSRI measure, only the total scale should be used as the items loading on the factors two to four were not conceptually distinct from the items that loaded on the first factor (Schutte *et al.,* 1998). A number of researchers have found a clear four-factor solution as well as a satisfactory fit for the one-factor model (Ciarrochi *et al.,* 2001; Palmer, 2003; Petrides & Furnham 2000a; Saklofske *et al.,* 2003).

Palmer (2003) suggests that the four-factor model found in the scores of the SSRI should be explored as a more concrete model than using only a general scale score. The findings that the SSRI contains more than one factor and therefore diverges from the claims of the scale authors (Schutte *et al.,* 1998) has been indicated as cause for concern (Mathews *et al.,* 2003; Petrides & Furnham 2000a).

In order to determine whether the SSRI displayed predictive validity, Schutte *et al.,* (1998) conducted a longitudinal study to test whether scores on the SSRI would predict academic marks of students in their first year at college and found that scores on the SSRI significantly predicted averages at the end of the academic year. The SSRI was found to meaningfully correlate with aspects of adaptive interpersonal functioning and well-being (Schutte *et al.,* 2001; Saklofske *et al.,* 2003). It was found that people with higher EI scores display more co-operative responses toward partners and experience greater marital satisfaction (Schutte *et al.,* 2001). The SSRI was further found to predict performance on difficult and frustrating cognitive tasks (Schutte, Schuettpelz & Malouff, 2000) and positive mood states and self esteem (Schutte *et al.,* 2002). Investigation into the predicative validity of the SSRI using adolescents found that the scores on the SSRI were meaningfully related to skill at identifying emotional expression, degree of social support, satisfaction with social support and mood management behaviour (Ciarrochi *et al.,* 2001).

The SSRI has been found to display positive and negative characteristics, however a number of studies have indicated that the SSRI displays sufficient reliability and validity in measuring Self-Report EI and can therefore be used with a reasonable certainty of obtaining meaningful results. The relationship to personality characteristics further supports the use of this scale for measuring EI as a trait.

3.3.2. The Thinking Styles Inventory

3.3.2.1. Description and scoring of the Thinking Styles Inventory

The Thinking Styles Inventory (TSI) developed by Sternberg and Wagner (1992) identifies 5 different dimensions of thinking styles which are further subdivided into 13 categories of preference. The measure is based on Sternberg's (1988) theory of mental self-government. The assumption is that a person will have certain

preferences for thinking styles and although the preference for these styles may be flexible and adaptive to varying situations people will still succeed more effectively in an environment that matches their preferred thinking styles.

The TSI consists of 104 statements, with eight items for each of the 13 subscales. For each item, the participants are asked to rate themselves on a Likert scale ranging from 1 (the statement does not describe the way they normally carry out tasks at all) to 7 (the statement characterises the way that they normally carry out tasks extremely well) (Sternberg, 1997a).

3.3.2.2. Reliability of the Thinking Styles Inventory

The TSI has been shown to be reliable and valid across a number of cultural groupings. The scale has been used extensively in the United States (Grigorenko & Sternberg, 1997; Sternberg, 1997a; Sternberg & Grigorenko, 1995a, 1995b) as well as in Hong Kong and China (Zhang & Sachs, 1997; Zhang & Sternberg, 1998, 2000). Studies have also been conducted successfully in South Africa (Cilliers & Sternberg, 2001) and a number of European countries (Balkis & Isiker, 2005; Fjell & Walhovd, 2004). The scale has been found to be reliable for student as well as adult populations (Zhang, 2005b).

The original college sample collected by Sternberg & Wagner (cited in Sternberg, 1997a) found subscale reliabilities (Cronbach's alpha) ranging from 0.42 (monarchic) to 0.88 (external) with a median reliability of 0.78, which indicates an overall reliable measure. The statistics from a number of studies using the TSI in cross cultural settings have found similar reliability measures to the original reliability scores. Sternberg (1994b) found that the Cronbach's alpha coefficients ranged from 0.44 to 0.88, Zhang and Sachs (1997) found a range from 0.53 to 0.87 and Zhang (1999) found values ranging from 0.46 to 0.89.

Table 1: Scale reliabilities and corresponding question numbers for the 13 subscales of the TSI

Categories		Scale Reliabilities	
	Item numbers	Zhang & Sternberg (1998) n=622	Zhang (2005b) n=333
Liberal	3, 19, 25, 80, 88, 91, 97, 103	0.78	0.82
Conservative	20, 27, 45, 51, 53, 55, 66, 79	0.68	0.77
External	7, 35, 36, 61, 71, 77, 82, 84	0.73	0.71
Monarchic	8, 18, 46, 52, 54, 56, 90, 98	0.46	0.68
Hierarchical	10, 26, 31, 40, 50, 57, 60, 95	0.74	0.77
Legislative	4, 12, 21, 32, 59, 65, 72, 86	0.71	0.78
Executive	5, 15, 22, 24, 58, 62, 69, 74	0.64	0.60
Internal	17, 28, 33, 43, 67, 81, 93, 102	0.78	0.75
Global	11, 14, 39, 63, 68, 78, 85, 100	0.58	0.70
Judicial	1, 9, 38, 41, 48, 73, 89, 96	0.71	0.71
Anarchic	29, 34, 42, 64, 70, 83, 94, 104	0.43	0.55
Oligarchic	6, 23, 37, 47, 75, 87, 92, 99	0.63	0.71
Local	2, 13, 16, 30, 44, 49, 76, 101	0.43	0.69

Problems have been found with three of the 13 scales, resulting in low reliabilities for these scales: local, monarchic and anarchic (Zhang, 2004). The scale reliabilities for this sample range from 0.42 (monarchic) to .88 (external) with a median reliability of 0.78, which is considered to indicate an overall reliable measure. Table 1 presents the Cronbach's alpha for each of the 13 subscales obtained from two previous studies (Zhang, 2005b; Zhang & Sternberg, 1998).

3.3.2.3. Validity of the Thinking Styles Inventory

The validity of the TSI has been verified by a number of studies. The five-factor model that was originally found by Sternberg and Wagner has been replicated in a number of studies (Fjell & Walhovd, 2004; Sternberg, 1994b; Zhang, 1999) which provides evidence of construct validity.

Convergent validity has been found for the TSI in a number of studies which have correlated the measure with other measures of styles such as Gregorc's measure of mind styles (Sternberg, 1994b) and Biggs' study processes questionnaire (Zhang & Sternberg, 2000). As a result researchers are confident that the various measures of styles assess similar, but not identical constructs (Zhang & Sternberg, 2000). Construct validity of the test items was assessed in two separate studies by Zhang and Sternberg (1998, 2000) and the items were found to correlate in the predicted directions.

Construct validity was enhanced by studies that found thinking styles to be related to theoretically similar constructs, specifically personality. If styles are believed to be associated with personality traits and inhabit certain similar characteristics then it is expected that there should be relationships between these measures (Fjell & Walhovd, 2004). Researchers found relationships between thinking styles and measures of personality such as the Myers-Briggs type Indicator (Sternberg, 1994b), a short version of Holland's measure of personality types (Zhang, 2001) and the NEO Five-Factor Inventory which measures the Big-Five personality characteristics (Balkis & Isiker, 2005; Fjell & Walhovd, 2004; Zhang & Huang, 2001). Evidence of discriminant validity was provided as the TSI and the NEO-PI-R were not found to be intercorrelated and were therefore considered as measuring independent constructs (Fjell & Walhovd, 2004).

Evidence of cross cultural validity has been established as the thinking styles identified in the theory of mental self-government have also been identified amongst

respondents in a number of countries including Hong Kong (Zhang, 1999; Zhang & Sachs, 1997; Zhang & Sternberg, 1998), South Africa (Cilliers & Sternberg, 2001), Turkey (Balkis & Isiker, 2005) and Scandinavia (Fjell & Walhovd, 2004) and is therefore considered as a valid measure for use in different cultures.

The TSI has been assessed for its heuristic and predictive validity in educational settings and has been found to indicate significant relationships between styles of thinking and factors such as academic performance, performance in varying subjects and demographic characteristics such as birth order and socio-economic status (Grigorenko & Sternberg, 1997; Sternberg, 1997a; Sternberg & Grigorenko, 1995a). Grigorenko and Sternberg (1997) found that certain thinking styles significantly contribute to academic performance after scores on academic tests had been controlled for. The incremental validity of the TSI in predicting academic performance was supported by Zhang and Sternberg (1998) who replicated the findings in a Hong Kong setting, finding that thinking styles do serve as predictors of academic achievement over and above academic ability. Furthermore results indicated that students with tendencies towards particular thinking styles performed better on some forms of assessments than others (Grigorenko & Sternberg, 1997).

3.3.3. Demographic information sheet

A short questionnaire was included after the two measurement instruments. This questionnaire requested demographic information such as age, study field, gender, population group, level of education, home language and the respondent's self-reported proficiency in English (see Appendix C).

3.4. DATA COLLECTION PROCEDURE

Permission was obtained from the ethics committee of each of the various faculties (humanities, management, sciences and engineering) to sample 200 students from each faculty. Questionnaires, consisting of the two scales (Appendix A & B) as well as the biographical information sheet (Appendix C) were administered to groups of participants in their scheduled lecture periods and participants either completed the questionnaires in the lecture period or took them home and returned them by request of the instructor. All participants were provided with consent forms (see Appendix D) which explained the nature of the study and provided contact details of the researcher.

The nature of the study was explained to participants before the questionnaires were distributed. Participants were told that the study involved a research scale intended to investigate the relationship between thinking styles and career choice. Participants were not told that the survey included an EI questionnaire, to prevent response bias. Participants were assured that their participation was voluntary and that the results of their questionnaires would remain confidential and anonymous.

Respondents were not required to place their names on the completed questionnaires, however if they wanted to receive feedback on the thinking styles assessment measure, they could place an email address on the questionnaire. All respondents who returned completed questionnaires and requested feedback were sent personalised reports that detailed an interpretation of their scores on the thinking styles questionnaire. Further incentive included a packet of jelly sweets for each respondent who returned a completed questionnaire. The data collection period took approximately six weeks to complete.

3.4.1. Controlling for criticisms of the Schutte Self-Report Inventory

The SSRI scale has been criticised for a lack of reverse-keyed items (Petrides & Furnham, 2000a; Saklofske *et al.,* 2003) which could potentially lead to incorrect EI scores if respondents wish to manipulate their responses. In this study this concern was controlled for by providing respondents with the option of personalised results which only they would obtain. Schutte *et al.,* (1998) state that the SSRI would have value in assessing individuals who want a valid appraisal of their EI. It is therefore assumed that if respondents were to obtain some form of personalised benefit from filling in these results such as insight into themselves, they would be less likely to attempt to modify their responses to appear in a more favourable light.

Schutte and Malouff (1999) affirm that if respondents believe that the questionnaires will be used to assess them on some level they may respond in ways to make themselves look better than they are. Schutte and Malouff therefore recommend that the scale be given a nondescript title such as 'self-report scale' to prevent bias. Respondents were therefore not told that the scale was an EI scale, but rather only reference to the thinking styles questionnaire was made.

Schutte and Malouff (1999) state that the best way to obtain honest responses is for respondents to remain totally anonymous. Respondents were assured anonymity and confidentiality to encourage them to answer truthfully. Responses that appeared to have been filled in randomly were not included in the study. Palmer (2003) criticised research that was conducted on the SSRI by the original authors for containing only small sample sizes ranging from a high of n=77 to a low of n=24. This study has purposefully included a large sample of 309 respondents from diverse study fields in order to counteract the influences of small sample sizes.

3.5. DATA ANALYSIS PROCEDURES

3.5.1. Reliability and validity of the measurement instruments

The following statistical techniques were applied in testing the hypotheses using the Statistical Package for the Social Sciences (SPSS) computer program for Windows version 12.0. Before commencement of the analysis the data from the SSRI and TSI scores were transformed to aggregate scores using procedures to control for missing values. In scoring the SSRI, items 5, 28 and 33 for the SSRI were reverse coded and the sum of the scales were added together to provide a total EI score. The aggregate scores for each of the subscales of the TSI were obtained by calculating the mean of the items in each of the subscales.

To examine the *validity of the SSRI* an exploratory factor analysis method was used on the total sample. In the overview of previous research regarding the factorial validity of the SSRI it was discovered that a number of researchers have found a clear four-factor solution (Palmer, 2003; Petrides & Furnham 2000a; Saklofske *et al.,* 2003) as well as a satisfactory fit for the one-factor model (Ciarrochi *et al.,* 2001; Schutte *et al.,* 1998) identified by Schutte *et al.,* (1998). It was therefore decided to test for the factorial validity of the SSRI in order to determine whether the one-factor model or the four-factor model provided the best fit for the present data.

Exploratory factor analysis is used to discover the nature of the constructs that influence a set of responses (DeCoster, 1998). Confirmatory factor analysis is a complex factor analysis technique used to confirm or test certain hypotheses concerning the structure underlying a set of variables (Pallant, 2001).

In the initial development of the instrument Schutte *et al.,* (1998) used a principal component analysis with a varimax rotation and found that one strong general factor

emerged from the model. Principal component analysis and principal factor analysis are similar methods of exploratory analysis and produce similar results. The main difference between the two types of analysis is that a principal factor analysis is designed to be affected less by unique and error variability due to the focus on shared variance, whereas the principal component analysis uses all the variance in the variables (Pallant, 2001).

To minimise error the principal axis factor analysis with a direct oblimin rotation and the Kaiser normalisation was considered to be the best technique to examine the factor structure of the SSRI. A direct oblimin (oblique) rotation was used as the underlying constructs cannot be considered as independent, for example; a person cannot manage emotional information without first understanding it (Petrides & Furnham, 2000a).

Catell's scree test was used to study the slope of the plotted eigenvalues in order to determine the factor solution. The eigenvalue (Kaiser's criterion) for a given factor measures the variance in all the variables explained by that factor. If a factor has a low eigenvalue then it is contributing little to the explanation of variance in the variables and may be considered as redundant. Kaiser's criterion has been criticised for resulting in the retention of too many factors, therefore Catell's scree test is used to clearly determine the number of factors to use. The scree test shows a sharp drop levelling off to a flat tail as each successive component's eigenvalue explains less and less of the variances. The Catell rule is to pick all factors prior to where the plot levels off, or changes (Pallant, 2001).

Factor rotation is used to present the pattern of loadings in a manner that is easier to interpret. The direct oblimin rotation is an oblique rotation used to maximise the variance of the loadings of a factor on all the variables in a factor matrix, thereby minimising the number of variables which have high loadings on any one given factor. Each factor will tend to have either large or small loadings of particular variables on it (Pallant, 2001).

The groups of items that loaded highest on each factor were assessed for meaningful content and assigned headings. After the factors were created the correlations between them was compared using a Pearson's product-moment correlation to determine whether the correlations between the subscales were in the directions expected according to the Salovey and Mayer's (1990) model of EI on which the SSRI was based. This would provide support for the content validity of the factors (also referred to as subscales). Correlation scores indicate the degree to which two variables assess the same construct and vary between +1.00, which can be considered as a perfect positive correlation and –1.00, which indicates a perfect negative correlation. A score at or close to 0.00 indicates none or very little correlation between scores (Owen, 1996).

The *content validity of the TSI* was investigated through the use of Pearson's product-moment correlation coefficient. The validity was examined by measuring the intercorrelations among the subscales of the TSI to determine whether the relations shown were similar to those predicted by the theory of mental self-government (Sternberg, 1997a) and those reported in previous studies.

To ascertain the *reliability of the TSI and the SSRI,* estimates of internal consistency for the overall SSRI scale and the four identified subscales, as well as the overall TSI scale and the 13 category subscales were obtained using Cronbach's alpha.

3.5.2. Differences between groups on the total scale of the Schutte Self-Report Inventory and the subscales of the Thinking Styles Inventory

The *criterion group's validity* of the scales was assessed by examining differences between variations of the categorical variables; gender, age, language and culture. The following methods of analysis were used to assess the differences between groups on the total scale of the SSRI and the 13 subscales of the TSI. To explore

whether there were any significant differences for gender on the measurement instruments an independent samples t-test was conducted. To explore whether there were any significant differences for age on the measurement instruments, the data was analysed using the Pearson's product-moment coefficient (Pearson's r).

In order to assess the differences in EI for culture and language, a one-way analysis of variance (ANOVA) was used. The post hoc Scheffe test was used to control the likelihood of a type 1 error and to indicate where the specific areas of difference lie. To prevent the incidence of type 1 error from conducting ANOVA on a number of related dependent variables, a multivariate analysis of variance (MANOVA) was used to assess the differences in thinking styles for culture and language on the 13 subscales of the TSI.

3.5.3. Differences between study fields on the total scale of the Schutte Self-Report Inventory and the subscales of the Thinking Styles Inventory

The hypothesis that *scores on the total scale of the SSRI would differ depending on the study field of the respondent* was assessed using a one-way analysis of variance. The post hoc Scheffe test was used in order to determine the likelihood of a type 1 error and to indicate where the specific areas of difference lie.

The hypotheses that *scores on the subscales of the TSI would differ depending on the study field of the respondent* was assessed using a multivariate analysis of variance (MANOVA). To further control for the incidence of type 1 error a Bonferroni adjusted alpha level of $p < .003$ was used as the cut-off level for significance.

3.5.4. Relationship between the Schutte Self-Report Inventory and the Thinking Styles Inventory

The hypotheses that the *subscales of the TSI would correlate in certain predicted directions with the total scale of the SSRI* was assessed using Pearson's product-moment correlation coefficient. As explained previously a Pearson's coefficient indicates the strength and direction of the correlations between item scores on the various scales. If the relationships found between the TSI and the SSRI support the relationships predicted in the hypotheses, this would assist in establishing the validity of considering both EI and thinking styles as traits.

In order to determine whether *thinking styles are able to predict levels of EI,* a Stepwise multiple-regression procedure was used. Stepwise regression analysis was used with the total EI score and the four subscales of the SSRI defined as the dependent variables and the 13 subscales of the TSI defined as the independent variables. Stepwise regression was preferred as the procedure allows the construction of an optimal yet parsimonious model by only entering variables that contribute significantly to the predictive ability of the resultant model. The stepwise regression procedure would be the most suitable regression procedure for the study due to the large number of independent variables involved, as the variables which made insignificant contributions to the model would be eliminated. Stepwise regression develops a model made up of the independent variables that are the best predictors of the dependent variable.

3.5.5. Differences between groups on the subscales of the Schutte Self-Report Inventory

The differences between groups on the factors of the SSRI identified in the principal axis factor analysis were assessed. The gender differences on the subscales were assessed using a t-test. The differences between culture, language and study fields were assessed using a multivariate analysis of variance (MANOVA). To control for the incidence of type 1 error a Bonferroni adjusted alpha level of $p<.01$ was used as a cut-off for statistical significance. To explore whether there were any significant differences for age on the subscales of the SSRI, the data was analysed using the Pearson product-moment coefficient (Pearson's r).

3.6. SUMMARY

Chapter 3 provided a description of the methodology of the study as well as the history of the reliability and validity of the measurement instruments. The study design outlined was a quantitative correlational design with the purpose of testing the strength of correlations between several independent variables, such as age, gender, culture, language and study field and the dependent variables; the aggregate EI score and aggregate scores of each of the 13 categories of thinking styles. The relationship between EI and thinking styles was also investigated, as well as the ability of thinking styles to predict variance in EI. Further analysis included an assessment of differences between groups on the four EI subscales identified using a principal axis factor analysis. The population was comprised of 309 university students enrolled in final year and graduate courses at a South African university. Each participant completed the SSRI to measure EI, the Thinking Styles Inventory and a biographical information sheet. The results of the data analysis are presented in Chapter 4.

Chapter 5 provides a discussion of the findings, an overview of the limitations of the study and recommendations for future studies

CHAPTER 4
RESULTS

The following chapter reports the results of the study arrived at through analysis of the data using the SPSS statistical package v12.0. The purpose of this study was to explore the relationship between the levels of EI and the preferences for thinking styles of students in various subject fields. The population of the study consisted of graduate students and undergraduate students in final years of study sampled from a South African university.

The results of the study are presented in the different sections. Firstly an overview of the demographic characteristics of the sample is provided. The validity and reliability of the measures are reported beginning with the results of the principal axis factor analysis conducted on the SSRI, followed with the results of the Pearson's product-moment correlation conducted on the subscales of the TSI and concluding with the analysis of the reliability of the measures. The results of group differences in the EI and thinking styles of participants are reported specifically for age, culture, language and gender. The only difference found between the groups was for gender on the oligarchic subscale, the effect size however was small. Group differences were not viewed as a threat to the integrity of the results and therefore not controlled.

The results of the hypotheses tested are reported after the analysis of the groups. The results of the analyses used to examine the hypotheses that students would differ in terms of EI and thinking styles depending on the study field of the students, are reported first. The result of the Pearson's product-moment correlation used to assess the relationship between the scales of the two measures is then reported. Following this are the results of the multiple-regression procedure used to determine the extent to which thinking styles predict the variance in EI. The chapter concludes

with an analysis of the effects of group differences on the four factors (subscales) of the SSRI.

4.1. DESCRIPTION OF THE SAMPLE

A total of 309 respondents completed the Thinking Styles Inventory and 308 completed the Schutte Self-Report Inventory. The demographic characteristics of the sample are presented in Table 4.1.

Thirty-eight percent (38%) of the respondents were male and 62% were female. Thirty-two percent (32%) of the sample were from the humanities faculty, 13% were from the management faculty, 12% were from the engineering faculty and 42% were from the sciences faculty. Respondents who belonged to the white population group made up the majority of the sample due to the emphasis placed on English proficiency; 80% of respondents were White, 17% of respondents were Black and 3% were Asian or Coloured. Respondents who spoke predominantly Afrikaans at home formed the largest language grouping in the sample (52%), English respondents formed 30% of the sample and respondents who spoke an African language formed the remaining 17% of the sample.

The exact age which respondents provided ranged from 18 years to 58 years of age with a mean age of 22.37 and a standard deviation of 4.37. Eight respondents did not provide an exact age. The age distribution is positively skewed with respondents clustering in the lower age groups. The large range of ages was due to the emphasis on students in final years of study and students in post-graduate programmes. The distribution also has a positive kurtosis. The effects of skewness and kurtosis are nullified due to the large number of respondents. Respondents were provided with an option of selecting an age category, to which 309 participants responded. 24% were

between the ages of 18-20 years, 61% between the ages of 21-23 years, 10% between the ages of 24-28 years and 6% were over the age of 29.

Table 2: Description of the sample

Groups		n	%
Gender			
	Male	116	38
	Female	193	62
	Subtotal	309	100
Study Field			
	Humanities	99	32
	Management	41	13
	Engineering	38	12
	Sciences	131	42
	Subtotal	309	100.0
Age grouping			
	18-20	74	24
	21-23	187	61
	24-28	30	10
	29+	18	6
	Subtotal	309	100
Population Group			
	White	247	80
	Black	51	17
	Asian	10	3
	Coloured	1	0
	Subtotal	309	100
Language			
	English	93	30
	Afrikaans	162	52
	African language	53	17
	Subtotal	308	100

Total sample n=309

The bar graph depicted in Figure 3 shows the summaries of the means for the 13 TSI subscales in order of preference from the strongest to the weakest. Students overall appeared to have a stronger preference for the hierarchical, legislative and judicial styles which are more creativity generating and complex thinking styles. The styles

that were least preferred by students were the conservative, global and monarchic styles.

Figure 3: Profile of students preferred thinking styles
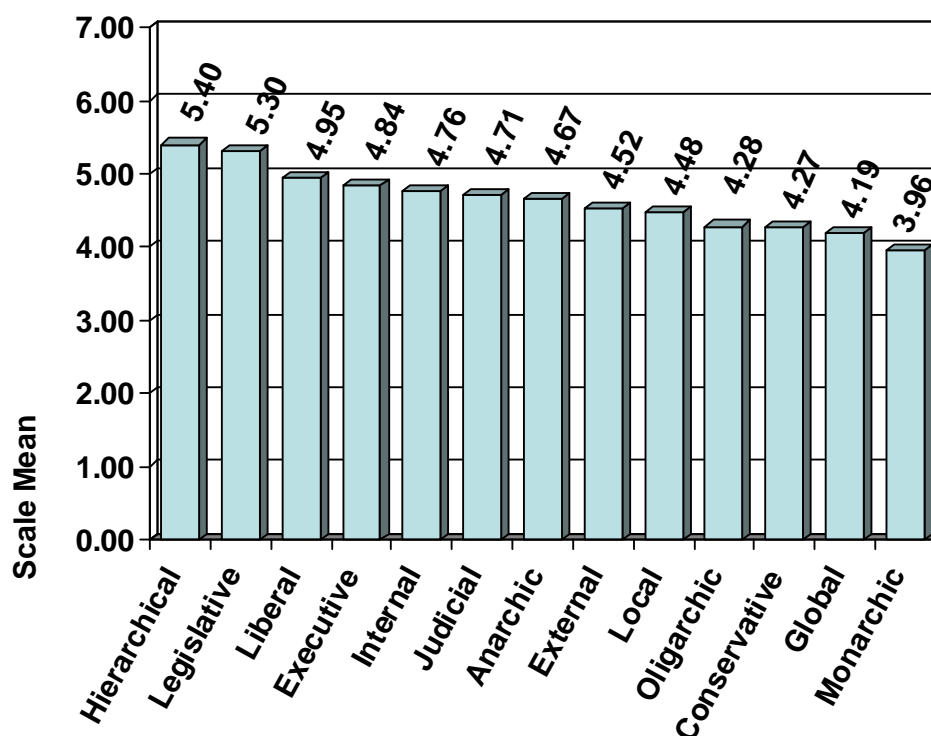
Total sample n=309

The histogram depicted in Figure 4 indicates that the total EI scores for students are skewed towards the positive end of the scale, with few students obtaining very low EI scores. The mean score for total EI was 128.22 with a standard deviation of 15.36. Schutte *et al.,* (1998) reported mean scores for two groups in the initial development of the SSRI. Therapists were recorded as obtaining a mean of 134.92 (SD = 20.25) and prisoners were recorded as obtaining a mean of 120.08 (SD=17.71). The findings from the present study indicate a mean value between these two scores, which is expected of a diverse university student population.

Figure 4: Student scores on the total scale of the SSRI
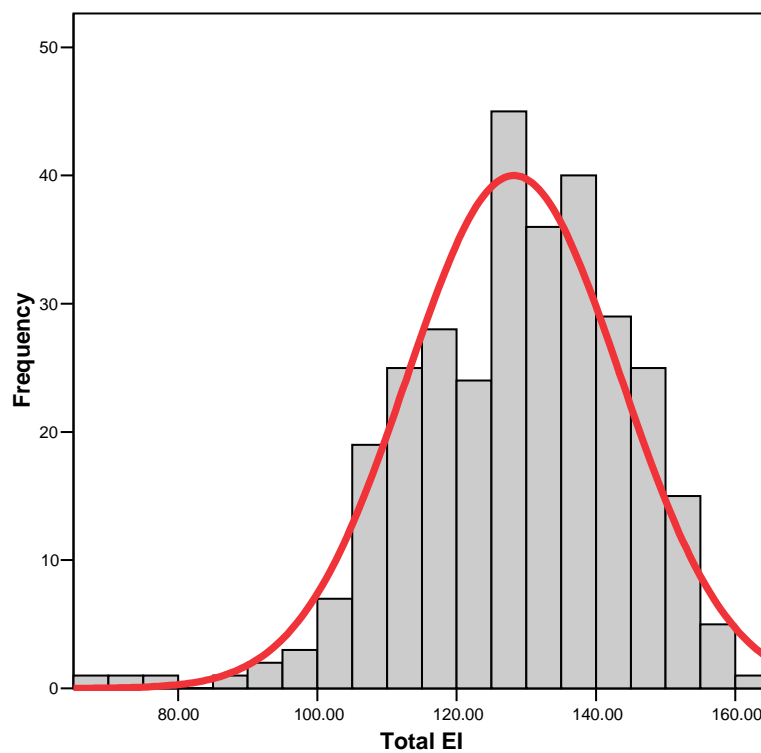
Total sample n=308

4.2. VALIDITY AND RELIABILITY OF THE MEASUREMENT INSTRUMENTS

To examine the validity of the SSRI an exploratory factor analysis was conducted to investigate the factor structure of the SSRI. To examine the validity of the TSI a Pearson's product-moment correlation was used to examine whether the relationships between the scales reflected the relationships predicted by the theory of mental self-government. Estimates of internal consistency for the total scale and subscales (factors) of the SSRI and the 13 thinking-style scales were obtained as Cronbach's alphas. The scales were found to be reliable and valid for the population used in the present study.

4.2.1. The factorial validity of the Schutte Self-Report Inventory

Principal axis factor analysis with a direct oblimin rotation was used to investigate whether one general factor could be extracted from the SSRI as claimed by Schutte *et al.,* (1998), or whether four factors could be extracted as found in previous research (Palmer, 2003; Petrides & Furnham 2000a; Saklofske *et al.,* 2003). Prior to performing the factor analysis, the suitability of the data for factor analysis was assessed. The correlation matrix revealed a number of coefficients of 0.3 and above. The Kaiser-Mayer-Oklin value was 0.87 which exceeded the recommended value of 0.6 (Pallant, 2001). The Bartlett's Test of Sphericity was statistically significant (p=.000). The sample size is greater than the recommended 150 respondents (n=309) and there were more than the recommended ratio of five cases for each of the variables or items (Pallant, 2001). The data was therefore considered as suitable for a factor analysis. All negatively worded items were reversed for the analysis of the data so that a higher numbered response on the Likert scale would represent a positive response.

The initial eigenvalues were inspected to determine the number of factors to use for the factor analysis. Initial eigenvalues with a total value higher than one indicates a strong extraction (Pallant, 2001) therefore all factors with eigenvalues below 1.0 were not reported in the results and can be seen as insignificant. Eight factors were found to have eigenvalues (Kaiser Criterion) exceeding 1.0 (see Table 3), this eight-factor model accounts for 44.90% of the total variance. Inspecting Catell's scree test revealed that the graph levelled off at the fifth factor (see Figure 5). Taking into account that the first four factors explain more variance than the remaining factors and that Mayer and Salovey's (1997) model on which the SSRI was also based identified four components of EI, it was decided to retain four factors for further investigation.

Table 3: Total variance explained for the overall scale of the SSRI before extraction

(Excluding factors with eigenvalues lower than one)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.410	25.484	25.484	7.874	23.861	23.861	2.753	8.344	8.344
2	2.468	7.480	32.964	1.960	5.938	29.799	2.341	7.095	15.439
3	2.031	6.155	39.119	1.498	4.540	34.339	2.315	7.017	22.455
4	1.538	4.662	43.780	.991	3.002	37.342	2.116	6.412	28.867
5	1.242	3.765	47.545	.679	2.057	39.399	1.984	6.012	34.879
6	1.191	3.608	51.153	.663	2.008	41.407	1.432	4.339	39.218
7	1.112	3.370	54.523	.636	1.927	43.334	1.095	3.320	42.538
8	1.014	3.072	57.595	.518	1.571	44.904	.781	2.366	44.904

Extraction Method: Principal Axis Factoring.

Figure 5: Scree plot for the overall scale of the SSRI

Scree Plot
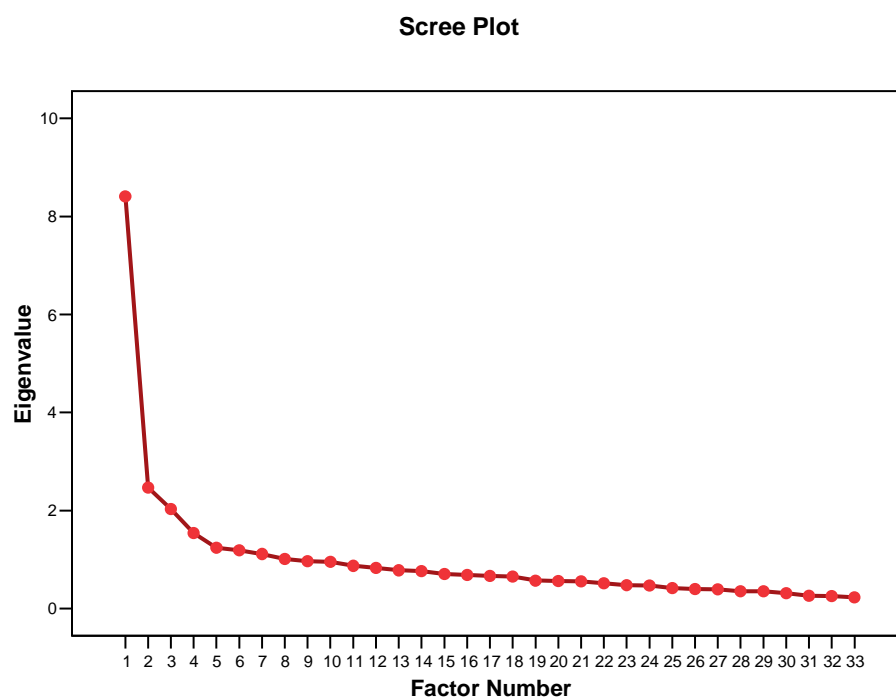
To aid in the interpretation of the four factors that were extracted, an oblique direct oblimin rotation with Kaiser normalisation was performed. The communalities after extraction are considered as high as none are below 0.2, which indicates that the items seem to be well defined by the factors (see Table 5). The four-factor solution explained a total of 36.30% of the variance (see Table 4). Examining the factor matrix (see Table 5) after the four factors were extracted did not reveal a simple structure, with items loading on more than one factor. The majority of the items loaded strongly on the first factor which supports Schutte *et al's* (1998) claim that the SSRI measures one general factor of EI. Petrides and Furnham (2000a) maintain that the scale is predisposed to a strong general factor due to the varimax rotation used to develop the original scale. The fourth factor which explains the lowest variance has few items loading on it.

Table 4: Total variance explained for the overall scale of the SSRI after extraction

(Excluding factors with eigenvalues lower than one)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings [a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.410	25.484	25.484	7.789	23.603	23.603	5.743
2	2.468	7.480	32.964	1.882	5.703	29.306	4.683
3	2.031	6.155	39.119	1.403	4.251	33.557	3.621
4	1.538	4.662	43.780	.905	2.742	36.299	3.139
5	1.242	3.765	47.545				
6	1.191	3.608	51.153				
7	1.112	3.370	54.523				
8	1.014	3.072	57.595				

Extraction Method: Principal Axis Factoring.
[a] When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 5: Factor matrix and communalities (h^2) for the four-factor solution of the SSRI

Item numbers	Factor 1	Factor 2	Factor 3	Factor 4	h^2
1	**.486**	-.041	.087	.030	.247
2	**.558**	**-.319**	-.001	.113	.426
3	**.337**	**-.387**	.131	.170	.310
4	**.504**	.131	-.024	.146	.294
5	**.358**	**.472**	.277	.241	.486
6	**.429**	.046	-.147	.044	.209
7	**.342**	.020	**-.337**	.000	.231
8	**.466**	.029	-.038	-.153	.243
9	**.592**	-.036	.165	-.118	.392
10	**.440**	**-.423**	.070	.015	.378
11	**.355**	-.022	-.182	**-.326**	.266
12	**.610**	-.196	.028	-.230	.465
13	**.456**	.038	-.167	-.164	.264
14	**.523**	-.212	-.107	-.121	.344
15	**.453**	.187	.213	-.093	.294
16	**.511**	-.005	.013	.076	.267
17	**.551**	-.060	-.298	.270	.470
18	**.565**	**.302**	.004	.134	.429
19	**.497**	-.063	**.351**	-.156	.398
20	**.570**	-.033	-.294	.190	.449
21	**.310**	-.260	**.398**	-.120	.336
22	**.482**	-.166	**.455**	-.242	.525
23	**.536**	**-.378**	-.040	.137	.450
24	**.570**	.055	-.031	.113	.341
25	**.563**	**.471**	.160	-.040	.565
26	**.392**	.177	-.249	-.264	.317
27	**.481**	-.025	-.280	-.087	.318
28	.277	-.132	.267	**.395**	.321
29	**.463**	**.436**	.014	-.080	.412
30	**.627**	.163	-.136	-.072	.443
31	**.581**	**-.308**	-.113	.080	.452
32	**.525**	.254	-.092	.069	.354
33	**.321**	**.309**	.267	.118	.284

Extraction Method: Principal Axis Factoring. 4 factors extracted. 7 iterations required
Factor loadings greater than 0.3 are shown in boldface. The items along with their numbers are shown in Appendix A

Table 6 displays the rotated pattern matrix which indicates a clearer distribution amongst the four factors. Pattern matrixes are used more frequently than structure matrixes because they show the unique relationships of items to factors and loadings represent the direct effects of factors on items. Factor loadings greater than 0.3 were considered as sufficient to assume a strong relationship between a variable and a

factor (Pallant, 2001). There were three items, items 6, 1 and 8 that had factor loadings less than 0.3. These items were removed from subsequent analysis with the identified factors and corresponding subscales.

Table 6: Pattern matrix for the four-factor solution of the SSRI

Item numbers	Factor 1	Factor 2	Factor 3	Factor 4
17	**.658**	.137	-.197	-.053
23	**.599**	-.101	.208	.016
20	**.592**	.146	-.155	-.132
31	**.578**	-.064	.167	-.095
2	**.541**	-.032	.234	.003
3	**.443**	-.116	.269	.190
10	**.432**	-.176	**.353**	-.001
24	**.356**	.297	.055	-.069
14	**.345**	-.058	.225	-.269
16	**.311**	.225	.117	-.055
7	**.330**	.031	-.171	-.272
6	.297	.170	-.034	-.156
1	.248	.196	.210	-.044
5	-.039	**.737**	-.015	.206
25	-.082	**.691**	.110	-.158
29	-.070	**.556**	.004	-.242
33	-.053	**.536**	.104	.124
18	.216	**.536**	-.036	-.065
32	.222	**.423**	-.066	-.158
15	-.047	**.396**	.269	-.108
4	**.303**	**.352**	-.010	-.030
30	.242	**.324**	.047	**-.319**
22	-.069	.134	**.699**	-.068
21	.014	-.003	**.577**	.066
19	-.003	.220	**.531**	-.066
12	.234	.007	**.410**	**-.316**
9	.151	.226	**.381**	-.161
8	.127	.151	.178	-.279
28	**.369**	.204	.124	**.443**
11	.043	-.042	.153	**-.475**
13	.173	.106	.077	**-.357**
27	**.333**	.041	-.019	**-.348**
26	.031	.146	-.008	**-.493**

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalisation. Rotation converged in 38 iterations.
Factor loadings greater than 0.3 are shown in boldface. The items along with their numbers are shown in Appendix A

After the factor analysis was performed, a score was calculated for each factor by obtaining the mean for all items comprising each factor. The items used in each of the factors can be found in Appendix A. The first factor accounted for 5.74% of the total scale variance after rotation of the factors and consists of items such as 'when I am in a positive mood, solving problems is easy for me'. The first factor will therefore be referred to as 'optimism' as the majority of the items refer to self motivation and positive emotions. The second factor accounted for 4.68% of the total scale variance and contains items such as 'I am aware of the non-verbal messages I send to others'. Factor two will be referred to as 'social skills' as the majority of the items refer to dealing with emotions in social contexts. The third factor accounted for 3.62% of the total scale variance. The items in this factor refer to recognising, awareness and control over emotions and will be referred to as 'appraisal' of emotions. The fourth factor accounted for 3.14% of the total scale variance and includes items that refer to active use of emotions. Items included in this section are 'I like to share my emotions with others' and 'I arrange events that others enjoy'. The fourth factor will therefore be referred to as 'utilisation' of emotions.

Examination of the items provided face validity for the subscales as the content of the items relate to the factor themes. The factor names are the same as those reported by Palmer (2003). The results of the principal axis factor analysis support the four factor solution found in previous studies (Palmer, 2003; Petrides & Furnham, 2000a). These four factors will be used in the remainder of the study as four subscales of the SSRI. Further analysis will include the factor scores as well as the total score due to the clear evidence of the scales multidimensionality (Petrides & Furnham, 2000a).

After the factors were defined[1] the relationships between the factors (referred to from here onwards as subscales) were investigated using Pearson's product-moment correlation coefficient. Preliminary analysis was performed to ensure that there were no violations of the assumptions of normality, linearity and homoscedasticity. Table 7 presents the correlation matrix for the correlations between the four subscales. All the

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[1] Item 28 was removed from the utilisation subscale due to low item-total correlation, see section 4.2.3

subscales were significantly correlated in a positive direction indicating that high scores on any of the subscales are associated with high scores on the remaining scales. This is expected as the four dimensions identified in Salovey and Mayer's (1990) model were assumed to be positively related and not independent. All the correlations between the subscales were strong except for the relationships between the optimism and social skills subscale (r=0.45) and the appraisal and social skills subscale (r=0.37) which were of medium strength. The subscales of the SSRI were therefore considered as valid for further analysis with the current sample.

Table 7: Pearson's correlation matrix for the correlations between the four subscales of the SSRI

Factor	Optimism	Social Skills	Appraisal	Utilisation
1. Optimism	1.000			
2. Social Skills	.445***	1.000		
3. Appraisal	.565***	.374***	1.000	
4. [a]Utilisation	.657***	.501***	.513***	1.000

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalisation.
***$p < 0.0001$
[a]Item 28 was removed from factor due to low item-total correlation, see section 4.2.3.
Total sample n=308

4.2.2. The validity of the Thinking Styles Inventory

The relationships between the subscales of the TSI were investigated using Pearson's product-moment correlation coefficient in order to contribute to the construct validity of the TSI. Preliminary analysis was performed to ensure that there were no violations of the assumptions of normality, linearity and homoscedasticity. The correlations between the 13 subscales of the TSI were in the direction predicted by the theory of mental self-government (Sternberg, 1997a) (see Table 8 for details).

The following correlations that supported the theory of mental self-government were reported in previous studies. Sternberg (1994b) found the following correlations: Global and local (r= -0.61, p<.001), liberal with legislative (r= 0.66, p<.001), conservative with legislative (r= -0.50, p<.001), conservative with executive (r= 0.59, p<.001) and liberal with conservative (r= -0.60, p<.001). Zhang and Sternberg (1998) reported the following correlations: executive and conservative (r= 0.63, p<.001), legislative and liberal (r= 0.41, p<.001), conservative and liberal (r= -0.14, p<.01), internal and external (r= -0.30, p<.001). The legislative and liberal styles are described as associated, as are the executive and conservative styles. Global and local styles are described as negatively correlated (Sternberg, 1994b).

In the present study the subscales were found to correlate in a similar manner; the correlation between the executive and conservative styles was 0.73 (p<.001), between the legislative and liberal styles was 0.70 (p<.001), between the conservative and liberal styles was -0.47 (p<.001), between the conservative and legislative was -0.28 (p<.001), between the global and local was -0.16 (p<.01) and between the internal and external styles was -0.48 (p<.001). The TSI scale was therefore considered to be a valid measure for this population.

Table 8: Pearson's correlation matrix for 13 subscales of the TSI

Subscale	1	2	3	4	5	6	7	8	9	10	11	12
1. Legislative												
2. Executive	-.15**											
3. Judicial	.35***	.28***										
4. Global	.26***	.03	.19**									
5. Local	.13*	.41***	.20***	-.16**								
6. Liberal	.70***	-.28***	.41***	.25***	.01							
7. Conservative	-.28***	.73***	.08	.06	.37***	-.47***						
8. Hierarchic	.23***	.47***	.45***	.08	.21***	.15**	.23**					
9. Monarchic	-.03	.27***	.12*	.29***	.26***	-.05	.42**	.06				
10. Oligarchic	.21***	.39***	.25***	.34***	.33***	.04	.41**	.27***	.42***			
11. Anarchic	.48***	-.06	.30***	.26***	.24***	.54***	-.13*	.02	.15**	.12*		
12. Internal	.45**	.11*	.28***	.13*	.27***	.24***	.10	.17**	-.03	.30**	.19***	
13. External	.15***	.10	.20***	.27***	.01	.27***	.01	.15**	.29***	.13*	.31***	-.48***

Total sample n=309
***p < 0. 001   **p < 0.01   *p< 0.05

4.2.3. Reliability of the Thinking Styles Inventory and the Schutte Self-Report Inventory

According to Schutte *et al.,* (1998) the SSRI has demonstrated a good internal consistency with a Cronbach's alpha reported of 0.90 for community members and 0.87 for college students. In the current study the Cronbach's alpha coefficient for the SSRI scale at a total level was found to be 0.90 with a mean of 128.22 and a standard deviation of 15.36. These values were found to be similar to results reported by Palmer (2003) for the overall scale. Palmer found the Cronbach's alpha for the overall scale to be 0.92, with a mean of 129.16 and a standard deviation of 15.82.

The Cronbach's alpha coefficients for the subscales of the SSRI defined according to the four factors identified in the principal axis factor analysis were good. The optimism subscale had a high Cronbach's alpha of 0.83. Item 28 of this scale had a low corrected item-total correlation (r=0.29), however as the overall reliability is high this item will be retained. The social skills subscale had a high reliability of 0.81 and the appraisal subscale had a good reliability of 0.76. The utilisation scale initially had a moderate reliability of 0.66, on examination of the item-total correlations it was evident that item 28 was inappropriate to this scale (r= -0.01). After removal of this item from the scale the total reliability increased to a level of 0.72.

Palmer (2003) reported Cronbach's alpha coefficients for subscales of the SSRI identified in the referred research of 0.84 for the optimism scale, 0.84 for the social skills scale, 0.78 for the appraisal scale and 0.67 for the utilisation scale. The scales identified in the current research, especially the utilisation scale, are similar to or improve on the reliability of the subscales identified in Palmer's research. Table 7 presents the Cronbach's alpha coefficients of the total scale of the SSRI and the four identified   subscales.

Table 9: Scale reliabilities (Cronbach's alpha), means and standard deviations of the total scale and subscales of the SSRI

Scale	N of items	Item numbers	M	SD	α
Total Scale	33	-	128.22	15.36	0.90
Optimism	14	2, 3, 4, 7, 10, 14, 16, 17, 20, 23, 24, 27, 28, 31	4.03	.50	0.83
Social Skills	9	5, 4, 15, 18, 25, 29, 30, 32, 33	3.81	.65	0.81
Appraisal	6	9, 10, 12, 19, 21, 22	3.90	.68	0.76
Utilisation	5	11, 13, 26, 27, 30	3.65	.60	0.72

Total sample n=308

The overall Cronbach's alpha coefficient obtained for the TSI was 0.90 for the total 104 items. As the total value is above 0.7, the scale was considered to be a reliable measure for examining the current sample (Pallant, 2001). The alpha coefficients ranged from 0.56 (local) to 0.87 (liberal) with a median of 0.79 (executive / legislative). These values are similar in magnitude to the Cronbach's alpha values reported by Zhang (2000, 2005b) and the majority of the subscales exceed the Cronbach's alpha reported by Zhang and Sternberg (1998) (See section 3.3.2.2). Only the internal, judicial and oligarchic scales have slightly lower Cronbach's alpha values as those reported in the 1998 study. The alpha coefficients obtained in the present study were however considered as acceptable for further statistical analysis. Table 10 presents the Cronbach's alpha for each of the 13 subscales established for the present study. Each of the 13 subscales consists of 8 items.

Table 10: Scale reliabilities (Cronbach's alpha), means and standard deviations of the TSI subscales

Subscale	M	SD	α
Hierarchical	5.40	0.92	0.82
Legislative	5.30	0.82	0.79
Liberal	4.95	1.02	0.87
Executive	4.84	0.94	0.79
Internal	4.76	0.91	0.74
Judicial	4.71	0.77	0.67
Anarchic	4.67	0.79	0.59
External	4.52	1.07	0.83
Local	4.48	0.77	0.56
Oligarchic	4.28	0.79	0.58
Conservative	4.27	1.06	0.85
Global	4.19	0.84	0.73
Monarchic	3.96	1.00	0.83

Total sample n=309

4.2.4 Differences between groups on the Schutte Self-Report Inventory and the Thinking styles Inventory

4.2.4.1. Gender differences in emotional intelligence and thinking styles

Table 11 presents the means and standard deviations for males and females on the total scale of the SSRI and Table 12 presents the means and standard deviations for males and females on the subscales of the TSI. An independent samples t-test was conducted to compare the differences in the mean scores on the total scale of the SSRI and the subscales of the TSI for males and females.

Table 11: Gender - means and standard deviations on the total scale of the SSRI

Scale	Males (n=115)		Females (n=193)		T-Test	Effect size (eta squared)
	M	SD	M	SD		
Total EI score	127.37	13.87	128.73	16.19	t(306) = -0.75, p=.45	.002

*p< 0.05

There was no significant difference found in scores for males and females on the total score of the SSRI. The magnitude of the differences in the means was very small (eta squared=.002). On the TSI subscales a statistically significant difference was found at the p<.05 level on the oligarchic subscale. Males (M=4.41, SD=0.81) were found to be more inclined to use an oligarchic thinking style than females [M=4.20, SD=0.77; t(307)=2.33, p=.02]. The magnitude of the effect size was small (eta squared =.017).

Table 12: Gender - means and standard deviations on the subscales of the TSI

Subscales	Males (n=116)		Females (n=193)		t-Test	Effect size (eta squared)
	M	SD	M	SD		
Hierarchic	5.38	0.91	5.40	0.93	t(307) = -0.18, p= .86	.000
Legislative	5.28	0.78	5.32	0.85	t(307) = -0.42, p= .67	.001
Executive	4.95	0.91	4.77	0.96	t(307) = 1.58, p= .11	.008
Liberal	4.87	0.96	5.00	1.06	t(307) = -1.05, p= .29	.004
Internal	4.81	0.89	4.73	0.93	t(307) = 0.76, p= .45	.002
Judicial	4.74	0.70	4.70	0.82	t(307) = 0.51, p= .61	.001
Anarchic	4.66	0.76	4.68	0.80	t(307) = -0.18, p= .86	.000
Local	4.51	0.71	4.46	0.80	t(307) = 0.59, p= .56	.001
External	4.49	1.08	4.55	1.07	t(307) = -0.44, p= .66	.001
Oligarchic	4.41	0.81	4.20	0.77	t(307) = 2.33, p= .02*	.017
Conservative	4.38	1.03	4.21	1.08	t(307) = 1.35, p= .18	.006
Global	4.21	0.81	4.17	0.86	t(307) = 0.44, p= .66	.001
Monarchic	4.06	1.03	3.91	0.99	t(307) = 1.26, p= .21	.005

*p< 0.05
.

Figure 6 presents the profile of thinking style preferences for males and females separately. The graph indicates similar results to the overall profile of students depicted in Figure 3. Both males and females had higher preferences for the hierarchic and legislative styles. Females had a higher preference for the liberal style than the executive style and males preferred the executive style over the liberal style. The global and monarchic styles were the styles least preferred by both groups.

Figure 6: Profile of student thinking styles by gender
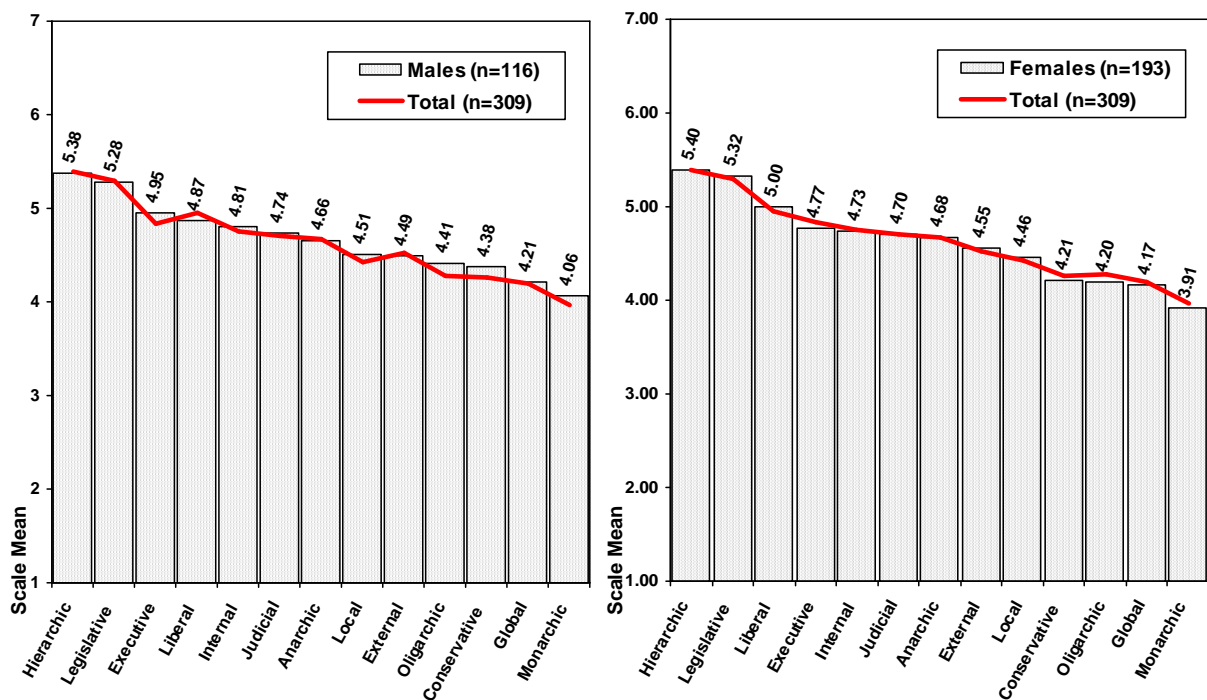
4.2.4.2. Age differences in emotional intelligence and thinking styles

The relationship between age as a continuous variable and the total score on the SSRI as well as the subscales of the TSI was examined using Pearson's product-moment correlation coefficient. No significant relationship was found between age and the total scale of the SSRI (r=0.05, n=300, p=.41) (see Table 13). There were also no significant differences found between age and the 13 subscales of the TSI.

For the 13 subscales, Pearson's co-efficient ranged from r= -0.06 (local, n=301, p=.29) to r=0.10 (monarchic, n=301, p=.10).

Table 13: Pearson's correlation matrix for age on the subscales of the TSI and the total scale of the SSRI

Scales	Number of responses	Exact Age	
Total EI	300	Pearson	.05
		Sig. (2-tailed)	.41
Legislative	301	Pearson	-.01
		Sig. (2-tailed)	.87
Liberal	301	Pearson	-.04
		Sig. (2-tailed)	.50
Conservative	301	Pearson	.04
		Sig. (2-tailed)	.54
External	301	Pearson	.04
		Sig. (2-tailed)	.51
Monarchic	301	Pearson	.10
		Sig. (2-tailed)	.10
Hierarchical	301	Pearson	-.03
		Sig. (2-tailed)	.60
Executive	301	Pearson	.04
		Sig. (2-tailed)	.51
Internal	301	Pearson	-.04
		Sig. (2-tailed)	.52
Global	301	Pearson	.01
		Sig. (2-tailed)	.86
Judicial	301	Pearson	-.06
		Sig. (2-tailed)	.29
Anarchic	301	Pearson	-.01
		Sig. (2-tailed)	.83
Oligarchic	301	Pearson	.02
		Sig. (2-tailed)	.74
Local	301	Pearson	-.06
		Sig. (2-tailed)	.29

4.2.4.3. Cultural and language differences in emotional intelligence and thinking styles

Cultural groups were assessed for differences in EI using a one-way analysis of variance (ANOVA) and for differences in thinking styles using a multivariate analysis of variance (MANOVA). Respondents were divided into three groups; White, Black and Asian. The means of the groups were compared on the scores of the total scale of the SSRI and the subscales of the TSI. Due to the small number of respondents in the Coloured group (n=1) this group was excluded from the analysis. The sample size of the Asian sample is small (n=10) therefore caution should be taken when drawing inferences from the results.

No significant differences were found on the total scale of the SSRI between the three groups [$F(2,304)=0.74$, p=.48]. Table 14 presents the means and standard deviations of the culture groups on the total score of the SSRI. There were no significant differences found between the three groups on the combined dependent variable thinking styles [$F(2,305)=1.46$, p=.07; Wilks' Lambda =.88; partial eta squared =.061] (see Table 15 for further details). To control for the incidence of type 1 error in using analysis of variance across a number of dependent variables, a Bonferroni adjusted alpha level of p<.003 was used as the cut-off level for significance. Table 16 presents the means and standard deviations of the culture groups on the subscales of the TSI.

Table 14: Cultural grouping - means and standard deviations on the total scale of the SSRI

Scale	Cultural Grouping	M	SD	ANOVA	Effect size (eta squared)
Total EI		128.22	15.36	F(2,304)=0.74, p=.48	.005
	White	127.82	15.62		
	Black	129.22	14.42		
	Asian	133.30	14.61		

Total (n=307), White (n=246), Black (n=51), Asian (n=10)

Table 15: Cultural & Language grouping - Wilks' Lambda results for the TSI subscales

Group	Wilks' Lambda Value	F	Hypothesis df	Error df	Sig.	Partial eta Squared	Noncent. Parameter	Observed Power(a)
Race	0.88	1.46	26.00	586.00	.07	.061	37.87	0.97
Language	0.91	1.12	26.00	586.00	.31	.047	29.19	0.83

Table 16: Cultural grouping - means and standard deviations on the subscales of the TSI

Subscale	Cultural Grouping	M	SD	MANOVA	Effect size (partial eta squared)
Legislative		5.30	0.82	F(2,305)=0.88, p= .41	.006
	White	5.27	0.82		
	Black	5.42	0.87		
	Asian	5.44	0.58		
Executive		4.84	0.94	F(2,305)=1.87 p= .16	.012
	White	4.82	0.94		
	Black	5.01	0.97		
	Asian	4.43	0.78		
Judicial		4.71	0.77	F(2,305)=0.34 p= .71	.002
	White	4.70	0.80		
	Black	4.79	0.72		
	Asian	4.71	0.48		
Global		4.19	0.84	F(2,305)=0.56 p= .57	.004
	White	4.18	0.86		
	Black	4.15	0.75		
	Asian	4.45	0.80		
Local		4.48	0.77	F(2,305)=1.61 p= .20	.010
	White	4.45	0.74		
	Black	4.66	0.86		
	Asian	4.40	0.81		
Liberal		4.94	1.03	F(2,305)=0.19 p= .83	.001
	White	4.98	0.99		
	Black	5.22	1.02		
	Asian	5.13	1.03		
Conservative		4.27	1.06	F(2,305)=1.02 p= .36	.007
	White	4.26	1.05		
	Black	4.40	1.07		
	Asian	3.90	1.25		

Hierarchical		5.40	0.92	F(2,305)=1.18 p= .31	.008
	White	5.36	0.91		
	Black	5.56	0.98		
	Asian	5.58	0.89		
Monarchic		3.96	1.00	F(2,305)=1.47 p= .23	.010
	White	4.01	1.02		
	Black	3.83	0.96		
	Asian	3.58	0.84		
Oligarchic		4.28	0.79	F(2,305)=0.69 p= .50	.005
	White	4.29	0.77		
	Black	4.27	0.94		
	Asian	3.99	0.30		
Anarchic		4.67	0.79	F(2,305)=4.70 p= .01	.030
	White	4.61	0.77		
	Black	4.97	0.85		
	Asian	4.75	0.76		
Internal		4.76	0.91	F(2,305)=0.28 p= .76	.002
	White	4.77	0.90		
	Black	4.77	1.03		
	Asian	4.55	0.77		
External		4.52	1.07	F(2,305)=0.33 p= .72	.002
	White	4.52	1.10		
	Black	4.47	0.94		
	Asian	4.78	1.03		

Total (n=308), White (n=247), Black (n=51), Asian (n=10)

Language groups were assessed for differences in EI using a one-way analysis of variance (ANOVA) and for differences in thinking styles using a multivariate analysis of variance (MANOVA). Respondents were divided into three groups; English, Afrikaans and other African languages, based on the language the respondent spoke most frequently at home. Due to the small sample sizes of the separate African language groupings all the African languages were combined into one group. The means of the groups were compared on the total scale of the SSRI and the subscales of the TSI.

No significant differences were found on the total scale of the SSRI between the three groups [F(2,304)=0.20, p=.82]. Table 17 presents the means and standard deviations of the language groups on the total score of the SSRI. There were no significant differences found between the three groups on the combined dependent variable

thinking styles [F(2,305)=1.12, p=.31; Wilks' Lambda =.91; partial eta squared =.047] (see Table 15 for further details). To control for the incidence of type 1 error a Bonferroni adjusted alpha level of p<.003 was used as the cut-off level for significance. Table 18 presents the means and standard deviations of the language groups on the subscales of the TSI.

Table 17: Language - means and standard deviations on the SSRI

Scale	Language	M	SD	ANOVA	Effect size (eta squared)
Total EI		128.20	15.38	F(2,304)=0.20, p=.82	.001
	English	128.16	14.48		
	Afrikaans	127.85	16.24		
	Other African	129.42	14.38		

Total (n=307), English (n=95), Afrikaans (n=162), Other African language (n=50)

Table 18: Language - means and standard deviations on the subscales of the TSI

Subscale	Language	M	SD	MANOVA	Effect size (partial eta squared)
Legislative		5.30	0.82	F(2,305)=0.42, p=.66	.003
	English	5.24	0.82		
	Afrikaans	5.33	0.84		
	Other African	5.34	0.79		
Executive		4.84	0.94	F(2,305)=0.05, p=.95	.000
	English	4.85	0.96		
	Afrikaans	4.82	0.94		
	Other African	4.86	0.96		
Judicial		4.71	0.77	F(2,305)=0.19, p=.83	.001
	English	4.72	0.77		
	Afrikaans	4.69	0.81		
	Other African	4.76	0.66		
Global		4.19	0.84	F(2,305)=0.22, p=.81	.001
	English	4.14	0.87		

		Mean	SD	F	η²
	Afrikaans	4.20	0.83		
	Other African	4.22	0.85		
Local		4.48	0.77	F(2,305)=0.42, p=.66	.003
	English	4.45	0.81		
	Afrikaans	4.47	0.73		
	Other African	4.57	0.82		
Liberal		4.95	1.02	F(2,305)=0.38, p=.68	.003
	English	4.88	1.04		
	Afrikaans	5.00	1.05		
	Other African	4.92	0.89		
Conservative		4.27	1.06	F(2,305)=0.04, p=.96	.000
	English	4.27	1.07		
	Afrikaans	4.27	1.06		
	Other African	4.31	1.05		
Hierarchical		5.39	0.92	F(2,305)=0.00, p=1.00	.000
	English	5.39	0.89		
	Afrikaans	5.39	0.93		
	Other African	5.39	0.99		
Monarchic		3.97	1.00	F(2,305)=2.53, p=.08	.016
	English	3.88	1.04		
	Afrikaans	4.08	0.97		
	Other African	3.77	1.00		
Oligarchic		4.28	0.79	F(2,305)=1.63, p=.20	.011
	English	4.21	0.70		
	Afrikaans	4.36	0.77		
	Other African	4.17	0.98		
Anarchic		4.67	0.79	F(2,305)=3.60, p=.03	.023
	English	4.59	0.70		
	Afrikaans	4.64	0.81		
	Other African	4.94	0.84		
Internal		4.76	0.91	F(2,305)=0.07, p=.93	.000
	English	4.74	0.76		
	Afrikaans	4.78	0.96		
	Other African	4.76	1.03		
External		4.52	1.07	F(2,305)=0.19 p=.82	.001
	English	4.53	1.00		
	Afrikaans	4.54	1.15		
	Other African	4.44	0.94		

Total (n=308), English (n=95), Afrikaans (n=162), Other African language (n=51)

4.2.5. Emotional intelligence in the humanities, management, sciences and engineering study fields

It was hypothesised that students in the fields of humanities and management studies would display higher levels of EI than students in the fields of engineering and sciences.

A one-way between-groups analysis of variance was conducted to explore the impact of the different study fields, humanities, management, sciences and engineering, on levels of EI as measured by the total scale of the SSRI. The results do not support the hypothesis of the study as there were no significant differences found for the four study fields on the total score of the SSRI [F(3, 304)=1.54, p=.20] (see Table 19).

Figure 7: Means of the study fields on the total scale of the SSRI
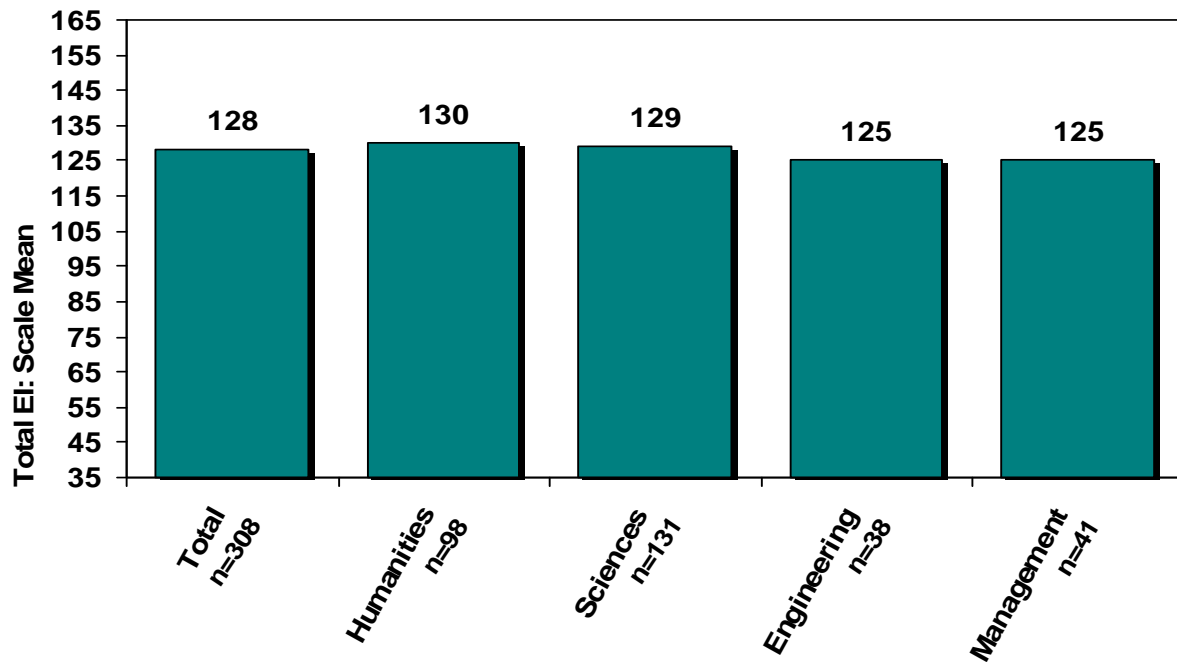
Table 19: Study fields - means and standard deviations on the total scale of the SSRI

Scale	Study Field	M	SD	ANOVA	Effect size (eta squared)
Total EI		128.22	15.36	F(3,1.54 304)=, p=.20	.015
	Humanities	130.10	16.06		
	Management	125.05	14.37		
	Engineering	125.39	11.53		
	Sciences	128.62	15.96		

Total (n=308), Humanities (n=98), Management (n=41), Engineering (n=38), Sciences (n=131)

4.2.6. Thinking styles in the humanities, management, sciences and engineering study fields

It was hypothesised that students in the fields of humanities and management studies would display predominately legislative, judicial, hierarchical, global, liberal and external thinking styles. It was also hypothesised that students in the fields of engineering and sciences studies would be more likely to display predominately executive, local, monarchic, conservative and internal thinking styles. In order to explore the impact of the different study fields; humanities, management, sciences and engineering, on thinking styles as measured by the 13 subscales of the TSI, a multivariate analysis of variance (MANOVA) was conducted. To control for the incidence of type 1 error a Bonferroni adjusted alpha level of p<.003 was used as the cut-off level for significance.

The results do not support the hypotheses as there were no significant differences found for the four groups on the combined dependent variable thinking styles [F(3,305)=1.15, p=.25; Wilks' Lambda =.86; partial eta squared =.049] (see Table 20

for further details). Table 21 presents the means and standard deviations of the study fields on the subscales of the TSI.

Table 20: Study fields - Wilks' Lambda results for the TSI subscales

Group	Wilks' Lambda Value	F	Hypothesis df	Error df	Sig.	Partial eta Squared	Noncent. Parameter	Observed Power(a)
Study Field	0.86	1.15	39.00	868.38	.25	.049	44.27	0.97

Table 21: Study fields - means and standard deviations on the subscales of the TSI

Subscale	Study Field	M	SD	MANOVA	Effect size (partial eta squared)
Legislative		5.30	0.82	F(3,305)=1.61, p=.19	.016
	Humanities	5.36	0.81		
	Management	5.06	0.87		
	Engineering	5.42	0.76		
	Sciences	5.31	0.82		
Executive		4.84	0.94	F(3,305)=1.61, p=.19	.016
	Humanities	4.91	0.92		
	Management	5.04	0.89		
	Engineering	4.87	0.90		
	Sciences	4.71	0.98		
Judicial		4.71	0.77	F(3,305)=0.94, p=.42	.009
	Humanities	4.67	0.77		
	Management	4.73	0.74		
	Engineering	4.90	0.68		
	Sciences	4.69	0.81		
Global		4.19	0.84	F(3,305)=1.75, p=.16	.017
	Humanities	4.28	0.87		
	Management	4.23	0.82		
	Engineering	4.33	0.67		
	Sciences	4.06	0.86		
Local		4.43	0.83	F(3,305)=0.51, p=.67	.005
	Humanities	4.43	0.83		
	Management	4.59	0.65		
	Engineering	4.55	0.77		
	Sciences	4.46	0.76		
Liberal		4.95	1.02	F(3,305)=1.70, p=.17	.016
	Humanities	5.01	1.00		

	Management	4.68	0.95		
	Engineering	5.18	0.92		
	Sciences	4.93	1.07		
Conservative		4.27	1.06	$F(3,305)=1.75$, p=.16	.017
	Humanities	4.39	1.01		
	Management	4.49	0.88		
	Engineering	4.18	0.90		
	Sciences	4.14	1.17		
Hierarchical		5.40	0.92	$F(3,305)=0.09$, p=.96	.001
	Humanities	5.39	0.93		
	Management	5.45	0.82		
	Engineering	5.43	0.82		
	Sciences	5.37	0.98		
Monarchic		3.96	1.00	$F(3,305)=3.26$, p=.02	.031
	Humanities	3.97	0.99		
	Management	4.19	0.94		
	Engineering	4.28	1.02		
	Sciences	3.79	1.00		
Oligarchic		4.28	0.79	$F(3,305)=3.65$, p=.01	.035
	Humanities	4.32	0.72		
	Management	4.47	0.72		
	Engineering	4.50	0.81		
	Sciences	4.12	0.84		
Anarchic		4.67	0.79	$F(3,305)=1.02$, p=.38	.010
	Humanities	4.67	0.79		
	Management	4.50	0.69		
	Engineering	4.79	0.73		
	Sciences	4.70	0.83		
Internal		4.76	0.91	$F(3,305)=0.78$, p=.50	.008
	Humanities	4.69	0.91		
	Management	4.66	0.78		
	Engineering	4.75	0.93		
	Sciences	4.85	0.95		
External		4.52	1.07	$F(3,305)=2.03$, p=.11	.020
	Humanities	4.69	1.13		
	Management	4.49	0.90		
	Engineering	4.67	1.09		
	Sciences	4.37	1.05		

Total (n=309), Humanities (n=99), Management (n=41), Engineering (n=38), Sciences (n=131)

Figure 8 depicts the profiles of thinking styles for each of the separate study fields ranked in order of preference. It is apparent that students in the management and humanities study fields prefer the hierarchic, legislative and liberal thinking styles which is in accordance with the expectations of the hypothesis. All the profiles

however follow a similar trend which is contrary to the predictions of the hypothesis. There are no further results that support the predictions made.

Figure 8: Means of the study fields on the total scale of the TSI
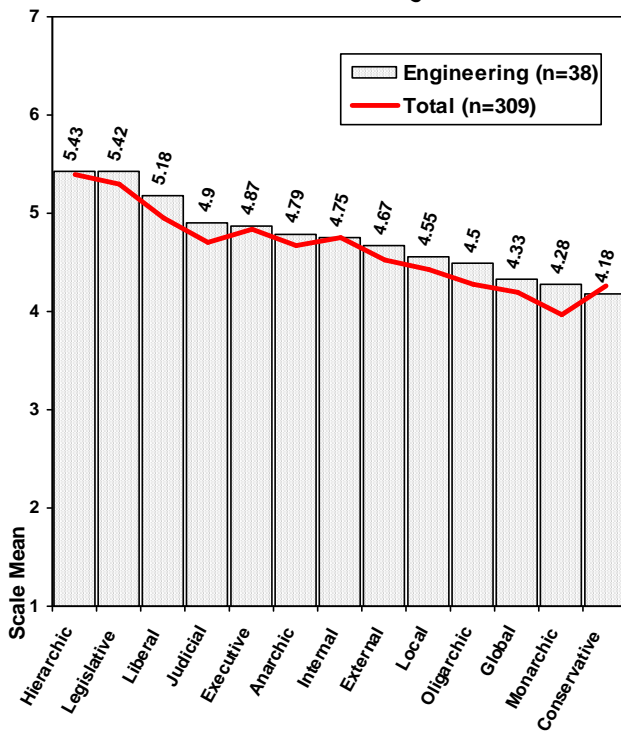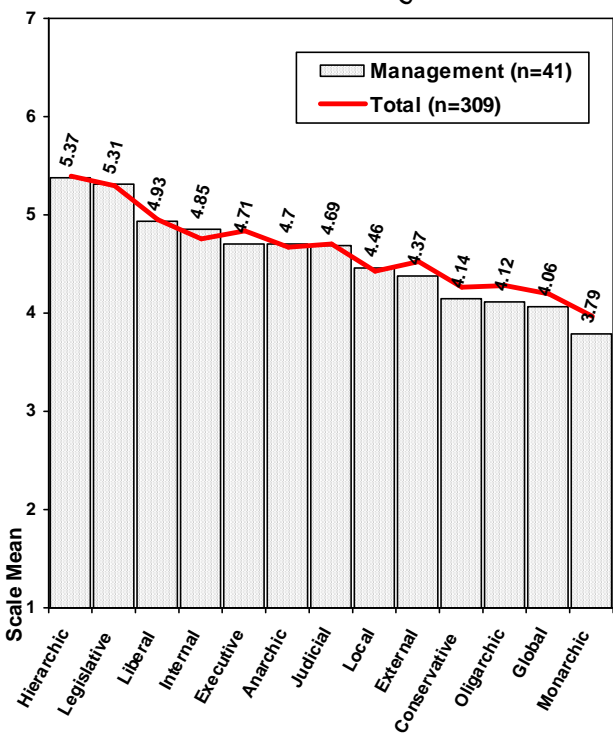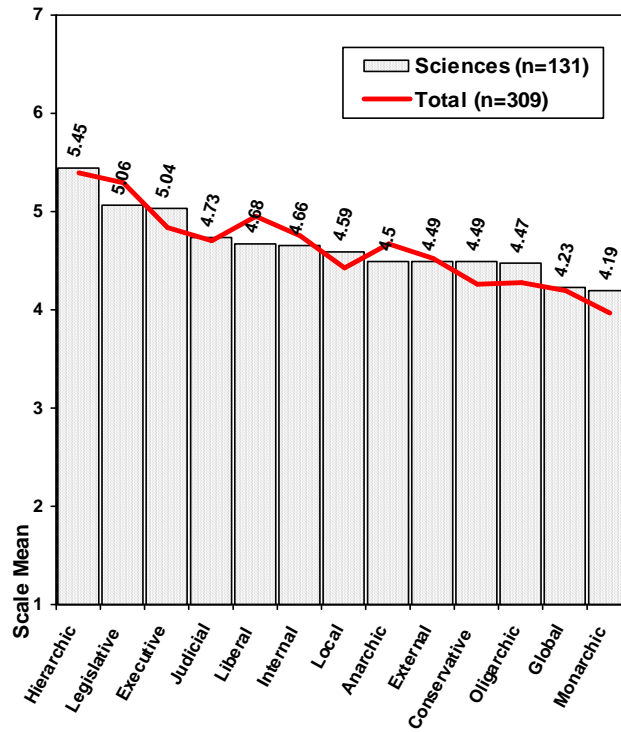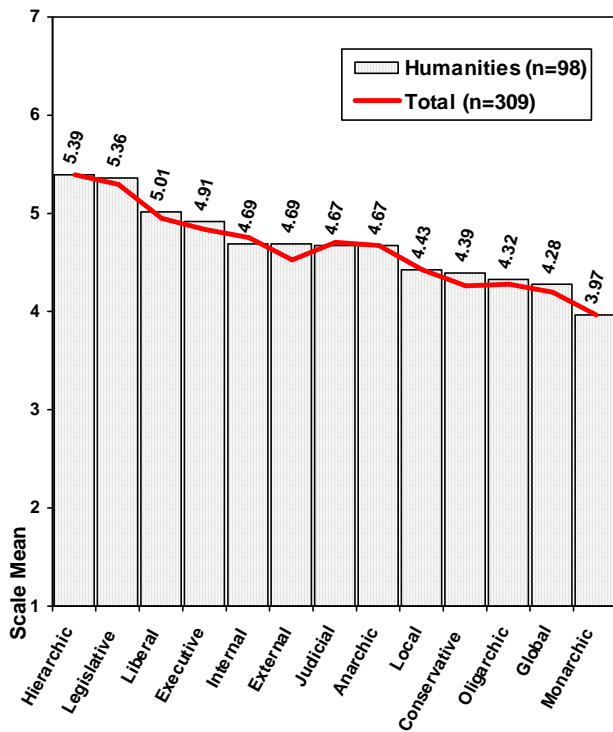
4.2.7. The relationship between thinking styles and emotional intelligence

The hypotheses that type I thinking styles (including the legislative, judicial, hierarchical, global and liberal styles) and external thinking styles (type III) would correlate positively with the overall score of the SSRI assessment measure and type II thinking styles (including the executive, local, monarchic and conservative styles) and internal thinking styles (type III) would correlate negatively with the SSRI assessment measure were investigated using Pearson's product-moment correlation coefficient. The subscales of the SSRI identified using the principal axis factor analysis were also assessed for correlations with the 13 subscales of the TSI.

The results of the Pearson's correlation matrix revealed significant relationships between a number of the subscales of the TSI and the overall SSRI scores. There was strong support for the hypothesis that type I thinking styles including the external thinking style (type III) would correlate positively with the overall score on the SSRI, as small yet significant correlations were found between the legislative (r=0.23, p<.001), hierarchical (r=0.29, p<.001), liberal (r=0.26, p<.001) and external (r=0.18, p<.001) thinking styles. The hypothesis that type II thinking styles including the internal thinking style (type III) would correlate negatively with the overall score on the SSRI did not obtain similarly strong support. The only style that obtained a significant negative correlation was the conservative style   (r= -0.12, p<.05). The strength of the relationship between the variables was however small. Table 22 presents the intercorrelations between the overall score on the SSRI and scores on the subscales of the TSI.

One correlation that did not support the predictions made was that the anarchic style was significantly correlated in a positive direction with the overall score on the SSRI (r=0.23, p<.001). The directions of the correlations indicated that students who had high levels of EI tended to use legislative, hierarchical, liberal, external and anarchic thinking styles and students who had low levels of EI tended to use the conservative style of thinking.

The majority of the correlations were in the predicted directions as all the type I thinking styles and the external thinking style correlated in a positive direction with the SSRI and a number of the type II thinking styles (local, conservative and monarchic) correlated in a negative direction with the SSRI total score. Executive and internal thinking styles were the only styles that correlated in opposite directions to the predictions made by the hypothesis. Although the findings were not significant, this seems to indicate a general trend that type I thinking styles are associated with high levels of EI and type II thinking styles are associated with low levels of EI.

The subscales of the SSRI were correlated with the TSI in similar directions. The optimism subscale correlated significantly with all of the type I thinking styles. Positive, medium strength correlations were found between the optimism subscale and the hierarchical ($r=0.32$, $p<.001$), liberal ($r=0.32$, $p<.001$) and legislative ($r=0.31$, $p<.001$) subscales. Small significant relationships were found with the anarchic ($r=0.26$, $p<.001$) (type III), judicial ($r=0.16$, $p<.01$) and internal subscales ($r=0.15$, $p<.01$). The only significant negative correlation found with the type II subscales was a correlation between the optimism scale and the conservative scale ($r= -0.11$, $p<.05$) which was of small strength.

The social skills subscale correlated positively with two of the type II subscales; the liberal ($r=0.16$, $p<.01$) and hierarchical ($r=0.14$, $p<.05$) subscales. The strength of the correlation was however small. The social skills subscale also indicated small significant correlations with the external style ($r=0.12$, $p<.05$) and anarchic style ($r=0.15$, $p<.01$) (type III). Significant yet small negative correlations were found for the type II styles, conservative ($r= -0.17$, $p<.01$), monarchic ($r= -0.13$, $p<.05$) and the type III oligarchic style ($r= -0.17$, $p<.05$).

Table 22: Pearson's correlation matrix for the subscales of the TSI and the total scale and subscales of the SSRI

TSI Subscale		Total SSRI	Optimism	Social Skills	Appraisal	Utilisation
Legislative	Correlation	**.231*****	**.307*****	.102	**.164****	.090
	Sig. (2-tailed)	.000	.000	.073	.004	.114
Executive	Correlation	.043	.088	-.044	.021	.071
	Sig. (2-tailed)	.455	.123	.439	.711	.214
Judicial	Correlation	.107	**.157****	.002	.057	.089
	Sig. (2-tailed)	.061	.006	.966	.321	.120
Global	Correlation	.021	.050	-.053	-.048	**.140***
	Sig. (2-tailed)	.714	.380	.355	.398	.014
Local	Correlation	-.019	.063	-.106	.011	-.044
	Sig. (2-tailed)	.744	.272	.063	.852	.437
Liberal	Correlation	**.255 *****	**.315*****	**.158****	.107	**.185****
	Sig. (2-tailed)	.000	.000	.005	.060	.001
Conservative	Correlation	**-.121 ***	**-.114***	**-.173****	-.045	.004
	Sig. (2-tailed)	.034	.045	.002	.436	.942
Hierarchical	Correlation	**.293 *****	**.324*****	**.141***	**.176****	**.216*****
	Sig. (2-tailed)	.000	.000	.014	.002	.000
Monarchic	Correlation	-.083	-.081	**-.133***	-.059	.057
	Sig. (2-tailed)	.147	.156	.019	.304	.323
Oligarchic	Correlation	-.023	.002	**-.168****	.080	.067
	Sig. (2-tailed)	.684	.970	.003	.161	.240
Anarchic	Correlation	**.232 *****	**.255*****	**.147****	.080	**.210*****
	Sig. (2-tailed)	.000	.000	.010	.164	.000

Internal	Correlation	.040	**.148****	-.043	.074	-.051
	Sig. (2-tailed)	.485	.009	.457	.197	.374
External	Correlation	**.184** **	.111	**.117***	.056	**.282*****
	Sig. (2-tailed)	.001	.052	.040	.326	.000

Total sample (n=308)
***p < 0.001   **p < 0.01   *p< 0.05

Small significant positive correlations were observed between the appraisal subscale and the type I thinking styles, hierarchical (r=0.18, p<.01) and legislative (r=0.16, p<.01). Small significant positive correlations were observed between the utilisation subscale and the type I thinking styles, hierarchical (r=0.22, p<.001), liberal (r=0.19, p<.01), global (r=0.14, p<.05) and the type III styles, external (r=0.28, p<.001) and anarchic (r=0.21, p<.001). A similar trend to the overall SSRI scale was apparent, that the type I thinking styles correlate in a positive direction and the type II styles correlate in a negative direction with the subscales of the SSRI.

4.2.8. Predicting emotional intelligence from thinking styles

In order to examine the contribution of the 13 thinking style subscales as predictors of total EI and the four subscales of the SSRI, a stepwise multiple-regression procedure was used. In a stepwise regression the order in which the variable is entered into the model is based on a statistical decision and not on theory. The first variable entered accounts for the most variance in the dependant measure and the remaining variables entered add the most to the ability of the regression equation to account for the variance in the dependent variable (Pallant, 2001).

As shown in Table 23, three of the 13 subscales were significant predictors of overall EI and all but three (executive, global and internal styles) of the 13 subscales were significant predictors of the EI subscales, although it varied from two to five thinking

styles subscales predicting each of the EI scales. The hierarchical (β=.33, t=6.01, p=.000), anarchic (β=.20, t=3.83, p=.000) and conservative (β= -.17, t= -3.09, p=.002) thinking styles together accounted for 16% of the variance in **total EI**. The hierarchical (β=.35, t=6.14, p=.000), liberal (β=.21, t=3.20, p=.002), anarchic (β=.19, t=2.99, p=.003), judicial (β= -.13, t= -2.06, p = .040) and monarchic (β= -.11, t= -1.99, p=.047) styles accounted for 20% of the total variance in the **optimism subscale**. The hierarchical (β=22, t=3.82, p=.000), oligarchic (β= -.19, t= -3.13, p=.002), anarchic (β=.15, t= -3.13, p=.002) and conservative (β= -.12, t= -2.00, p=.047) styles accounted for 10% of the total variance in the **social skills subscale**. The hierarchical (β=.15, t=2.56, p=.01) and legislative (β=.13, t=2.29, p=.023) styles accounted for 4% of the total variance in the **appraisal subscale**. The hierarchical (β=.31, t=5.08, p=.000), anarchic (β=.27, t=4.45, p=.000), external (β=.14, t=2.50, p=.013), local (β= -.12, t= -2.21, p=.028) and judicial (β= -.13, t= -2.05, p=.04) subscales accounted for 15% of the total variance in the **utilisation subscale**. The hierarchical style contributed to all of the EI scales, followed by the anarchic style which contributed to all of the EI scales except for the appraisal subscale.

Table 23: Predicting emotional intelligence scores from thinking styles

Variable	Total EI	Optimism	Social Skills	Appraisal	Utilisation
$\beta_{\text{Legislative}}$				0.13*	
β_{Judicial}		-0.13*			-0.13*
β_{Local}					-0.12*
β_{Liberal}		0.21**			
$\beta_{\text{Conservative}}$	-0.17**		-0.12*		
$\beta_{\text{Hierarchical}}$	0.33***	0.35***	0.22***	0.15*	0.31***
$\beta_{\text{Monarchic}}$		-0.11*			
$\beta_{\text{Oligarchic}}$			-0.19**		
β_{Anarchic}	0.20***	0.19**	0.15**		0.27***

β_{External}					0.14*
Adjusted R^2	0.16	0.20	0.10	0.04	0.15
F	19.76***	16.64***	9.01***	7.58**	12.17***
df.	(3, 304)	(5, 302)	(4, 303)	(2, 305)	(5, 302)

Total sample n=308
***p < 0. 001   **p < 0.01   *p< 0.05

4.2.9. Group differences in emotional intelligence on the subscales of the Schutte Self-Report Inventory

4.2.9.1. Gender differences

An independent samples t-test was conducted to compare the differences in the mean scores on the subscales of the SSRI for males and females. A significant difference was observed between males and females at the p<.05 level on the social skills subscale. Males (M=3.70, SD=0.62) were found to score lower on the social skills subscale than females (M=3.87, SD=0.66) (see Table 24). The magnitude of the effect size was small (eta squared =.017). No further significant differences were found on the subscales. Figure 9 presents the summary of means table graphically. It appears that although not statistically different, in general males tend to score higher on appraisal of emotions than females and females score higher on utilisation of emotions than males.

Figure 9: Summary of means for males and females on the subscales of the SSRI

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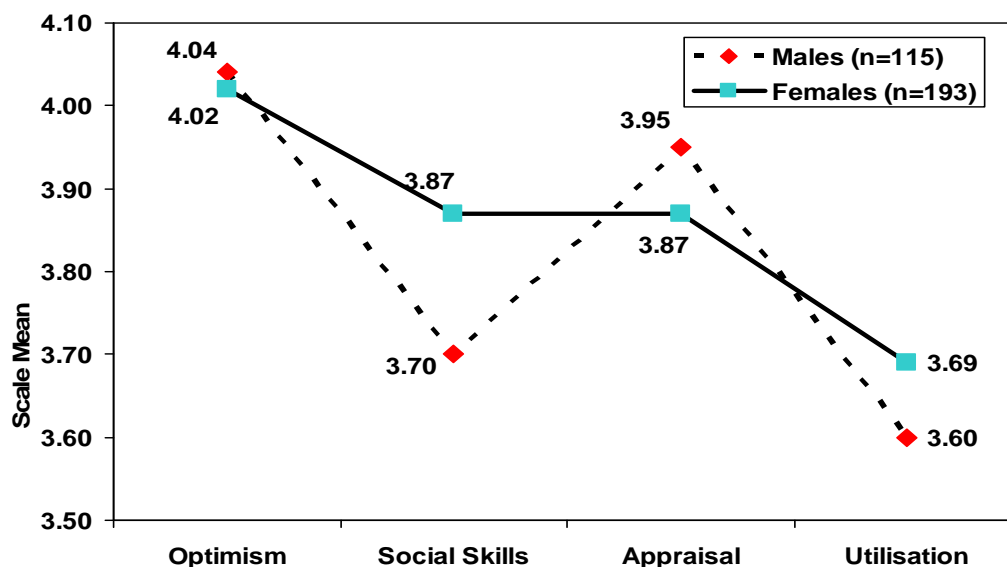
Table 24: Gender - means and standard deviations on the subscales of the SSRI

Subscales	Males (n=115)		Females (n=193)		t-Test	Effect size (eta squared)
	M	SD	M	SD		
Optimism	4.04	0.45	4.02	0.52	t(306) = -0.37, p= 0.72	.000
Social Skills	3.70	0.62	3.87	0.66	t(306) = -2.29, p= 0.02*	.017
Appraisal	3.95	0.61	3.87	0.71	t(306) = 0.99, p= 0.32	.003
Utilisation	3.60	0.57	3.69	0.61	t(306) = -1.29, p= 0.20	.005

Total sample n=308
*p< 0.05

4.2.9.2. Differences in study fields

A one-way multivariate analysis of variance was conducted on the study fields to determine whether there were any differences between the groups on the four subscales of the SSRI. To control for the incidence of type 1 error a Bonferroni adjusted alpha level of p<.01 was used as the cut-off level for significance. The post hoc Scheffe test was used to further control for the likelihood of a type 1 error and to indicate where the specific areas of difference lie

Respondents were divided into four groups; humanities, management, sciences and engineering, based on the faculty that the respondents were registered with. No significant differences were found on the combined subscales as a dependent variable between the four groups [F(3,304)=1.99, p=.02; Wilks' Lambda =.92; partial eta squared =.026] (see Table 25 for more details).

Table 25: Study fields - Wilks' Lambda results for the SSRI subscales

Group	Wilks' Lambda Value	F	Hypothesis df	Error df	Sig.	Partial eta Squared	Noncent. Parameter	Observed Power(a)
Study Field	0.92	1.99	12.00	796.66	.02	.026	21.06	0.88

Although the combined dependent variable indicated that there were no significant differences between the study fields on the subscales as a combined dependent variable, the between subjects effects indicated a significant difference on the social skills subscale of p<.01 (Bonferroni adjusted alpha level) [F(3,304)=4.55, p=.004]. The effect size was small to medium (partial eta squared =.043). Post-hoc comparisons using the Scheffe test indicated that the mean score for the humanities study field (M=3.94, SD=0.64) was significantly different from the engineering study field (M=3.54, SD=0.50). The management and sciences study fields did not differ significantly from the other groups. Table 26 presents the means and standard deviations of the study fields on the subscales of the SSRI. After examining the summary of means plot (Figure 10) it was apparent that the humanities study field scores higher on the social skills subscale than the engineering study field. Although not statistically significant it appears that the engineering students also tend to score lower on utilisation of emotions than humanities students.

Figure 10: Summary of means for study fields on the subscales of the SSRI
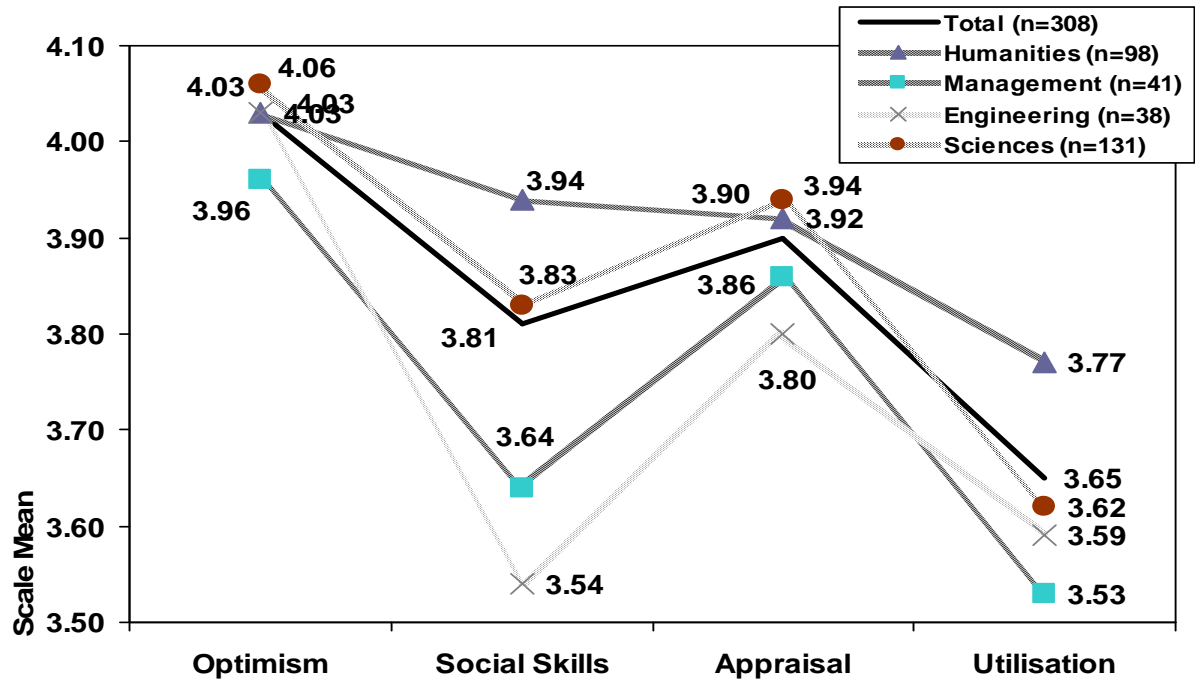
Table 26: Study field - means and standard deviations on the subscales of the SSRI

Subscale	Study Field	M	SD	MANOVA		Effect size (partial eta squared)
Optimism		4.03	0.50	F(3,304)=0.44,	p=.727	.004
	Humanities	4.03	0.54			
	Management	3.96	0.46			
	Engineering	4.03	0.43			
	Sciences	4.06	0.49			
Social Skills		3.81	0.65	F(3,304)=4.55,	p=.004	.043
	Humanities	3.94	0.64			
	Management	3.64	0.58			
	Engineering	3.54	0.50			
	Sciences	3.83	0.69			
Appraisal		3.90	0.68	F(3,304)=0.47,	p=.700	.005
	Humanities	3.92	0.70			
	Management	3.86	0.64			
	Engineering	3.80	0.62			
	Sciences	3.94	0.69			
Utilisation		3.65	0.60	F(3,304)=2.07,	p=.104	.020
	Humanities	3.77	0.54			
	Management	3.53	0.55			
	Engineering	3.59	0.56			

| | Sciences | 3.62 | 0.65 |

Total (n=308), Humanities (n=98), Management (n=41), Engineering (n=38), Sciences (n=131)

4.2.9.3. Differences in culture and language

A one-way multivariate analysis of variance was conducted on the criterion groups, culture and language to determine whether there were any differences between the groups on the four subscales of the SSRI. To control for the incidence of type 1 error a Bonferroni adjusted alpha level of p<.01 was used as the cut-off level for significance.

Table 27: Culture and Language grouping - Wilks' Lambda results for the SSRI subscales

Group	Wilks' Lambda Value	F	Hypothesis df	Error df	Sig.	Partial eta Squared	Noncent. Parameter	Observed Power(a)
Race	0.98	0.77	8.00	602.00	.63	.010	6.14	0.36
Language	0.99	0.38	8.00	602.00	.93	.005	3.04	0.18

Respondents were divided into three cultural groupings, White, Black and Asian. Due to the small number of respondents in the Coloured group (n=1) this group was excluded from the analysis. The sample size of the Asian sample is small (n=10) therefore caution should be taken when drawing inferences from the results. No significant differences were found on the combined subscales as a dependent variable between the three cultural groups [$F_{(2,304)}=0.77$, p=.63; Wilks' Lambda =.98; partial eta squared =.010] (see Table 27 for more details). Table 28 presents the means and standard deviations of the culture groups on the subscales of the SSRI.

Table 28: Culture grouping - means and standard deviations on the subscales of the SSRI

Subscale	Cultural Grouping	M	SD	MANOVA	Effect size (partial eta squared)
Optimism		4.03	0.50	$F_{(2,304)}=1.16$, p= .32	.008
	White	4.01	0.50		
	Black	4.10	0.44		
	Asian	4.19	0.58		
Social Skills		3.81	0.65	$F_{(2,304)}=1.02$, p= .36	.007
	White	3.79	0.65		
	Black	3.80	0.66		
	Asian	4.09	0.45		
Appraisal		3.90	0.68	$F_{(2,304)}=0.43$, p= .65	.003
	White	3.90	0.66		
	Black	3.99	0.67		
	Asian	3.88	0.78		
Utilisation		3.65	0.60	$F_{(2,304)}=0.12$, p= .89	.001
	White	3.65	0.59		
	Black	3.65	0.64		
	Asian	3.74	0.63		

Total (n=307), White (n=246), Black (n=51), Asian (n=10)

Respondents were divided into three groups; English, Afrikaans and other African languages, based on the language the respondent spoke most frequently at home. No significant differences were found on the combined subscales as a dependent variable between the three groups [$F_{(2,304)}=0.38$, $p=.93$; Wilks' Lambda $=.99$; partial eta squared $=.005$] (see Table 27 for more details). Table 29 presents the means and standard deviations of the language groups on the subscales of the SSRI.

Table 29: Language - means and standard deviations on the subscales of the SSRI

Subscale	Language	M	SD	MANOVA	Effect size (partial eta squared)
Optimism		4.03	0.50	$F_{(2,304)}=0.50$, $p=.61$	.003
	English	4.02	0.45		
	Afrikaans	4.02	0.53		
	Other African	4.09	0.45		
Social Skills		3.81	0.65	$F_{(2,304)}=0.19$, $p=.83$	.001
	English	3.83	0.63		
	Afrikaans	3.79	0.68		
	Other African	3.83	0.60		
Appraisal		3.90	0.68	$F_{(2,304)}=0.32$, $p=.73$	.002
	English	3.87	0.71		
	Afrikaans	3.90	0.66		
	Other African	3.97	0.66		
Utilisation		3.65	0.60	$F_{(2,304)}=0.02$, $p=.98$	.000
	English	3.65	0.60		
	Afrikaans	3.66	0.57		
	Other African	3.64	0.67		

Total (n=308), English (n=95), Afrikaans (n=162), Other African language (n=50)

4.2.9.4. Age differences

The relationship between age as a continuous variable and the four subscales of the SSRI was examined using Pearson's product-moment correlation coefficient. No significant relationship was found between age and any of the four subscales (see Table 30). Pearson's co-efficient ranged from r=0.01 (optimism, n=300, p=.82) to r=0.06 (utilisation, n=300, p=.27).

Table 30: Pearson's correlation matrix for age on the subscales of the SSRI

Subscales	Number of responses	Exact Age	
Optimism	300	Pearson	.013
		Sig. (2-tailed)	.820
Social	300	Pearson	.031
		Sig. (2-tailed)	.592
Appraisal	300	Pearson	.028
		Sig. (2-tailed)	.625
Utilisation	300	Pearson	.064
		Sig. (2-tailed)	.272

CHAPTER 5
DISCUSSION OF RESULTS AND CONCLUSION

5.1. SUMMARY OF THE STUDY

The aim of this study was to determine whether there is any relationship between study fields and EI or thinking styles. Specifically the aim was to determine whether an analysis based on EI or thinking styles could discriminate between students in different study fields. A further aim was to investigate the possible relationship that EI has to thinking styles, thereby assessing the validity of the perspective that EI and thinking styles both belong to trait theory. Specific attention was paid to the reliability and validity of the measurement instruments, both in terms of the acceptability of the measurement instruments for the present population and in terms of expected group differences between the scores.

The study was an exploratory correlational design and the population consisted of university students enrolled in final year or postgraduate courses at a South African university in Gauteng. A total of 309 students participated in the study. Students from four faculties were used to separate the sample into four groups of study fields namely humanities (n=99), management (n=41), engineering (n=38) and sciences (n=131). It was proposed that students registered for management and psychology courses would differ from sciences and engineering students in terms of thinking styles and EI. The instruments used to assess EI and thinking styles in this population were the Schutte Self-report Inventory (SSRI) (Schutte *et al.,* 1998) and the Thinking Styles Inventory (TSI) (Sternberg & Wagner, 1992). The TSI measures 13 categories of thinking styles and the SSRI measures one general level of EI. A principal axis factor analysis of the SSRI revealed four factors which were identified as subscales.

The SSRI was therefore analysed on a general level as well as according to the four subscales.

In the literature review, the relationship of EI to personality and cognitive ability were discussed, placing emphasis on the distinction between EI as a trait and EI as an ability. It was decided to focus this study on EI as a trait, which is based primarily on self-report measures. Thinking styles were similarly defined as a higher order personality trait. Both constructs were discerned as building a bridge between personality and intelligence (Zhang, 2001).

Four hypotheses were tested. The first hypothesis tested was that students in the fields of humanities and management studies would display higher levels of EI than students in the fields of engineering and science. The second hypothesis tested was that students in the fields of humanities and management studies would display predominately type I thinking styles (including the legislative, judicial, hierarchical, global and liberal styles) and external thinking styles (type III) as well as that students in the fields of engineering and sciences would display predominately type II thinking styles (executive, local, monarchic and conservative styles) and internal thinking styles (type III). The third and fourth hypotheses concerned expected relationships between EI and thinking styles. It was hypothesised that type I thinking styles (including the legislative, judicial, hierarchical, global and liberal styles) and external thinking styles (type III) would correlate positively with the overall score of the SSRI assessment measure. It was also hypothesised that both type II thinking styles (executive, local, monarchic and conservative styles) and internal thinking styles (type III) would correlate negatively with the SSRI assessment measure. No differences in variables such as age, language and culture were found. A difference was found for gender on the social skills subscale of the SSRI but this difference was small. Group differences were therefore not viewed as a threat to the integrity of the results and were not controlled for.

The results were analysed using the Statistical Package for Social Sciences (SPSS) version 12.0. A description of the sample as well as the sample profile in terms of EI and thinking styles was provided. The reliability and validity of the instruments were confirmed using Cronbach's alpha for reliability of measures. A Pearson's correlation co-efficient analysis was conducted to examine the relationship between the subscales of the TSI and a principal axis factor analysis was used to confirm the factor structure of the SSRI. The following groups; gender, age, culture and language, were analysed to determine whether there were any significant differences between the group members in terms of EI and thinking styles.

The hypotheses that study fields differ in terms of EI and thinking styles was investigated by testing the significant differences in TSI and SSRI scores between students from the different faculties. The hypothesis that EI and thinking styles measure similar constructs was investigated using Pearson's product-moment correlation to investigate the relationship between scores on the SSRI and TSI. A Stepwise multiple-regression was conducted to examine the contribution of the 13 subscales of thinking styles as predictors on the general measure and the four subscales of EI.

5.2. DISCUSSION OF THE RESULTS

5.2.1. The reliability and validity of the measurement instruments

The results of the study indicated that the two inventories were reliable as well as valid. Cronbach's alpha values were found to be acceptable for the total SSRI scale and were consistent with the Cronbach's alpha values reported in previous studies (Ciarrochi *et al.*, 2001, 2002; Palmer, 2003; Schutte *et al.*, 1998). The Cronbach's

alpha values were also found to be acceptable for the total TSI and the TSI subscales and were consistent with values reported in previous studies (Zhang, 2005b; Zhang & Sternberg, 1998). The validity of the TSI was confirmed by analysing the intercorrelations between the scale items. It was found that the items of the TSI scale correlate in the directions predicted by the theory of mental self-government (Sternberg, 1997a). As a result the TSI was considered to be a valid measure for the population of the present study.

The factor analysis results of the SSRI confirm the results of previous factor analysis studies of the SSRI (Palmer, 2003; Petrides & Furnham, 2000a; Ciarrochi *et al.*, 2002). Although this study confirms the four-factor structure of the SSRI, there is some disparity between the items belonging to the factors identified in previous studies and those found in the present study (see Appendix E for further details).

The optimism subscale was found to include four items (4, 7, 24 and 27) that were not part of the optimism subscale in the previous studies and to exclude three items (12, 21 and 22) that were previously included in the subscale. The social skills subscale was found to include three items (4, 30 and 33) that were not included previously, however item 33 was included in this subscale in the Ciarrochi *et al.*, (2002) study. Three items were excluded from the social skills subscale (9, 19 and 22) that were included in previous studies. The appraisal subscale contained the greatest number of differences with only item 12 having been used previously by Palmer (2003) in this subscale. Items 1, 6 and 8 were used previously in the appraisal subscale however these items were removed from use in the subscales of the present study as these items had low loadings on all the factors. The utilisation subscale also only had one item in common with previous studies, item 27. The utilisation subscale was removed from the study by Ciarrochi *et al.*, (2002) due to a low Cronbach's alpha. In the present study the utilisation subscale initially had a mediocre Cronbach's alpha however after item 28 was removed from the subscale, the Cronbach's alpha increased to an acceptable level.

Different studies have used different names to describe the factor subscales of the SSRI. The factor names used in the present study are consistent with those used by Palmer (2003) and Petrides and Furnham (2000a). The factor names used by Ciarrochi *et al.,* (2002) were based more on the dimensions upon which the scale was based (Salovey & Mayer, 1990) with 'optimism' labeled as 'managing self-emotions', 'social skills' labeled as 'managing other emotions' and 'appraisal' was labeled as 'perception of emotions'. As discussed previously the fourth factor was also labeled 'utilisation' but was excluded from the study due to low reliability.

On face value the groupings of the items in each of the subscales seemed to make substantive sense. There is however a certain degree of overlap between the subscales, with a few items loading on more than one factor. For example 'Other people find it easy to confide in me' taps into the optimism as well as the social skills factor. Further factor analysis of the SSRI is required in similar as well as different populations to validate the items used in the subscales and define the factors more clearly. The validity of the factors was further supported by examining the intercorrelations between the factors, which were found to correlate in the expected directions.

As examination of the variables used in the study would provide more insightful information if subscales were used in addition to the total scale, the subscales were therefore calculated from the factor items and used for additional analysis in the study. The Cronbach's alpha values of the optimism, appraisal and social skills factors were found to be good. The Cronbach's alpha values of the utilisation subscale was found to be higher than those reported in previous studies (Ciarrochi *et al.*, 2002; Palmer, 2003; Petrides & Furnham, 2000a), however there is room for improvement. Future research could therefore focus on improving the items in the utilisation subscale by possibly rewording items or by developing new items to better assess a person's ability to use emotions in thought (Palmer, 2003). The results from the subscales on the variables used in the study should however be considered as

tentative until further factor analysis studies have confirmed the item structures of the subscales of the SSRI.

Although previous research has cautioned against continued research with the SSRI (Petrides & Furnham, 2000a), the findings of this research support conclusions made by Palmer (2003) that the total scale and the subscales of the SSRI are reliable and that future research with the scale is not only warranted by necessity to clearly define the factors and provide clarity regarding the relationship between trait EI, personality and intelligence.

5.2.2. Group differences between emotional intelligence and thinking styles

Previous studies have found that EI (Palmer, 2003) and thinking styles (Cilliers & Sternberg, 2001; Sternberg & Grigorenko, 1995a; Zhang, 2002c, 2005b; Zhang & Sachs, 1997) can vary on one or more of the following demographic characteristics; age, gender, culture and language. It was therefore expected that similar results would be found for the present study. As a result analysis was conducted to identify possible significant differences based on the variables; age, gender; language and culture in order to determine whether there were any variables that could affect the outcome of the results and would need to be controlled.

Based on the results of the study there were no differences found for males and females for overall EI. Schutte *et al.,* (1998) found that females who had a mean score of 130.94 (SD=15.09) scored significantly higher on the total SSRI scale than males who had a mean score of 124.78 (SD=16.52). In the present study the means of the two groups were higher than those previously reported for males (M=127.37, SD=13.87) and lower than previously reported for females (M=128.73, SD=16.19). There was however a significant difference found on the social skills subscale of the

SSRI with females scoring significantly higher on social skills than males. This result is confirmed by Palmer (2003) who found similar differences on the social skills subscale of the SSRI.

Gender differences in EI have previously been explained by theorising that females are more empathetic and better at distinguishing emotions than males (Schutte *et al.,* 2001). The results of this study indicate that this may not be the case. Replication of the results with similar populations would be needed to test the hypothesis that gender differences may not have as significant an effect on EI as previously reported (Schutte *et al.,* 1998, 2001).

In the original model of EI outlined by Salovey and Mayer (1990), EI was reported as being based on underlying skills that can be learned and should therefore develop with age and life experiences. There was no significant relationship found in the results of the study between age and EI on the overall scale or any of the subscales. This finding is consistent with results reported by Palmer (2003) who also found no significant differences between the scales of the SSRI and age. The findings regarding the lack of a relationship between age and EI is possibly due to the concentration of ages present in the sample as the majority of respondents were students with a mean age of 22.7 and a standard deviation of 4.37. Further research is required with a wider range of age groups including a greater number of comparisons between adolescents and adult samples to fully assess the relationship between age and EI and determine whether EI does improve with age.

The theory of mental self government describes thinking styles as variable throughout the lifespan and socialised by learning and environmental influences (Sternberg, 1997a). It would therefore be expected that thinking styles would differ as a result of gender socialisation, cultural or language influences and age. Differences in thinking styles were found between males and females in a number of studies. Male students were found to have higher scores on thinking styles such as the legislative, judicial, global, liberal (Zhang, 2002c; Zhang & Sternberg, 2000), executive (Zhang, 2002c;

Zhang & Sternberg, 2002), monarchic (Zhang, 2002c) and internal styles (Zhang & Sternberg, 2000). Students who had additional life experience outside university such as travel and work experience (Zhang, 1999) were also found to be more inclined to use judicial, liberal and hierarchical styles than students who did not have similar experiences.

A significant difference was found on the oligarchic subscale of the TSI with males obtaining higher scores than females. This implies that males are more inclined to attempt many projects simultaneously and may have trouble setting priorities. The effect size of this difference is however small and has not been found in previous studies. It is therefore necessary to confirm the results of this finding in further studies before drawing inferences from it. No further differences were found between males and females, which is contrary to the findings of previous research.

As gender differences have been attributed to cultural socialisation (Cilliers & Sternberg, 2001), the lack of gender differences could be attributed to the stronger effect of socialisation of thinking stylus influenced by the teaching style of the university. Thinking styles have been described as traits that are socialised and learned through interaction with the environment (Sternberg, 1997a). As a result of the intensive interaction with the teaching styles and assessment methods used by the university as well as the logical and scientific reasoning taught to students in the final years of a degree or postgraduate studies, these students may have adapted their thinking styles to suit the needs of the environment.

There were no significant relationships between age and thinking styles on any of the 13 thinking styles categories. This finding is supported by Zhang (2001) who also found no relationships between thinking styles and age. Again the possible reason for the lack of differences is because of the concentration of ages and further research is required with varying age groups to determine whether thinking styles do vary across the life-span.

There were no significant differences found for language and culture on overall EI or any of the subscales. The lack of language differences is expected, as emphasis was placed in the study on a good level of English proficiency, therefore students who may have been hampered by language difficulties were excluded from the study. This is contrary to findings by Swart (1997) who found significant differences between students who belonged to Afrikaans and English language groups and participants who belonged to an African language group on EI. Language proficiency was however not controlled for in the referred study.

The present study did not confirm the results reported by Cilliers and Sternberg (2001) who found significant differences for English and Afrikaans groups on the 13 thinking styles categories. Possible reason for the lack of differences could once again be because the socialisation effect of the teaching styles employed by the university have a more pervasive effect on the thinking styles of the students than cultural or language forces. Further research is required to support the potential strength of effect of the teaching styles employed by educational institutions over the effects of cultural socialisation.

5.2.3. Differences in emotional intelligence and thinking styles for different career fields

The study hypothesised that students from different faculties would differ in terms of EI and that students from the humanities and management studies would have higher levels of EI than students from the engineering and sciences studies. The hypothesis was examined by computing an analysis of variance to assess whether differences between the career fields on the total scale of the SSRI was significant. The results of this study found no significant differences in EI between students from the different faculties. On the subscales of the SSRI, the humanities students were found to score

significantly higher on the social skills subscale than the engineering students. No further significant differences were found.

Schutte *et al.,* (1998) established in previous research that therapists (M=134.91, SD=20.25) scored significantly higher on the total score of the SSRI than prisoners (M=120.08, SD=17.71) and clients in a substance abuse treatment programme (M=122.23, SD=14.08). When the results of the scores of the students in the various study fields on the total scale of the SSRI were plotted graphically (see Figure 7) it was apparent that although not statistically significant, the mean of the humanities department (M=130.10, SD=16.06) is greater than the mean of the total sample as well as the other study fields. The mean of the humanities students is also a great deal closer to that of the therapist scores reported in Schutte *et al.,* (1998). It is recommended that subsequent studies examine these apparent trends to determine whether they can be replicated.

On the subscales of the SSRI, humanities students were found to score significantly higher on the social skills subscale than engineering students. The difference between humanities and engineering students on the social skills subscale also makes intuitive sense due to the increased emphasis placed in the humanities courses on team work, social skills and theories of human interaction.

A reason for the lack of a relationship between EI and career fields could be due to the nature of the measurement instrument. Van Staaden (2001) found that engineering and psychology students differed in terms of EI on an ability assessment measure. The SSRI is a self-report instrument which measures perceived levels of EI rather than actual abilities. It would therefore be beneficial to compare the differences between study fields on a measure of self-report and a measure of ability EI for different study fields to understand the similarities and differences between the two types of instruments.

An additional reason for the lack of difference in EI for students in different fields could be because students have not yet been placed in situations that require them to express or be aware of their own EI. Goleman (1998) states that often EI only emerges once people are in a given role or profession, for only then are people forced to confront their actual abilities regarding EI in social interaction. Future research is therefore necessary to compare EI across a variety of careers to determine whether EI does differ in different occupational environments.

A further hypothesis of the present study was that students from different study fields would differ in terms of thinking styles, specifically that students from the humanities and management studies would be more inclined to use legislative, judicial, hierarchical, global, liberal and external styles than students in engineering and sciences fields. It was also hypothesised that students in the fields of engineering and sciences would display predominately executive, local, monarchic, conservative and internal styles.

The results of the study did not support the hypothesis as no significant differences were found in thinking styles between students from different study fields. Contrary to expectations, the dominant thinking styles of all the study fields were the hierarchic, legislative and liberal styles. Students from the sciences department had a slightly different profile, preferring executive and judicial styles over liberal styles. This indicates that students from all four faculties prefer to use styles that are concerned with prioritising multiple tasks, formulating ideas and being creative and intuitive in problem solving tasks (Sternberg, 1997a).

Previous studies have found relationships between study fields and thinking styles. Cilliers and Sternberg (2001) found that arts, education and sciences students had different preference profiles for thinking styles. Arts students were found to prefer legislative and internal styles. Education students and natural sciences students were found to exhibit stronger preferences for the executive, global and conservative styles than the art students. The sample from the referred study was however based on first

year students and therefore the thinking styles displayed could reflect training received in the South African schools systems which has in the past been structured, systematic and focused on favouring analytical skills (Sternberg & Cilliers, 2001).

As suggested previously, the reason for the similarity of styles observed in the present study could be because the majority of the sample consists of final year and postgraduate students. Styles are described as varying across the life span and are modifiable depending on the demands of the current environment (Sternberg & Zhang, 2005). For many study fields the first year of study is focussed on structured learning of the content of the subject (Sternberg, 1997a). Towards the end of the degree course however more emphasis is placed on scientific reasoning, the generation of ideas and creative problem solving techniques for research proposals and students are required to work simultaneously on a number of projects. The nature of the expectations placed on students in these final years of study could therefore have prompted these students to adapt their thinking style preferences in order to be successful students. It is interesting to note that, although not significantly different from the other study fields, students from the sciences study field have a greater preference for executive and judicial styles over liberal styles which could be explained by the systematic approach and need for adherence to strict scientific rules required from empirical scientific research.

A further explanation for the uniformity in thinking styles could be the so called backwash effect. Zhang and Sternberg (2000) have found that often the type of assessment, the content of the curriculum and how teachers teach influences the ways in which students learn and think. Although thinking styles and teaching styles in initial years of study may be far more diverse (Cilliers & Sternberg, 2001), students in final years and postgraduate studies are being prepared through curriculum and assessment for research projects and dissertations that demand similar skills in creative problem solving and complex scientific thought. The findings of this study therefore support the claim made by the theory of mental self-government (Sternberg, 1997a) that thinking styles are socialised by the expectations of the environment and

that successful students adapt their thinking styles to suit their environment. The style profile displayed by the respondents consisted of predominantly type I styles which are considered to involve more complex and creative cognitive processing. It is understandable that students in higher levels of educational learning would display predominantly complex styles of thought as a great deal of logical processing is required of them to attain final years and postgraduate levels of study.

5.2.4. The relationship between emotional intelligence and thinking styles

The literature review provided evidence of EI as both a trait and an ability. The validity of the claim that EI as a trait is a different construct to EI as an ability would be supported by correlating a measure of trait EI with a similar instrument that also measures a higher order personality trait, namely that of thinking styles. The hypothesis of the study was that creative and complex thinking styles would correlate positively with EI and that norm-favouring and simple thinking styles would correlate negatively with EI. The significant relationships that have previously been found between thinking styles and personality (Zhang, 2001; Zhang & Huang, 2001) and EI and personality (Pérez *et al.,* 2005; Petrides & Furnham, 2000a; Van der Zee *et al.,* 2002) (see Chapter 2 for a detailed explanation) provide conceptual support for the relationship between the two constructs.

Strong support was obtained for the first hypothesis as the legislative, liberal, hierarchical and external thinking styles were positively and significantly correlated with EI. This indicates that people with high EI are generally people who know how to juggle multiple tasks without loosing sight of priorities, solve problems and deal with situations in new and creative ways that require complex thought and are group oriented, preferring to work with other people. A result that was not expected was that high EI was significantly correlated with anarchic style. The anarchic style was however significantly correlated with the legislative style which implies that creative

people are more inclined to ignore set guidelines and norms in their creative processing. It is therefore understandable that people with high levels of EI may defy normative and rule bound guidelines, preferring to deal with problems in creative and unique ways. The highest correlate of EI was the hierarchical style (r=0.29) followed closely by the liberal style (r=.26), anarchic style (r=0.23) and legislative style (r=0.23).

Partial support was obtained for the second hypothesis as the conservative approach was found to correlate with low EI. It stands to reason that people with low EI would prefer conventions and approach tasks according to standard ways of doing things. The remaining expected negative relationships between EI and the executive, local, monarchic and internal styles were not found, however the correlations were in the predicted negative directions. This implies that students in this sample who have high EI may still prefer to work independently, may prefer a structured working environment in certain situations using concrete examples rather than abstractions and favour approaching tasks in a systematic order.

Analysis with the subscales of the SSRI revealed similar relationships between thinking styles and the four factors of the EI scale, which make substantive sense. The social skills scale for example, is significantly positively correlated with the liberal, hierarchical, external and anarchic scales and significantly negatively correlated with the conservative, monarchic and oligarchic scales. People with good social skills are usually characterised as people who are outgoing, spontaneous and open to new ideas and meeting new people and like being involved in a variety of social situations. Understandably people with low EI would be more comfortable following conventions and working under structured situations and would therefore struggle with working on multiple tasks and setting priorities.

The significant positive correlations established between the utilisation subscale and the global, liberal, hierarchical, anarchic and external styles are also a good example. It is understandable that people who know how to use emotions effectively would be

able to use emotions to assist in the process of thinking creatively about solutions to problems, are able to prioritise emotional information, are outgoing and able to interact effectively in social situations and push the boundaries of norms and conformity.

The optimism subscale correlates significantly in a positive direction with the legislative, judicial, liberal, hierarchical, anarchic and internal styles as well as in a negative direction with the conservative style. It is conceivable that people who are able to approach difficult situations with optimism are people who are able to generate creative and new approaches to solving problems, are able to accurately evaluate other people and situations and are able to prioritise effectively. It is also credible that these people prefer not to apply more conventional solutions to problems. The positive correlation with the internal style is however unexpected and could be due to people who are less optimistic needing greater approval and guidance from other people.

The appraisal subscale correlates significantly in a positive direction with the legislative and hierarchical styles. It is conceivable that people who are able to accurately assess emotions would be able to effectively prioritise emotional information and have unique ways of assessing social cues.

The results from the multiple-regression analysis revealed that thinking styles were able to predict EI. According to these results three of the 13 thinking styles categories accounted for 16% of the variance in the total EI scale. The hierarchical and anarchic styles were positively predictive of general EI and conservative styles were negatively predictive of general EI. Between two and five thinking styles accounted for variance in the EI subscales ranging from 4% to 20%. Concerning the EI subscales, a number of predictive relationships were identified. The hierarchical, liberal and anarchic styles were positively predictive of 'optimism', whereas judicial and monarchic styles were negative predictors. The hierarchical and anarchic styles positively predicted 'social skills' however the oligarchic and conservative styles were negative predictors. The

hierarchical and legislative styles were positive predictors of 'appraisal' and the hierarchical, anarchic and external styles contributed positively to 'utilisation' whereas local and judicial styles contributed negatively.

It was anticipated that students who scored highly on the EI factors would also score highly on the type I styles including the type II external style and that students who had low scores on the EI factors would score highly on the type II styles including the type III internal style. Three of the five type I styles (legislative, liberal and hierarchical) and the external style have positively contributed to the prediction of one or more of the EI factors. This supports the prediction that high EI is related to the use of more creative, socially oriented and norm-questioning thinking styles. Three of the four type II styles (monarchic, conservative and local), have negatively contributed to the prediction of one or more of the EI factors supporting the prediction that low EI is related to the use of more norm-favouring and simplistic styles.

The relationship between the two inventories used in this study indicates that the trait approach to EI and Sternberg's (1997a) theory of mental self-government apply to similar but not identical constructs. Thinking styles and EI are two constructs that are viewed as contributing towards building a bridge between cognition and personality (Zhang, 2001). Styles in general show some promise for explaining academic and occupational performance that cannot be explained by differences in abilities (Sternberg, 1997b). The correlations found between the TSI and EI measures suggest that these two measures do touch on similar areas of unexplained space between cognition and personality, but do so in different ways.

5.2.5. Contributions of the study

From a research viewpoint, the results of this study has enhanced knowledge about EI and thinking styles. The first question raised was whether EI and thinking styles differed for different study fields. The results indicated that students in final years of study and postgraduate study have the same levels of EI and similar thinking style preferences. Sternberg (1997a) maintained that styles are socialised by the environment and the results of this study imply that the expectations of the learning environment, teaching styles of lecturers and methods of assessment affect the thinking style preferences of students. The second question raised was whether self-report measures of EI and measures of thinking styles are valid higher order personality traits. The relationships found between the total scales and subscales of the two inventories suggest that the two theories touch on similar constructs. Furthermore, this study has contributed to literature on the validity and reliability of the TSI and the SSRI instruments including the extension of the validity of these measures in different cultural contexts, specifically that of a university student population in Gauteng, South Africa.

The results of this study can be used on a practical level both within educational, clinical and occupational contexts. As the SSRI is susceptible to respondents presenting themselves in a favourable light (Schutte *et al.,* 1998), the measure would not be suitable for personnel selection, however the scale is useful for people who would want an honest assessment of their EI abilities. An assessment of EI abilities could be used to guide students who are considering entering careers where EI is regarded as important. EI testing can also be used within a clinical context to assist people who are having emotional difficulties in understanding their EI abilities especially when the subscales of the SSRI are used in addition to the total scale. Further validation of the subscales and of EI in different career contexts is however required.

An understanding of the nature of EI and whether it can be trained and developed would assist organisations in encouraging employees to perform better in teams, to collaborate effectively with people and to better understand and react to the needs of customers or clients. Further research is required to understand whether EI can be taught and learned and how trait EI affects academic performance as well as performance within actual work contexts.

Educational and career psychologists can use the TSI to assist students in obtaining insight into their thinking style preferences. As learning styles can be modified (Sternberg, 1990, 1994a, 1997a), an understanding of thinking styles can facilitate awareness in students of how they approach tasks as well as help them identify preferences for thinking styles. Students would therefore be able to use this information to not only capitalise on their strengths and compensate for their weaknesses but also to adapt to learning environments within which their own styles may not be compatible (Zhang & Sternberg, 2000). From an educational viewpoint it is important for lecturers to understand the relationship between teaching styles and thinking styles. Sternberg (2003a) found that when students were taught in a manner that suited their thinking styles, their academic performance improved. Teaching in a variety of styles would assist all students, regardless of their preferred thinking styles, in learning effectively. A career guidance counsellor could thereby aid students in exploring their career interests more holistically by using the TSI in combination with the SSRI to understand their EI and their preferences for certain thinking styles.

5.2.6. Limitations and directions for future research

There are several limitations to the findings of this study. The findings are based only on self-report data. Previous criticisms of self-report questionnaires state that observed correlations between measures could be attributed to the replication of results from using a similar self-report measure (Rosette & Ciarrochi, 2005). Another

limitation of self-report measures is that they are subject to reporting bias and based on perceptions of abilities rather than concrete measurement of those abilities. Further verification of the relationship between EI and thinking styles should also involve the use of ability measures of EI.

The research methods were correlational which raises the question of the direction of causation. It is possible that the relationship between EI and thinking styles is caused by some third unknown variable that underlies both constructs. For example both thinking styles (Zhang, 2001, 2002c) and EI (Van der Zee *at al.,* 2002; Van Rooy & Viswesvaran, 2004) have been found to correlate with personality measures; personality could therefore have a large impact on the interaction between the two constructs. To confirm the relationship between EI and thinking styles there is need for additional research between the two constructs especially using experimental studies such as interventions aimed at increasing EI by attempting to modify thinking styles or studies that control for the influences of personality and intelligence.

The lack of information about the teaching styles used by the lecturers limits the interpretation of the findings regarding the relationship between thinking styles and study fields. The effect of thinking styles appears to have been socialised by the specific teaching styles in which the students were taught. Students have been found to match the style profiles preferred by their teachers as well as the teaching styles encouraged by different schools (Sternberg & Grigorenko, 1995a). Further research is required to examine the relationship between teaching and learning styles within different educational institutions as well as during different stages of study (first year, third year, post-graduate and so on). This type of research would provide important information on the strength of the effect of expectations of the environment on the socialisation of thinking styles as well as the differences in styles between different institutions in South Africa. This would provide valuable information on how to expand teaching methods to reach more students and thereby possibly lowering drop-out rates.

As the study was performed among students the results cannot be generalised to occupational environments. The results may be very different within different career fields in workplace environments. In order to use these measures of EI and thinking styles in occupational environments to determine potential for success within different career fields, the predicative validity needs to be established against the criteria of measurable job success. There is also need for validation of the ability of EI or thinking styles to predict future performance. A longitudinal study is therefore needed which assesses new employees when they join a company to determine how EI and thinking styles change during the progression of a career.

The sample consists of a high percentage of Black and White students and may therefore not be generalisable to Asian (n=10) students and are not generalisable to Coloured (n=1) students. Further research is required to confirm the effects of cultural socialisation on thinking styles in more homogenous samples. The sample chosen was also restricted to students within one university in Gauteng. Additional studies with more heterogeneous samples would be required to replicate and extend the results of the study. As this was the first investigation to examine the relationship between thinking styles and EI, further investigations are required to replicate and define the relationship between the two constructs.

5.3. CONCLUSION

The goal of this research was to examine whether there were differences in EI and thinking styles for different fields of study. This study also examined the relationship between EI and thinking styles to confirm the claim that both constructs are higher-order personality traits. A further goal of this study was to validate the reliability of the EI and thinking styles assessment measures used.

In terms of differences between study fields, the results of the study confirmed that students from different study fields do not differ in EI and thinking styles, rather that the profiles across the study fields are similar. It can therefore be concluded that students in final years of undergraduate and postgraduate study generally prefer thinking styles such as the hierarchic, legislative and liberal styles that are more creativity-generating and complex.

The results of the study confirmed that there is a significant degree of overlap between the TSI and the SSRI indicating that the instruments measure similar but not identical constructs. Students who had high levels of EI preferred using legislative, liberal, hierarchic, external and anarchic styles which are more creative and norm-questioning. Students with low levels of EI preferred the conservative thinking style which is more norm-favouring and simplistic. Although correlations between the scales were low, they were statistically significant. It was also found that EI can be predicted by the hierarchic, conservative and anarchic thinking styles.

Confirmation was obtained for the reliability and validity of the SSRI and the TSI for the present sample. The four-factor structure of the SSRI proposed by previous studies (Palmer, 2003; Petrides & Furnham, 2000a) was confirmed by the results of the present study however further investigation is required into the definition and item allocation of the four identified subscales.

The study has made significant contributions to the understanding of thinking styles and of EI and the resulting relationships between them. As a result this study has further contributed to an understanding of how personality traits, intelligence and emotions interact in generating thought. The relationship between thinking styles and EI is therefore considered as worthy of further examination both within educational as well as occupational contexts.

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APPENDIX A – Schutte Self-Report Inventory (SSRI)

Schutte *et al.*, (1998)

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	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	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
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 recognise 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 recognise 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

APPENDIX B – Thinking Styles Inventory (TSI)

(Sternberg & Wagner, 1992)

Directions

Read each statement carefully and decide how well it describes you. Use the scale provided to indicate how well the statement fits the way you typically do things at university, at home, or on a job. Circle 1 if the statement does not fit you at all, that is, you almost never do things this way. Circle 7 if the statement fits you extremely well, that is, you almost always do things this way. Use the values in between to indicate that the statement fits you in varying degrees.

1	2	3	4	5	6	7
Not At All Well	Not Very Well	Slightly Well	Somewhat Well	Well	Very Well	Extremely Well

There are no right or wrong answers. Please read each statement and circle the number on the scale next to the statement that best indicates how well the statement describes you. Please proceed at your own pace, but do not spend too much time on any one statement. If you have any questions, feel free to ask them now.

1. When discussing or writing down ideas, I like criticising others' way of doing things.	1	2	3	4	5	6	7
2. I prefer to deal with specific problems rather than with general question.	1	2	3	4	5	6	7
3. I enjoy working on projects that allow me to try novel ways of doing thing.	1	2	3	4	5	6	7
4. When making decision, I tend to rely on my own ideas and ways of doing things.	1	2	3	4	5	6	7
5. When discussing or writing down ideas, I follow formal rules of presentation.	1	2	3	4	5	6	7
6. When talking or writing about ideas, I stick to one main idea.	1	2	3	4	5	6	7
7. When starting a task, I like to brainstorm ideas with friends or peers.	1	2	3	4	5	6	7
8. I tend to base my decisions only on concerns important to my group or peers.	1	2	3	4	5	6	7
9. When making a decision, I like to compare the opposing points of view.	1	2	3	4	5	6	7
10. I like to set priorities for the things I need to do before I start doing them.	1	2	3	4	5	6	7

11. I like situations or tasks in which I am not concerned with details.	1	2	3	4	5	6	7
12. When faced with a problem, I use my own ideas strategies to solve it.	1	2	3	4	5	6	7
13. In discussing or writing on a topic, I think the details and facts are more important than the overall picture.	1	2	3	4	5	6	7
14. I tend to pay little attention to details.	1	2	3	4	5	6	7
15. I like to figure out how to solve a problem following certain rules.	1	2	3	4	5	6	7
16. I prefer tasks dealing with a single, concrete problem, rather than general or multiple ones.	1	2	3	4	5	6	7
17. I like to control all phases of a project, without having to consult with others.	1	2	3	4	5	6	7
18. I enjoy working on different tasks that are important to my peer group.	1	2	3	4	5	6	7
19. I like situations where I can try new ways of doing things.	1	2	3	4	5	6	7
20. I like to do things in ways that have been used in the past.	1	2	3	4	5	6	7
21. I like to play with my ideas and see how far they go.	1	2	3	4	5	6	7
22. I am careful to use the proper method to solve any problem.	1	2	3	4	5	6	7
23. I like to deal with major issues or themes, rather than details or facts.	1	2	3	4	5	6	7
24. I enjoy working on things that I can do by following directions.	1	2	3	4	5	6	7
25. I like projects that allow me to look at a situation from a new perspective.	1	2	3	4	5	6	7
26. In talking or writing down ideas, I like to have the issues organised in order of importance.	1	2	3	4	5	6	7
27. I stick to standard rules or ways of doing things.	1	2	3	4	5	6	7
28. I prefer to read reports for information I need, rather than ask others for it.	1	2	3	4	5	6	7
29. When I have many things to do, I do whatever occurs to me first.	1	2	3	4	5	6	7
30. I like to memorise facts and bits of information without any particular context.	1	2	3	4	5	6	7

31. Before starting a project, I like to know the things I have to do and in what order.	1	2	3	4	5	6	7
32. I like problems where I can try my own way of solving them.	1	2	3	4	5	6	7
33. When trying to make a decision, I rely on my own judgment of the situation.	1	2	3	4	5	6	7
34. I can switch from one task to another easily, because all tasks seem to me to be equally important.	1	2	3	4	5	6	7
35. If I need more information, I prefer to talk about it with others rather than to read reports on it.	1	2	3	4	5	6	7
36. In a discussion or report, I like to combine my own ideas with those of others.	1	2	3	4	5	6	7
37. In trying to finish a task, I tend to ignore problems that come up.	1	2	3	4	5	6	7
38. When faced with opposing ideas, I like to decide which is the right way to do something.	1	2	3	4	5	6	7
39. I care more about the general effect than about the details of a task I have to do.	1	2	3	4	5	6	7
40. When working on a task, I can see how the parts relate to the overall goal of the task.	1	2	3	4	5	6	7
41. I like situations where I can compare and rate different ways of doing things.	1	2	3	4	5	6	7
42. When there are many important things to do, I try to do as many as I can in whatever time I have.	1	2	3	4	5	6	7
43. When faced with a problem, I like to work it out by myself.	1	2	3	4	5	6	7
44. I tend to break down a problem into many smaller ones that I can solve, without looking at the problem as a whole.	1	2	3	4	5	6	7
45. When I'm in charge of something, I like to follow methods and ideas used in the past.	1	2	3	4	5	6	7
46. When faced with a problem, I make sure my way of doing it is approved by my peers.	1	2	3	4	5	6	7
47. I use any means to reach my goal.	1	2	3	4	5	6	7
48. I like to check and rate opposing points of view or conflicting ideas.	1	2	3	4	5	6	7
49. I like to collect detailed or specific information for projects on which I work.	1	2	3	4	5	6	7
50. In dealing with difficulties, I have a good sense of how important each of them is and in what order to tackle them.	1	2	3	4	5	6	7

51. I like situations where I can follow a set routine.	1	2	3	4	5	6	7
52. When discussing or writing about a topic, I stick to points of view accepted by my peers.	1	2	3	4	5	6	7
53. I like tasks and problems that have fixed rules to follow in order to complete them.	1	2	3	4	5	6	7
54. I prefer to work on a project or task that is acceptable to and approved by my peers.	1	2	3	4	5	6	7
55. I like situations where the role I play is a traditional one.	1	2	3	4	5	6	7
56. When there are several important things to do, I do those most important to me and my peers.	1	2	3	4	5	6	7
57. When discussing or writing down ideas, I stress the main idea and how everything fits together.	1	2	3	4	5	6	7
58. I like projects that have a clear structure and a set plan and goal.	1	2	3	4	5	6	7
59. When working on a task, I like to start with my own ideas.	1	2	3	4	5	6	7
60. When there are many things to do, I have a clear sense of the order in which to do them.	1	2	3	4	5	6	7
61. I like to participate in activities where I can interact with others as a part of a team.	1	2	3	4	5	6	7
62. Before starting a task or project, I check to see what method or procedure should be used.	1	2	3	4	5	6	7
63. In doing a task, I like to see how what I do fits into the general picture.	1	2	3	4	5	6	7
64. I like to tackle all kinds of problems, even seemingly trivial ones.	1	2	3	4	5	6	7
65. Before starting a task, I like to figure out for myself how I will do my work.	1	2	3	4	5	6	7
66. When faced with a problem, I like to solve it in a traditional way.	1	2	3	4	5	6	7
67. I like to work alone on a task or a problem.	1	2	3	4	5	6	7
68. I tend to emphasise the general aspect of issues or the overall effect of a project	1	2	3	4	5	6	7
69. I like to follow definite rules or directions when solving a problem or doing a task.	1	2	3	4	5	6	7
70. When discussing or writing down ideas, I use whatever comes to mind.	1	2	3	4	5	6	7

71. When working on a project, I like to share ideas and get input from other people.	1	2	3	4	5	6	7
72. I feel happier about a job when I can decide for myself what and how to do it.	1	2	3	4	5	6	7
73. I like projects where I can study and rate different views or ideas.	1	2	3	4	5	6	7
74. I like situations in which my role or the way I participate is clearly defined.	1	2	3	4	5	6	7
75. When trying to make a decision, I tend to see only one major factor.	1	2	3	4	5	6	7
76. I like problems where I need to pay attention to details.	1	2	3	4	5	6	7
77. I like projects in which I can work together with others.	1	2	3	4	5	6	7
78. I like situations where I can focus on general issues, rather than on specifics.	1	2	3	4	5	6	7
79. I dislike problems that arise when doing something in the usual, customary way	1	2	3	4	5	6	7
80. I like to challenge old ideas or ways of doing things and to seek better ones.	1	2	3	4	5	6	7
81. When discussing or writing down ideas, I only like to use my own ideas.	1	2	3	4	5	6	7
82. I like situations where I interact with others and everyone works together.	1	2	3	4	5	6	7
83. I find that solving one problem usually leads to many other ones that are just as important.	1	2	3	4	5	6	7
84. When making a decision, I try to take the opinions of others into account.	1	2	3	4	5	6	7
85. I like working on projects that deal with general issues and not with nitty-gritty details.	1	2	3	4	5	6	7
86. I like situations where I can use my own ideas and ways of doing things.	1	2	3	4	5	6	7
87. If there are several important things to do, I do the ones most important to me.	1	2	3	4	5	6	7
88. I like to take old problems and find new methods to solve them.	1	2	3	4	5	6	7
89. I prefer tasks or problems where I can grade the designs or methods of others.	1	2	3	4	5	6	7
90. When there are several important things to do, I pick the ones most important to my peer group.	1	2	3	4	5	6	7

91. When faced with a problem, I prefer to try new strategies or methods to solve it.	1	2	3	4	5	6	7
92. I like to concentrate on one task at a time.	1	2	3	4	5	6	7
93. I like projects that I can complete independently.	1	2	3	4	5	6	7
94. When trying to make a decision, I try to take all points of view into account.	1	2	3	4	5	6	7
95. When starting something, I like to make a list of things to do and to order things by importance.	1	2	3	4	5	6	7
96. I enjoy work that involves analysing, grading, or comparing things.	1	2	3	4	5	6	7
97. I like to do things in new ways not used by others in the past.	1	2	3	4	5	6	7
98. When I start a task or project, I focus on the parts most relevant to my peer group.	1	2	3	4	5	6	7
99. I have to finish one project before starting another one.	1	2	3	4	5	6	7
100. In talking or writing down ideas, I like to show the scope and context of my ideas, that is, the general picture.	1	2	3	4	5	6	7
101. I pay more attention to parts of a task than to its overall effect or significance.	1	2	3	4	5	6	7
102. I prefer situations where I can carry out my own ideas, without relying on others.	1	2	3	4	5	6	7
103. I like to change routines in order to improve the way tasks are done.	1	2	3	4	5	6	7
104. When I start on a task, I like to consider all possible ways of doing it, even the most ridiculous.	1	2	3	4	5	6	7

APPENDIX C – Biographical Information Sheet

The information supplied in this section will be treated confidentially and full anonymity is insured. It will be used for research purposes only.

1. AGE

Would you please CIRCLE which of these age categories you fall into:

Category 1 : 18 - 20 Years . 01

Category 2 : 21 - 23 Years . 02

Category 3 : 24 - 28 Years . 03

Category 4 : 29+ Years 04

2. RACE

Would you please CIRCLE which of these race categories you fall into:

White 01
Black.................................... 02
Asian 03
Coloured.............................. 04

3. EXACT AGE

Please could you provide me with your completed age in years

_____

4. LANGUAGE

Could you please CIRCLE what language is mostly spoken in your home?

English................................ 01
Afrikaans 02
Zulu 03
S. Sotho.............................. 04
N. Sotho 05
Tswana................................ 06
Xhosa 07
Other : 08

5. SEX

Male 1

Female 2

6. STUDY FIELD

Would you please CIRCLE which of these study categories you are registered for:

Humanities (BA or BSoc Sci) …..…………...01
Management (B Com)………………….…....02
Engineering (B Eng)………….…………...03
Plant and Soil Sciences (BSc)…….......... ….04
Other………… ………..…….05 (Please specify)

_____

7. LEVEL OF EDUCATION

Please would you CIRCLE your completed academic level of study?

MATRIC (Grade 12) COMPLETED 01
UNIVERSITY DEGREE CURRENT YEAR:
    ACADEMIC YEAR 1……………..…………….02
    ACADEMIC YEAR 2……………..…………….03
    ACADEMIC YEAR 3……………..…………….04
UNDERGRADUATE DEGREE COMPLETE. 05
HONOURS COMPLETED 06
MASTERS COMPLETED 07
OTHER (SPECIFY) 08

_____

8. ENGLISH PROFICIENCY

How would you describe your ability to read and understand English

Very poor ……………… …....1
Poor……………………..…….2
Neither fair nor poor 3
Fair.......................................4
Good 5
Very good 6
Excellent 7

9. YEARS OF STUDY

How many completed years have you been studying at university?

_____

APPENDIX D – Information and Consent Form

Thank you for being prepared to participate

My name is Angela Murphy. I am a postgraduate student conducting research for degree purposes. I am conducting a survey and I wonder if I might ask you a few questions. The information supplied in this questionnaire will be treated confidentially and full anonymity is insured. It will be used for research purposes only. The name of your university or any personal details about you will under no circumstances be released to any third party.

The study as will be explained by the researcher before you begin, involves a few personal questions about the way that you think when handling certain tasks such as solving problems, making decisions or working on projects. There are also questions about the way in which you respond emotionally to certain situations. There are also a few personal questions about yourself and your demographic characteristics. This study is by no means intended to judge or evaluate you, but rather to research whether people in different study fields differ in the ways in which they think and interact with other people. As a result it is essential that you are as honest as possible when answering these questions. If you are willing to participate please sign below that you voluntarily consent to being a respondent in this research project and fully understand the process involved. If you are not willing to participate please feel free to leave the venue at any time.

In return for participating in this study I will offer you personalised results from the study which could help you in better understanding the way you think and you approach problem solving. This is for your personal use only and you are free to decide whether to receive these results or not. If you do wish to receive results please fill in your email address on the space provided below. Your personal results will never be made available to anyone other than yourself. If you have any questions please feel free to ask me now or contact me later at:

amurphyy@gmail.com

INFORMED CONSENT

If you are participating in the research please sign in the space provided below:

I am voluntarily participating in this research and fully understand that the results will be kept anonymous and confidential and will be used for research purposes only, not to be made available to any third party.

_____

Do you wish to receive personal feedback (Please make a bold tick)

Yes	
No	

Email address:

_____

APPENDIX E – Differences in factor loadings of items on the Schutte Self-Report Inventory between the present study and previous studies

	Item number		
Factor	**Present study**	**Palmer (2003)**	**Petrides & Furnham (2000a)**
Factor 1 Optimism	2	2	2
	3	3	3
	10	10	10
	14	14	14
	16		16
	17		17
	20		20
	23	23	23
	28	28	28
	31	31	31
	4		
	7		
	24		
	27		
		12	12
		21	21
			22
Factor 2 Social skills	5	5	5
	15	15	15
	18	18	18
	25	25	25
	29	29	29
	32	32	32
	4		
	30		
	*33		
		9	9
		19	19
		22	22

	Item number		
Factor	**Present study**	**Palmer (2003)**	**Petrides & Furnham (2000a)**
Factor 3 Appraisal		1	1
		8	8
	9		
	10		
	12		12
	19		
	21		
	22		
		4	4
		6	6
		11	11
		13	13
		16	16
		24	24
		26	26
		30	30
		33	33
			31
Factor 4* Utilisation**	11		
	13		
	26		
	27	27	27
	30		
			6
		7	7
		17	17
		20	20
			31
Items **6, 1 and 8 were dropped from the present study due to low loadings below 0.3			

Note: Items highlighted in grey load on more than one factor

* Ciarrochi *et al.,* (2002) defined item 33 as belonging to this factor as well

** Ciarrochi *et al.,* (2002) also dropped item 6 for the same reason

*** Ciarrochi *et al.*, (2002) dropped the utilisation factor due to low reliability (α =0.58)