

UNDERSTANDING GROUP EMOTIONAL INTELLIGENCE  
IN THE PUBLIC SECTOR

by

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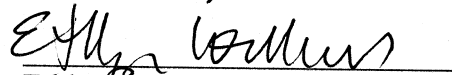
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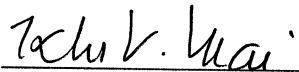
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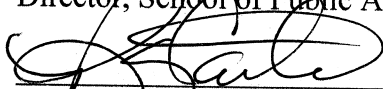
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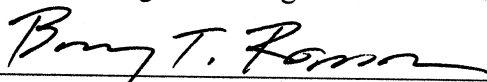
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## ABSTRACT

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In recent years behavioral management literature has created and utilized the concept of group emotional intelligence in work groups and work teams. This dissertation is a re-conceptualization and an empirical analysis of group emotional intelligence in the context of public administration work groups. This dissertation proposes a new conceptualization of GEI and utilizes it for the empirical measurement of GEI. By critically reviewing previous theoretical and empirical literature on group level phenomena and their measurement, this dissertation offers a re-conceptualization of group emotional intelligence. It also defines group emotional intelligence (GEI), creates a model for GEI, provides an empirical means of measuring (GEI) and demonstrates how GEI in groups can affect group performance and group learning ability.

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## INTRODUCTION

Past research has revealed the relationship between effective workgroups and organizational goals (Jordan & Troth, 2004). Considerable literature exists regarding how organizations can effectively utilize work groups and foster group development (Jordan & Troth, 2004; Belbin, 1981; Beyerlin, Johnson & Beyerlin, 1995). In the public sector, scholars have advocated the use of work groups for realizing organizational outcomes, such as increased organizational effectiveness, organizational learning as well as a better level of service in public sector organizations (Foldy and Buckley, 2010; Kalliola, 2003) . Scholars researching groups in public organizations have noted that bureaucratic rigidity and an adherence to procedure inherent in most public organizations may limit the ability of individual employees in terms of their performance and output (Foldy and Buckley, 2010). Yet individuals working together in groups can utilize collective knowledge and experience through group level processes (such as socialization and interaction amongst members) allowing the group to maneuver and manage bureaucracy in a more effective way (Foldy and Buckley, 2010). As Foldy and Buckley (2010) point out “significant social psychology and organizational behavior research attests to the importance of work group processes and characteristics in changing practice.”(p. 24).

Over the last couple of decades there has been increasing research on the importance of work groups in the public sector (Carnevale. 2003). Carnevale (2003)

argues that as organizational behavior in the public sector has shifted away from the scientific management ethos of Taylor and towards a more collaborative model of new public management, the importance of utilizing groups in the public sector has increased. Carnevale (2003) posits that the trend of new governmental thinking which emerged in the 1980's spurred the use of work groups and interdepartmental teams in governmental organizations as a means of enhancing the performance of the existing bureaucracy. Early work by Golembiewski (1959) emphasized the importance of groups in the public sector by stating that long standing groups with appointed leaders, and participative decision making processes tend to have greater stability and overall satisfaction amongst the members of the groups. The performance of such groups may also be considered greater than the performance of the traditional hierarchical, manager-subordinate relationship in bureaucratic governmental organizations (Golembiewski, 1959). As a result of this increasing emphasis on group behavior and group performance, there has been an increase in trying to understand group behaviors in the public sector.

To explain such benefits of work groups, scholars in management and administrative literature have conceptualized a number of constructs to explain group behavior. These conceptualizations have allowed analysis of interactions within the group as well as how such interactions can create group-level phenomena that may support beneficial results (Jehn and Mannix, 2001; George, 2002; George, 2000). Organizational researchers point out that the rapidly changing environment requires that groups become more adaptable and flexible. Consequently, the study of flexible, adaptable groups requires examining group level processes to explain group behavior.

Group Emotional Intelligence (GEI) is one such group-level construct, where the group utilizes its emotional intelligence to enhance group performance and output (Jordan & Troth 2004).

Critically analyzing the concept of group emotional intelligence (GEI) and how it relates to group and organizational performance is essential for improving both theory and practice. To gain a better understanding of GEI, this dissertation offers a background of the development of the concept of group emotional intelligence (GEI) in terms of its link to individual emotional intelligence, the means by which GEI is conceptualized, measured and its purported effects on group performance and group learning ability. In elucidating GEI, this dissertation illustrates the gaps in the theoretical conceptualization and empirical measurement of group emotional intelligence. To fill these gaps, this dissertation proposes a more complete understanding of GEI, which includes the definition of a model that can be measured, and providing hypotheses that posit an understanding of the effects of GEI on group and organizational performance. This dissertation improves our understanding of Group Emotional Intelligence through the following means: it provides a theoretical contribution of GEI; it re-conceptualizes GEI, and provides an operational analysis of GEI.

### **Theoretical contribution**

By utilizing past theoretical contributions and critically analyzing the current understanding of group emotional intelligence, this dissertation aims to provide a definition of group emotional intelligence (GEI) in terms of content (what the

constituent elements of group emotional intelligence are), its utilization (how the group employs GEI), and process (what are the processes that occur in the group that promote the creation of GEI). The theoretical analysis will explain the group level actions and abilities that constitute group emotional intelligence and how they affect the group, i.e. *what is GEI and what does it do?* In addition to providing a definition of GEI, this dissertation also provides empirical analysis of the concept such that a measurement of GEI can occur, i.e. *how can we measure GEI?*

Operationalization involves providing a means of measurement of GEI in organizational groups. The means of measurement allows for understanding how group emotional intelligence influences group abilities and group outcomes. The merit of researching a group level construct lies in its application and this dissertation proposes that an operationalization of the theory and its effects on group outcomes allows for research to be utilized by public service organizations. Past research in group emotional abilities have focused on how group emotion can affect group outcomes such as group learning ability, group performance and group effectiveness (Jordan & Troth, 2004; Jordan, Ashkanasy, Harte and Hooper, 2002). This dissertation aligns with past research in understanding the ways in which group emotional intelligence will affect group performance, group learning ability and group effectiveness i.e. *how do we understand the effects of GEI on group performance, group learning and group effectiveness?* The results obtained from the analysis demonstrate the ways in which public service organizations can utilize group emotional intelligence towards improving group effectiveness.

## LITERATURE REVIEW

### **Groups in the public sector**

Altman (1963) states that researching groups allows the scholar an ability to view "... the subject matter of all social sciences" (p. 204). Groups provide scholars with a micro perspective of certain behaviors such as economic behavior, negotiation and bargaining, establishing relationships with diverse partners, and creating norms of communication between disparate individuals (Altman, 1963). The study of group behavior also allows the researcher to understand the development and impact of societal processes such as norms and rules, and the ways in which individuals interact with each other and affect each other in terms of their personal self, their values and their belief systems (Klinger, Albanian, & Llorens, 2010; Altman, 1963).

The utilization of groups and teams in the public sector is a departure from the traditional methods by which individuals employees public administration were evaluated and motivated (Carnevale, 2003). Past understandings of organizational management in the public sector were based on classical organizational theory; the ideas of rationalism, specialization and individual output (Henry, 2010; Carnevale, 2003). Weber's (1946) conceptualization of a rigid, rule oriented hierarchical order, coupled with Taylor's (1911) idea of the individual worker requiring supervision using controlled and structured methods of performing tasks meant that the output of the individual employee

was the means by which an organizations assessed employee performance. The utilization of groups towards completing organizational goals was not the de facto mode of assessing organizational output. In fact, Carnevale (2003) points out that, “Groups were feared; they threatened control ... They did not fit in with the structure of things, work processes based on long like technologies or assembly-line ways of accomplishing tasks in factories and offices” (p. 81). However, after the Hawthorne Studies became prominent, a new understanding of work and organizational output emerged (Carnevale, 2003). These ideas stressed the importance of cooperation and collaboration between employees as well as between employees and supervisors, allowing for the utilization of shared knowledge and shared expertise towards addressing organizational goals. The concepts of collaboration and cooperation were taken further by the emergence of different styles of management in the 1980’s that emphasized participation and collaborative methods of dealing with organizational issues (Carnevale, 2003). The multiple forces of globalization, increased international competition and a growing recognition that the U.S. was no longer at the helm of management practices required a re-evaluation of organizational management and development in private organizations. New practices emerged which included creating an organizational vision, increasing staff motivation, emphasizing quality, and stressing the importance of participative decision making; all of which contributed towards a ‘renaissance’ of organizational management which emphasized the use of groups in organizations (Juran, 1988; Deming, 1986; Peters & Waterman, 1982, Ouchi, 1981, Golembiewski, 1959).

The new practices of organizational development in the private sector caused scholars of public management to incorporate some of these ideas into organizational

practices in the public sector. In an essay contemplating on the future of public administration practices, Gulick (1990) points out that "... there will be a continual development of alternative ways of producing and delivering public services, such as contracting out, creating new public organizations, cooperative action and designing innovative ways of attacking old problems" (p. 602)." The utilization of groups and teams in the public sector is an example of such continual development of delivering public services, since using groups and teams allow organizations to encourage cooperative action amongst employees (Klinger, Nalbadian and Llorens, 2010). The emergence of new public management (NPM) in latter part of the 20<sup>th</sup> century also emphasized collaboration and the importance of the participative voice (Carnevale, 2003). One of the tenets of NPM is participative management, which implies an involved, participative citizenry as well as a more involved, pro-active employee (Vigoda & Golembiewski, 2001). Participative management encouraged public organization employees to become actively immersed and aligned with the vision and the goals of the organization, and to become solution oriented towards the citizens that they serve, regardless of their hierarchical place in the organization (Vigoda & Golembiewski, 2001; Ostrom, 1969). The use of groups and teams became an important means of harnessing the power of the involved employee as well as a means of allowing employees from different departments to work together to fulfill the demands of the 'customer oriented' citizenry (Carnevale, 2003; Vigoda and Golembiewski, 2001).

In addition to the influence of New Public Management, the increase in the complexity of social environment has led to a greater number of conflicting demands from the public sector (Henry, 2010). Governmental organizations require the ability to



deal with issues that are increasingly complex and difficult and an argument in favor of work groups is that they allow for individuals with different abilities to work in a synergistic manner such that the ability of the work group to handle complexity is better than that of individuals working alone. Work groups therefore allow for synergism, task interdependencies and functional conflict such that the group is able to tackle a range of complex and unforeseen issues (Lawrence, 1997). Carnevale (2003) and Foldy & Buckley (2009) point to the increasing importance and relevance of work groups in the public sector when handling multifaceted issues and problems. It therefore is important for scholars of public administration to research how the behavior of groups can lead towards the fulfillment of organizational goals.

Sundstrom, Demeuse and Futrell (1990) define workgroups as “interdependent collections of individual who share responsibility for specific outcomes” (p. 120). Scholars of public sector management have encouraged public managers to utilize work groups and teams as a means of enhancing the performance and effectiveness of the organization (Bryson & Roering, 1988). Foldy and Buckley (2009) state that there has been extensive research in the positive aspects of groups in private organizations but there still exists a paucity of research of the effectiveness of groups in the public sector. They (Foldy and Buckley, 2009) posit that the empirical conclusions of effectiveness of workgroups have mostly been drawn from business sector organizations. As a result there exists a need for understanding the effectiveness of work groups in public sector organizations. Some studies have utilized organizational settings that may be characterized as quasi-private. Anderson and West (1996) and West and Poulton (1997) examined the characteristics of top management teams, and work groups in the health

care industry. Yet I believe that there still exists a need to understand and empirically determine the effectiveness of work groups in the public sector.

Altman (1963) suggested that assessing the importance of work groups in the public sector may require a focus on three dimensions; the characteristics of the group members, the characteristics of the group and the environmental (outside) influences on the group. Group member characteristics could include the personality of the members, their attitudes towards the other members and towards the group as well as their attitudes towards the assignment (Altman, 1963). Altman (1963) suggested that hiring 'bright' and capable employees in the group may positively affect the performance of the group. However, Perry and Porter (1982) state that the 'murkiness' and the conflicted goals of public organizations may affect the different motivations of individuals in public sector groups since most public organizations deal with goals that may be difficult to quantify, hard to assess and may conflict with each other. Group members may have to contend with such hard-to-assess goals and this may affect their internal motivation to perform assigned tasks and consequently the effectiveness of the overall group may also be compromised. Therefore, the Altman's (1963) first suggestion may not be enough to create an effective group based solely on the characteristics of group members.

Altman's (1963) second suggestion was that the characteristics of the group may also play a part in assessing group effectiveness. Group characteristics (also known alternatively as group demographic diversity) can include the personality, the abilities, the aptitudes and the past experiences (biography) of the group members (Altman, 1963). The theoretical assumption is that the increased demographic diversity of the

group members would positively affect the group's performance abilities since group interaction would allow for a richer conversation and a deeper analysis of performance issues which in turn would lead to an enhanced group performance (Pelled, Eisenhardt and Xin, 1999). There is considerable amount of scholarly literature that focuses on group diversity and its effects on group outcomes (Pelled, Eisenhardt, & Xin, 1999, Lawrence, 1997, Selznick, 1949). Most of the literature that explores the effect of group characteristics (demographic diversity) exists in the strategic management literature for private organizations (Pelled, Eisenhardt & Xin, 1999, Lawrence, 1997). From an empirical perspective, Pelled et al. (1999) and Lawrence (1997) state that studies that have explored the connection between demographic diversity and performance have found an 'unclear' relationship between the two. Golembiewski (1959) posits that the output of work groups has been shown to be greater than the aggregated independent output of individuals as a result of the synergistic effect of collaboration. Similarly other studies have demonstrated a positive relationship between demographic diversity and group task performance (e.g. Bantel and Jackson, 1989) whilst others have shown even a negative effect on group performance from the effects of group diversity (Murnighan and Conlon, 1991). Such a conflicting state of affairs caused Lawrence (1997) to state that demographic diversity is a 'black box' in terms of its effects on performance, i.e. the effects of demographic diversity on group performance cannot be assessed by demographic characteristics only. Perry and Porter (1982) mirror Buchanan's (1975) negative assessment of the effect of group diversity on group performance. As per Perry and Porter (1982), "Heterogeneous or representative groups, more typical of government than of the private sector, will, in Buchanan's (1975) terms, "rarely develop

intensely favorable attitudes toward their agencies or foster climates in which commitment to the agency is a group norm" (Buchanan, 1975b)" (p. 92). The argument in this case is that heterogeneity of the group would lead to conflicting motivations on the part of the group members, reducing the overall commitment to the agency or organization that the group is in. Thus Altman's (1963) suggestion of increasing group diversity as a means of enhancing group performance requires a more in-depth perspective that goes beyond increasing the demographic diversity of the group.

In their exploration of the Lawrence's (1997) 'black box' of group diversity, Pelled et al. (1999) suggest that researchers look closer at group process rather than just group diversity. This implies an exploration of those group's activities that utilize the characteristics (or diversity) of the group in such a way that group performance can be affected. Research on group processes may benefit from exploring more than the static view of group diversity and understanding a dynamic view of group interaction. Understanding and championing the processes by which the group arrives at an enhanced group performance has been recognized by scholars in the public sector (Carnevale, 2003). One of the classical models of understanding the processes with which a group utilizes the disparate characteristics of its members and aligns these characteristics and different motivations with a functional, attuned group performance output is Tuckman's (1965) model of forming, storming, norming and performing. The model elucidates a sequential process of stages during which groups establish group cohesiveness and commitment such that they are able to address the tasks that the group has been assigned (Carnevale, 2003; Tuckman, 1965). Forming refers to the first stage in which group members determine their positions in the group, elucidate and

understanding the procedures and the rules that the group is supposed to follow. The next stage, storming, is one in which the individual motivations of the team members conflict with interest and the influences of the group. The third stage 'norming' allows for the group to establish cohesiveness and commitment to the tasks assigned and establish group norms of how the work can be collectively accomplished. The fourth and final stage of performing occurs when the group utilizes the norms and procedures it has developed to successfully perform the task at hand. Although Tuckman's (1965) model may be considered a too simplistic linear explanation of a complicated progression of group development, but it does provide the seminal understanding that elucidating group processes are a key component of understanding how a group is able to translate its inputs into the required outputs.

The importance of understanding group processes to evaluate group effectiveness has been underscored in research on group literature. Anderson & West (1996) found in their study of hospital groups, that compared to group inputs, and group characteristics (such as size of group, resources available to group, tenure of group etc. ) group processes best predict the performance and effectiveness of the group. Pelled et al (1997) have also underscored the importance of understanding group process when predicting the performance of the group. Group processes can be understood as the means in which a group utilizes its inputs (such as group diversity) and perform activities that help it towards the required outputs. The inputs can consist of Altman's (1962) suggested factors that may affect a group's performance, namely the characteristics of the members, the characteristics of the group and the external environmental influences on the group. Group process involves the activities that the

group members undertake when they utilize their inputs to work towards a common goal or output (Richardson & Anderson, 1997). Richardson & Anderson (1995) underscore the importance of understanding group process when assessing productivity in the public sector.

This dissertation's examination of group emotional intelligence, GEI, is also the exploration of a group process, namely the development of group emotional intelligence in the work group. The development of GEI is theorized and empirically examined and the effects of GEI on the group's performance ability and the group's learning ability are tested. This dissertation theorizes that one of the characteristics that group members possess is their individual emotional intelligence. These individual emotional intelligences are utilized during group process activities and a group level emotional awareness and management allows for the collective to enhance the within-group activities such that group performance and group learning ability are positively affected.

This section examined the increasingly important roles that groups play in public sector organizations. It demonstrated that the utilization of groups and teams has become an integral aspect of the way public organizations conduct their activities. But this section also demonstrated that a significant portion of the information on group processes in organizations has been taken from research literature in the private sector. As a result there exists a dearth of empirical examination of groups and group processes in public sector organizations. This dissertation is an attempt to provide an empirical and theoretical examination of a recent topic in the group process literature using data from public sector organizations. The following sections discuss the development of the concepts of emotional intelligence and group emotional intelligence.

## **An understanding of emotional intelligence**

An individual's intelligence has been conceptualized as the ability to solve problems and meet the challenges of the task at hand (Sternberg and Salter, 1988). Early understandings of intelligence considered it an individual trait that utilized the cognitive abilities of perception, encoding, memory and reasoning (Glynn, 1996). This trait-based intelligence has been challenged as being a narrow perception of intelligent behavior and the idea of a contextual intelligence was proposed (Glynn, 1996; Gardner, 1993; Sternberg and Salter, 1988). Contextual intelligence veers away from the understanding of a general trait of intelligence that is present in all individuals and is limited to analytic, problem solving ability. Rather, the proponents of contextual intelligence argue that intelligence exists across multiple domains of ability and is relative to the situation in which it is utilized (Glynn, 1996). Contextual intelligence is considered to be a multi-dimensional ability in which many forms of intelligence may exist in a single individual. For example, Gardner (1993) identifies seven types of contextual intelligence such as linguistic, logical-mathematical, spatial and "and two forms of personal intelligence, one directed toward other persons and one directed toward oneself" (Gardner, 1993; pp. xi). Sternberg (1988) also classifies intelligent behavior as more than just problem solving, and including the abilities of verbal competence and social competence.

Emotional intelligence refers to the ability of an individual to be cognizant of, and manage one's own emotions, and successfully manage the emotions and emotive responses of others. Since Sternberg's (1988) understanding of intelligence included it being a social competence, emotional intelligence (EI) can be considered a form of

contextual intelligence. Mayer, Salovey, and Caruso (2000) define emotional intelligence as “the ability to accurately perceive, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion as well as emotional knowledge; and the ability to regulate emotions to promote intellectual growth” (Mayer et al , 2000; p. 396). Such a definition of emotional intelligence (EI) shows that EI can be considered a competent ability (and therefore a contextual intelligence) that allows the individual to successfully navigate through life situations.

Cherniss (2010) underscores the importance of EI on three premises; that emotions are important to navigate through life; that people vary in their ability to perceive and manage emotions and that these differences in emotional ability affect an individual’s adaptation to different life situations. Thus, Cherniss (2010) considers this ability to perceive and manage emotions as a form of intelligence since it allows an individual to overcome life challenges and involves the four abilities that an intelligence should possess; which are perception (of emotions in self and emotions in others), encoding (of behavior in emotional situations), memory (recall of successful and unsuccessful emotional responses) and reasoning (successful emotional response based on received emotional input and prior encoding). Cherniss (2010) defends emotional intelligence as another contextual intelligence since it “consists of a set of conceptually related *abilities*, and these abilities involve reasoning, problem solving and the processing of information” (Cherniss, 2010; p. 115).

Critics of EI however, have questioned whether it is a viable form of intelligence. Locke (2005) has argued that emotions are subconscious responses to



stimuli and that these responses are without reason. An emotional response precedes a reasoned reaction, and so attributing intelligence to a subconscious, reflexive emotional response is an unviable idea. Locke (2005) states that the individual does not reason with emotion, he/she just reasons about it. Locke (2005) dismisses the idea of emotional intelligence since he considers the ability to successfully navigate and adapt to certain emotional responses a learned behavior and not an individual trait. Becker (2003) also criticizes the idea of emotional intelligence as an individual trait by positing that EI might just be the presence of high levels of the personality traits of agreeableness and extraversion.

Landy (2005) states that emotionally intelligent behavior seems to be too broad and all inclusive a concept since some of its proponents such as Goleman, Boyatkis and Mckee (2002) have posited that emotionally intelligent behavior consists of thirteen different traits and can be noticed in six different styles of leadership.

Mathew, Zeidner and Roberts (2004) ably summarize the state of affairs when it comes to the current understanding and application of emotional intelligence. They claim that the measures that have purported to assess emotional intelligence have been met with skepticism by scholars in the fields of personality assessment, intelligence assessment and psychological research. According to Mathew et al. (2004), "... the media hype and the vast number of trade texts devoted to the topic often subsume findings from these fields in a faddish sort of way, rather than deal directly with the topic as defined by its chief exponents. This approach has arguably led to obfuscation, misunderstanding and wildly outlandish claims." (p. 4 -5)

Cherniss (2010) has suggested that the understanding of emotional intelligence may be an incomplete understanding and still in its developmental phases. Rather than providing a single definition of emotional intelligence, Cherniss (2010) posits that the current research of emotional intelligence points to four different models. These models suggest that EI may be a multi-faceted concept that is a combination personality trait, innate ability, learned behavior and social competence. Though Cherniss (2010) does promote the Mayer, Salovey and Caruso (1999) definition as the most viable definition of EI, he states that this definition does not encompass all the different understandings and models of the concept.

Though the four-component model of emotional intelligence is one of the most commonly employed models of individual EI (Moshe, Roberts, Mathews, 2008; Mayer 2000a), recent research supports a six component model which involves an individual's ability to 1) be emotionally self aware, (2) be emotionally aware of others, (3) regulate emotion in oneself, (4) manage emotions in others, (5) express emotion, (6) and to analyze emotions in terms of when they arise and what outcomes they might produce (Palmer, Gignac, Ekermans, & Stough, , 2008). However, as the table below indicates, the components of expressing and analyzing emotion can be coalesced into the earlier two components of regulating self emotions and managing emotion in others. It is evident that there are differences in the way that EI is represented in terms of the number of its constituent components. As yet there seems to be no consensus as to a generally accepted theoretical model and definition of emotional intelligence.

Differences also exist in the way EI is conceptualized. Some scholars have posited that EI is adaptable ability (Mayer, Salovey & Caruso, 2000a, 2000b), i.e. one

that can be learned, and developed by the individual when engaged in and learning from certain social behaviors. Other scholars have posited that EI is an innate trait such as a personality trait and exists within the realm of personality types (Moshe et al, 2008, Becker, 2003, Petrides and Furnham, 2003). When reviewing the recent controversies in EI, Moshe et al (2008) posit that a reason for debate on whether EI may be a personality or a trait could be because EI may be a mixed model of intelligence, i.e. multi-faceted concept that exists both as ability as well as trait.

**Table 1: The four and six factor model of individual emotional intelligence (Adapted from Palmer et al. 2008; Mayer et al. 2000)**

Six factor model of emotional intelligence	Definition	The classic four component model of emotional intelligence
Emotional Self Awareness + Regulation	The skill of perceiving and understanding one's own emotions.	Emotional Self Awareness/regulation
Emotional Awareness of Others	The skill of perceiving and understanding others' emotions.	Emotional Social Awareness
Emotional Management of Others	The skill of effectively managing one's own emotions.	Managing Emotions of others
Emotional Expression	The skill of influencing the moods and emotions of others.	Emotional Self Awareness/Regulation
Analyzing Emotion or Emotional Reasoning	The skill of effectively expressing one's own emotions.	Emotional Management

Critics of emotional intelligence have also questioned its distinction from other concepts of general intelligence, stating that the definition of EI suffers from low reliability (the ability to adequately capture the concept) and a lack of discriminant validity (validity that measures the difference a concept has from other similar

concepts) (Becker, 2003). Moshe et al. (2008) state “Thus it is presently unclear whether EI is cognitive or non cognitive, whether it refers to explicit or implicit knowledge of emotion, and whether it refers to a basic aptitude or to some adaptation to a specific social and cultural milieu (Zeidner, Mathew and Roberts, 2001)”. (p. 65)

Thus being able to provide an adequate definition of EI which is able to capture all the inherent complexities of EI is a controversial endeavor. Moshe et al. (2008) points to the fact that in some cases, proposed definitions of EI do not capture the inherent complexity of the concept (i.e. some definitions are too restricted), whereas other definitions are too inclusive, i.e. providing a “laundry list” of qualities, some of which are unduly ascribed to EI. A too restrictive definition would not capture the breadth of individual emotional intelligence, whereas an overly inclusive one would begin to overlap and correlate with other behavioral concepts.

### **EI Literature in public administration**

The earlier section on emotional intelligence shows that EI began to be discussed primarily in social psychology literature as a form of contextual intelligence. Its incorporation into management literature came about when Mayer and Salovey’s (1990) seminal article on emotional intelligence was used by Goleman (1995) to introduce the concept to the business world and since then it has gained enormous popularity as what Moshe et al. (2008) would term ‘a management fad’. The growing interest New Public Management amongst scholars of public administration predicated that some concepts that may have had great appeal in the for-profit business world would now be examined by scholars of public administration and public policy.

Additionally, since Goleman (1995) has posited that emotional intelligence may be a required form of intelligence for the charismatic transformational leader, EI also began to be discussed in the realm of political science as an trait/ability that political leaders should possess (Kauffman & Coutu, 2009; Greenstein, 2000). Both Kauffman & Coutu (2009) & Greenstein (2000) posit that among the qualities that effective American presidents should possess, emotional intelligence should be one of them, since it allows the leader to manage his/her emotions during situations as well as manage the emotions of others.

Emotional intelligence enters the realm of public administration from the same vantage point as it did in political science literature, as one of the qualities that public managers and public leaders should possess (Vigoda-Gadot & Meisler, 2010). In her review of the gap between teaching and practicing public administration, Adams and Griffin (1997) point out that public administration should be taught with an emotionally intelligent awareness how real life situations in managing the public sector may require more than just the application of 'textbook' ideas. In other words emotional perception, emotional awareness and emotional management allow public sector managers to assess the situation that they are dealing with and how it may differ from a classic textbook example. Emotional intelligence thereby allows managers the ability to fashion their responses to a situation such that they are best able to address the issue and not get stumped by how the reality of the situation differs from the 'textbook' understanding. Rafaeli & Sutton (1991) demonstrate how bill collectors can utilize their emotional intelligence to convey the most effective emotional demeanor when requesting a bill to be paid (emotionally aroused with a hint of irritation) and also use their emotional

intelligence to distance themselves from the negative responses of the citizens they deal with so that they are not too psychologically affected.

From such early responses to emotional intelligence, more recent scholarly works on emotional intelligence in public administration tend to be calls for incorporating EI as a requirement for training managers in the public sector (Neal, 2008; Dearborn, 2002). Jaeger (2004) uses the empirical research that shows the effectiveness of EI for performance to argue that EI should be taught to students of public sector management. As per Jaeger (2004) EI is a means of developing students' interpersonal capabilities and such capabilities are essential for management in the public sector. Additionally Kramer (2007) promotes the use of action learning as a self awareness and group awareness tool that should be used by public managers to develop their emotional intelligence skills. Kramer (2007) posits that emotional intelligence would develop the leadership capacity of senior public administrators in the U.S. government. Berman & West (2008) echo such a need for training public sector managers about the valuable assets that EI provides and state that very few cities offer training programs on the importance of emotional intelligence in public sector management. Interestingly enough, when teaching EI to one of my classes on organizational behavior, I had a couple of students employed by local governments tell me that their cities are now offering seminars and training sessions on the importance of emotional intelligence in the public sector.

Despite the calls for incorporating emotional intelligence training in public sector, little research has been done on how EI may affect public sector employees and managers (Vigoda-Gadot et al. 2010). As Vigoda-Gadot et al. (2010) state, "Despite the

growing interest in recent years in **emotional intelligence** within the managerial literature, too little has been written about **emotional intelligence** within the public sector. This is surprising in light of New Public Management voices that stress flexibility, responsiveness, and a focus on the needs and demands of citizens.” (p. 72). Indeed as mentioned in an earlier section of this dissertation developing an emotionally intelligent workforce in the public sector is very much aligned with the goals of New Public Management since an emotionally intelligent manager would be expected to utilize his/her perception and awareness of his/her internal emotions and the emotions of others to gauge a potentially problematic situation and respond in a manner that takes into account the emotional needs of the citizenry.

The above review demonstrates that even though emotional intelligence has been acknowledged as an increasingly importance ability for the public sector managers and employees to possess, the amount of research on EI in the public sector is far from adequate. In addition, I have not been able to see any literature that addressed the importance of group emotional intelligence in the public sector. This dissertation has demonstrated earlier the increasing importance and reliance of workgroups in public sector organizations and so this study is a contribution to two literature streams in public sector research that have been recognized as important for current and future public sector management.

### **Group emotional intelligence (GEI)**

In spite of the criticisms about EI, the proponents of emotional intelligence have continued to attest that emotional intelligence does exist as a separate, distinguishable

concept at the individual level (Mayer & Salovey, 2003). Indeed scholars have begun to argue for a *group level* emotional intelligence which has also been termed “work group emotional intelligence” (Druskat & Wolff, 2001, Cherniss & Goleman, 2001; Reus & Liu 2004). The claim for the existence of workgroup emotional intelligence lies in the assertion that since emotional intelligence becomes most utilized during interactions between individuals, it can be expected that individuals in group settings use their emotional intelligence during interactions with other group members (Jordan & Troth, 2004; Jordan, Ashkanasy, Hartel and Hooper, 2002). Group emotional intelligence (GEI) is thus theorized as the resultant group level ability that develops from socialization processes and interactions amongst group members (Ashkanasy, Hartel and Hooper, 2002; Ashkanasy, 2004). Thus rather than being an quasi personality concept like EI , i.e. part innate ability, part learned behavior, group emotional intelligence is distinguishable from individual emotional intelligence in the way it forms and its utilized by the group. Group socialization, the buildup of group norms, and the formation of a group culture, all create a group level ability that allows the group to recognize and manage its internal emotional state as well as manage and regulate any emotional input from outside (Druskat & Wolff, 2000). GEI thus cannot be a quasi-personality concept such as individual EI, since its development is based upon group dynamics and as a result GAI may vary from group to group and depend on the composition and the interactions of the group.

The current definitions for group emotional intelligence (GEI) argue for a concept that focuses on group norm development. In her dissertation on the measurement of group emotional intelligence, Hamme (2003) implies that GEI may be



considered an extension of individual EI, and uses Druskat and Wolf's (2001) conceptualization of group level emotional intelligence to develop a questionnaire for group emotional intelligence. Hamme (2003) offers no definition of GEI in her dissertation that distinguishes GEI from individual EI, but points out that GEI may develop through group socialization practices the creation of group norms and the emergence of a group culture. Hamme (2003) and Druskat & Wolff (2001) state that the members of groups with high collaboration and cooperation may share three beliefs that may aid in the development of GEI: mutual trust amongst group members, a sense of group identity and a sense of group efficacy (i.e. that the group considers itself a high performance and successful group).

Cherniss and Goleman (2001) point out the ways organizations, managers and group leaders can create group emotional intelligence and also theorize on the benefits of developing an emotionally intelligent work group but also do not define GEI. Gant & Agazarian (2004) state that even though prominent scholars advocate for developing GEI in organizations on the premise that GEI will promote organizational effectiveness, they fail to provide an adequate definition of what GEI is and what it involves. Certainly the concept has intuitive appeal. Scholars since the 1920's (McDougall, 1920) have been theorizing about groups that may have developed a 'group mind' (Klimoski & Mohammed, 2000, Wegner, 1987). In this dissertation GEI is partly conceptualized as a concept that facilitates the formation of a group mind which in turn may lead to organizational effectiveness.

## **GEI, the Group Mind vs. Group Think**

It is necessary to point out that the idea of the group mind differs considerably from Janis' (1972, 1982) concept of *group think*. Group think is a dysfunction that develops in the group under pressures of group cohesion; i.e. during group think the group shies away from any conflict and veers towards a unanimous, argument-free style of decision making. Peterson, Owens, Tetlock, Fan and Martorana (1998) explain groupthink as the following: "... extreme pressures for unanimity can build in a cohesive group that confronts serious threats (high stress) and lacks norms of deliberative decision making. Such pressures cause decision makers to censor any misgivings they may have, ignore outside information, and overestimate the group's chances of success." (p. 273).

The concept of the *group mind* is different. Weick and Roberts (1993) demonstrate a group mind mentality by the example of an air traffic control tower. The group here has developed a group culture, a highly effective set of norms and practices that allow the group to effectively manage air traffic without incident and without second guessing each other. The group mind utilizes a system of "collective mental processes" that allow it to process information, and promote knowledge building and action as a group. Weick and Roberts (2003) cite the work of Wegner and his associates to explain what is meant by collective mental processes (Wegner, Erber, & Raymond, 1991; Wegner, 1987; Wegner, Giuliano & Hetrel, 1985). According to Wegner and associates, when people develop close relationships in groups they begin to create a single system of memory. This system of memory allows each person to be responsible for some portion of a common memory that all group members have experienced. In

this way when group members come together to discuss a particular event from memory, each person can add the missing portions of the others description and thus arrive at a more complete rendering of the event that took place. Such a system of memory is known as a transactive memory system. Weick & Roberts (2003) posit that “When people trade lower order, detailed, disparate information, they often discover higher order themes” (p. 358). This implies that a synergy of memory develops when information is traded and collectively analyzed amongst a group, i.e. each person’s small amount of information, when traded and synthesized by group interaction, develops into a more complete picture since the effort and the collective mental processing of the entire group is being utilized. Such a sense of collective mental processing is what Weick and Roberts (2003) and Wegner and associates term the “collective mind”. Weick & Roberts (2003) also point out that such a collective mind process in groups is not characterized by a tendency towards *within group* agreement (distinguishing the concept from groupthink where, as pointed out earlier, the pressure is on unanimous agreement with little analysis of information) but by the collective processing of disparate information by the group, using a group level sense of memory and collaboration.

As Weick and Roberts (1993) point out “The word "collective," unlike the words "group" or "organization," refers to individuals who act as if they are a group. People who act as if they are a group interrelate their actions with more or less care, and focusing on the way this interrelating is done reveals collective mental processes that differ in their degree of development.” (p. 360). The focus of the group mind is not to have unanimity and lull the group into a false sense of security, but to promote the

ability of the individuals of a group working interdependently and successfully towards the goals of the group, with a commonly understood, collective purpose. The norm of the group mind seems to be towards creating a functioning group that makes effective decisions. Groupthink however focuses on creating a culture of unanimous agreement, and a group that does not want to create dissent or ‘rock the boat’. The focus of this dissertation is to understand and explicate a collective process of the group mind; the construct of group emotional intelligence (GEI).

### GEI: THE CONCEPT, THE MODEL, AND THE OUTCOMES

From the above sections it can be stated that the study of GEI thus requires that scholars disassociate from the faddish, intuitive appeal of the concept and focus on formulating a definition that would allow for the construct to be properly examined. An analytical review of the past literature on group emotional intelligence suggests that scholars have provided a theoretical understanding of group abilities and practices, some of which may be utilized to formulate a generally accepted definition of group emotional intelligence. The next section will discuss the development and understanding of GEI.

### **EI & GEI**

The first issue that needs to be addressed is the difference between emotional intelligence at the individual level (EI) and the concept of group emotional intelligence (GEI). As the past sections have noted about EI there is scholarly agreement that EI is a quasi personality construct. EI is both an innate ability in the individual (Mayer and

Salovey, 1990), i.e. a part of the individual's personality 'make-up' and a learned behavior, i.e. a kind of learned intelligence that the individual assimilates into his/her behavior through socialization and acculturation, with other members of society (Ashkanasy, 2003; Goleman, 1995). GEI on the other hand can not be considered innate. Group behavior is a result of, and dependant upon, the members of the group and the way that they socialize and interact with each other. The emotional intelligence of the group would not be innate but be developed when group members interact.

Additionally, EI and GEI exist at different levels of analysis; EI at the individual level and GEI at the group level. A level of analysis issue implies that the concept of group emotional intelligence is more than just the aggregate of individual emotional intelligence and that GEI develops and operates in a different way and in a different fashion than individual emotional intelligence. Using the theoretical contributions of past scholarly work, group emotional intelligence develops as a result of synergistic interaction within the group, as well as the development of an emotional capability within the group. The following sections will further explain these issues.

### **GEI: A multifaceted concept**

This dissertation postulates that there are two components to the development of GEI (group emotional intelligence), namely the building of relationships within the group and the building of a group emotional capability. In a recent article on emotional intelligence, Cherniss (2010) pointed out that although there are a variety of definitions of emotional intelligence, the most empirically accepted concept of EI is by Mayer et al (1990) which states that EI consists of emotional awareness, emotional regulation, and

emotional management. Druskat and Wolff's (2001) definition of group emotional intelligence involves the development of emotional norms centered around the development of a group identity, and a self of group efficacy but do not pursue the idea of a group level emotional intelligence aligned with the Mayer et al (1990) definition. Such an understanding of GEI could be considered an incomplete appreciation of the concept. I believe that group emotional intelligence should also incorporate Mayer et al.'s (1990) understanding of emotional intelligence i.e. the members being aware of the emotions in the group, and members being able to recognize, understand and manage such emotions. This dissertation posits that from a theoretical standpoint, a synergistic incorporation may benefit towards a better understanding of group emotional intelligence. One conceptualization would be that GEI is a competence of emotional management that develops from group socialization, norm building and developing relationships within the group. The other is that GEI would also partly incorporate Mayer et al.'s (1990) definition of emotional intelligence and the four components that it involves. The next section elaborates on the two proposed components of group emotional intelligence.

### **The relationship capability component of GEI**

Druskat & Wolff (2001) define group emotional intelligence “as the ability to develop a set of norms that manage emotional processes so as to cultivate trust, group identity and group efficacy” (p. 132). This definition of group emotional intelligence focuses on the ability of individuals in a group to utilize their socialization skills (including their emotional intelligence) to develop norms (group level agreements on

prescribed behavior) of emotional management such that the group is able to effectively address tasks. The definition focuses on the ability of the group to develop norms of emotional management that lead to successful group outcomes and such a conceptualization has also been termed as a group emotional competence, GEC (Druskat and Wolff, 1999). As understood earlier in this paper, intelligent behavior involves perception, encoding, memory and reasoning (Glynn, 1996), and the group's ability of developing collective norms that address group challenges may involve the aspects of perception, encoding, memory and reasoning.

Scholars who advocate the use of work group settings in organizational contexts do so because they attest that the collective output of the group is greater than the sum of its individual parts (Druskat and Wolff, 2001; Tziner & Eden, 1985). Socialization processes between the group members help create a group culture which includes knowledge of group norms, group values and other knowledge that group members assimilate as they become more familiar with each other. Over time, group culture and modes of practice become established and the group operates as a cohesive unit when processing tasks (Carnevale, 2001). To foster the development of group emotional intelligence, Druskat and Wolff (2008) argue that "... if emotional intelligence is to have a significant influence in a team, it must exist as something more than an individual team member's ability that may or may not make a difference-- it must exist as a norm or expectation about how team members should behave in a team." (p. 441). Druskat and Wolff's (2001) argument implies that the development of a group level emotional intelligence may require fostering an explicit culture which includes norms and value systems within a group which would cause group members to develop

behaviors and mental models that allow for group level emotional management and emotional understanding.

Thus one component of GEI may be considered a relationship building capacity, i.e. that the group utilizes its group level emotional understanding and management of its members to build relationships across the group, thereby effectively creating a group culture.

Fine (1979) defines culture (he uses the term idioculture) as a system of acquired knowledge, behaviors, belief and customs that are shared by a group such that members refer to this system as the basis for further interaction. Additionally Fine (1979) points out that

“Members recognize that they share experiences in common and these experiences can be referred to with the expectation that they will be understood by other members, and further can be employed to construct a social reality” (Fine, 1979; p. 734).

The interactive aspect of culture implies that the interaction between the members of a group cause the development of a common culture. Additionally, Blumer (1969) underscores the communicative aspect of culture, i.e. that culture is derived from the interaction between individuals which leads to a shared level of understanding. To take the idea of culture being derived from interaction further, Fine (1979) argues that culture is the outcome of the interaction between individuals and small groups are the “prototypes” of how cultures evolve in organizations and societies. Additionally Fine (1979) also states that, “... the prevalence of groups in society suggests that it may be



useful to conceive of culture as being part of the communication system of these interacting units (Spector, 1973)” (Fine, 1979; p.734). Thus the evolution of a group culture can be posited as stemming from an evolution of interaction through explicit and implicit communication that creates a sense of shared understanding; a shared value system, as well as shared means of group level communication all of which are involved in the capacity of the group to build an emotional relationship between its members.

Druskat & Wolff (2001) develop a concept they term group emotional competence (GEC) which they define as the *ability* of the group to create norms that build emotional competence and regulate group action such that group emotional intelligence is created, maintained and enhanced. They argue that this ability would enhance the social capital of the group and as a result improve group effectiveness. Work group emotional intelligence would require certain actions by key individuals in the group that would promote the formation and sustenance of GEC. GEC is also fostered by the use of external inputs to the group such as championing the benefits of emotional intelligence (EI), training for group members in the advantages and the development of EI and having an organizational culture that promotes EI. Thus the relationship building component of GEI, is termed group relationship capability and consists of group socialization processes such as members’ interactions within the group, leader behaviors, the development of group norms, and specific external inputs to the group allow that for the development of a group level synergy and group culture. Group synergy, group socialization and a group culture allow the group to emotionally process inputs such that the group is able to understand and manage its inputs and produce relevant responses.

This understanding of group emotional intelligence focuses on the development of socialization practices, shared culture and emotionally competent norms. Yet as the next section will demonstrate, other scholars of emotional intelligence have posited that the development of EI in groups goes beyond the development of norms, but incorporates a higher (group) level of emotional awareness, perception and management (Gant & Agazarian, 2004).

### **The emotional capability component of GEI (GEC)**

The concept of emotional capability was originally presented by Huy (1999) and involved the conceptualization of practices (either at a group or an organizational level) that would foster a collective emotional intelligence operating (Reus and Liu, 2004). Emotional capability describes the ability of group members to identify the emotional composition of the group (i.e. how the group thinks and feels collectively) and respond to that emotional composition in an effective manner. Emotional capability thus allows the group to analyze how the within-group emotion is understood. This understanding involves the level and type of emotion that is permissible in the group, how it is interpreted, and the way in which group members respond to emotional stimuli and subsequently regulate behavior in the group (Mayer et al, 2000; Reus & Liu 2004). This emotional capability of the group exists at a group level of analysis.

A definition of GEI by Gant and Agazarian (2004) provides a systems level understanding of group emotional intelligence (GEI). Gant & Agazarian (2004) advocate a systems perspective to understanding emotional intelligence in organizations. A human system, which may be an individual or a set of individuals,

utilizes its thinking, cognitive knowledge and its intuitive, emotional knowledge to make decisions about tasks (Senge, 1990). Emotional intelligence in a system is defined as “a system’s ability to discriminate and integrate information energy (cognitive and emotional) in the service of the goal of the context” (Gant & Agazarian; 2004; p. 162). In this definition group emotional intelligence (GEI) exists as a result of the context of the system in which it is created and thus the GEI of the group exists as a higher order system that exists as a result of within group interactions by the individual members of the group (Goyal & Akhilesh, 2007). The group develops a higher order collective emotional capability which involves emotional perception, emotional appraisal, emotional expression and emotional management, similar to Mayer et al.’s (2000) definition of individual emotional intelligence.

As is the case with individual emotional intelligence, both proposed components of group emotional intelligence further the understanding of the concept. The Druskat and Wolff (2001) concept of GEI as a collection of competent norms develops the relationship building aspect that utilized when members of the group work together to collectively address group tasks and challenges. For Gant and Agazarian (2004), GEI as a collective intelligence, more than just a function of the individuals in the group, but is a collective process that allows the system (in this case the group) to collectively be aware of how it manages group affect towards the goals of the group. The Mayer et al. (1990) definition requires that an emotionally intelligent individual have the “the ability to accurately perceive, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion as well as emotional knowledge; and the ability to regulate emotions to promote intellectual

growth”. In other words an individual with EI must be able to recognize and manage his/her affective state such that his/her emotional management is aligned with the goals that the individual has set. In a similar way, a systems conceptualization of emotional intelligence suggests that a group develop a *group emotional capability* (GEC) such that the group is able to recognize and manage its collective affective state such that it is aligned with the group’s goals. The emotional capability component (GEC) of GEI aligns itself with the development of a group mind, which allows for the group to undertake a collective mental processing and develop a group level method of emotional perception and emotional management. This group emotional capability can be assessed if group members have a high level of agreement on how the group expresses, manages, and recognizes and perceives emotions.

Group emotional capability allows the concept of GEI to be recognized as a group level construct. Group emotional capability implies that emotional recognition, perception, and management at the group level is distinct from the individual emotional intelligences of group members. That is not to imply that a group level emotional capability is not affected or created as a result of the interactions of the emotional states on the individual members, but that it exists as a separate system.

The past two sections have explored group emotional intelligence as a concept that incorporates two different understandings; an understanding based on the emotional relationship capability of the group; and an understanding of the emotional awareness and management of a group level emotional intelligence. The next section explores how both these facets of GEI can be brought together

## **A multifaceted conceptualization**

Since Cherniss (2010) posited that individual EI may be a multifaceted concept that incorporates different conceptualizations, it could be that group emotional intelligence may also benefit from a multifaceted understanding. Group emotional intelligence may have a norm-building, relationship capacity aspect and a systems-centered emotional capability aspect. GEI may incorporate both a group ability of successful norm development within the group, as well as a collective system of emotional management that contributes its energy towards the goals of the group. Goyal and Akhilesh (2007) state that using the Mayer and Salovey (2000) conceptualization of individual emotional intelligence; group emotional intelligence (GEI) should involve the abilities of emotional perception and cognition, emotional understanding and management and so it may be that a synergy between both understandings of group emotional intelligence would benefit a better conceptualization.

From the earlier discussion, it can be seen that the development of work group emotional intelligence may involve two components that interact with each other to produce a group level emotional intelligence. These two components would be group emotional capability and group relationship capacity. Group emotional capability would involve the collective understanding of how influential behaviors within the group foster the development of group level emotional understanding; i.e. the capability of the group to be aware of and manage group level affect. The other component would be relationship capacity which would involved the ability of the group to develop, incorporate and utilize relevant group norms and relevant group socialization practices

such that the group fosters those group norms and practices that allow for the group to develop emotional management practices. Thus group emotional intelligence may consist of the components of group emotional capability and group relationship capacity. Since group relationship capability has been termed as group emotional competence by Druskat and Wolff (2001), it may be necessary to point out the difference between GEC and GEI, namely that the multifaceted conceptualization of group emotional intelligence incorporates group emotional competence (GEC) as the facet of group relationship capability. Table 2 highlights the differences in conceptualization between GEC and GEI

**Table 2: The differences between GEC and GEI**

Group Emotional Competence (GEC)	Two Component Model of Group Emotional Intelligence (GEI)
Developed by Druskat and Wolff (2001) and consists of <ul style="list-style-type: none"> <li>• the development of group norms</li> <li>• the encouragement of certain group practices</li> <li>• the socialization of group members such that</li> <li>• the group is able to effectively manage its emotions and successfully perform assigned tasks</li> </ul>	Incorporates the relationship building aspects of Group Emotional Competence developed by Druskat and Wolff (2001)
Does not incorporate the Mayer et al. (2000, 1990) understanding of emotional intelligence that consists of emotional awareness, emotional perception, emotional management and emotional regulation	Incorporates the Mayer et al (2000, 1990) understanding of emotional intelligence by positing that the group develops as a higher order system that is collectively manages its affect in terms of emotional awareness, emotional perception, emotional management, and emotional regulation
Does not incorporate Cherniss' (2010) understanding of emotional intelligence which states that Mayer et al.'s (1990, 2000) four factor model of EI may be the most acceptable understanding of EI	Does incorporate both Cherniss' (2010) understanding of EI using a systems understanding of individual EI (developed by Gant & Agazarian, 2004) as well as Druskat and Wolff's (2001) conceptualization of GEI as a group level emotional competence developed by promoting certain norms and socialization practices.

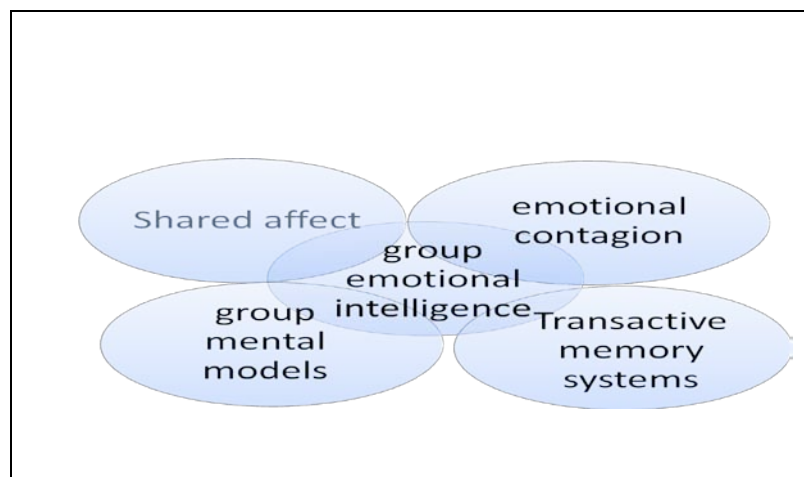
This section demonstrates that past theoretical conceptualizations of GEI have argued for the explicit input of certain group behaviors (competencies and capabilities) and the development of group norms and group socialization that would help create and foster GEI. Yet these recommendations are antecedents to the development of GEI but fall short of a complete understanding of the concept which may require that GEI be considered a multifaceted concept that includes both group relationship building, and a group level emotional capability; two components that take into account past theoretical understandings and a current appreciation of GEI in terms of its relation to individual emotional intelligence. This dissertation posits that group emotional intelligence cannot be understood solely in terms of the ability to build effective group level norms but also by how the group collectively understands its emotional self and it utilizes group level emotional understanding to manage group behavior, i.e. a systems centered realization as per Gant and Agazarian, (2004).

The next section addresses other theoretically explicated group level concepts that are related to GEI. These group level concepts are related to group emotional intelligence in terms of their theoretical similarity, their precedents and their outcomes. From a definitional standpoint it is important to identify these concepts so that the distinctness of GEI can be further explicated and extricated.

### **Group level processes related to GEI**

Past sections of this dissertation have shown how GEI is related to other group level concepts. In some cases the understanding and operation of these related concepts overlaps with the conceptualization and understanding of GEI. This section explores

these concepts and offers an understanding of the sort of relation that the aforementioned group level concepts have with group emotional intelligence. These concepts tend to explain the development of a group synergy i.e. the ability of the group to collectively accomplish more than the sum of the accomplishments of its individual members. This section illustrates the relationships among these group constructs and group emotional intelligence. Such relationships need to be examined to provide a definition of GEI that does not overlap with similar group level concepts which also explain group development. From one point of view, this could be illustrated using a Venn diagram where the circles of other group-level concepts overlap with each other and group emotional intelligence. Consequently, such an overlap may become difficult to isolate group emotional intelligence. This section takes a look at such group level concepts to determine how they could be related to group emotional intelligence. (See figure 1 below) (Reus & Liu, 2004, Kelly and Barsade, 2001; Mayer et al. 2000, Klimoski and Mohammed, 1994; Wegner, 1987)



**Figure 1: Concepts that overlap with group emotional intelligence**



These group level processes can be considered partly related to GEI and this dissertation aims to demonstrate how these processes related to group emotional intelligence. The concepts are shared affect, group mental models, transactive memory systems and emotional contagion (Reus & Liu, 2004, Mayer et al. 2000, Kelly & Barsade, 2001, Klimoski and Mohammed, 1994; Wegner, 1987). They overlap with group emotional intelligence such that they share similarities in theoretical conceptualizations, understandings and purported effects. The Venn diagram shown above has been used to understand this overlap. Table 3 lists the different concepts that are related to group emotional intelligence.

### **Shared affect, emotional contagion & group mood**

Kelly and Barsade (2001) cite the works of Williams and Sternberg (1988) and Tesluk, Mathieu, Zaccaro and Marks (1997) to demonstrate that within a group, the members' individual characteristics such as self awareness, dominance and social competence have an effect on group performance. Kelly and Barsade (2001) propose a model of *shared affect* (i.e. a group mood). Shared affect is a process whereby individual affective experiences combine to create an affective group mood created as a result of socialization and the interactions of group member. Kelly and Barsade (2001) also put forth the idea of emotional contagion, which is the effective transmission of emotions through out the group such that at any given time there is a prevailing group level emotion. Emotional contagion occurs when the moods and emotions of one individual are transferred to nearby individuals.

Hatfield, Cacciopo and Rapson (1994) state that the tendency occurs at the unconscious level as well when individuals tend to mimic and synchronize the expressions and facial movements of other members in the group. Such mimicking and synchronization can lead to empathic relationships between the individuals in the group, since group members displaying similar emotion allows for individuals in the group to feel mutually understood and appreciated. In other words emotional contagion allows for the sharing and transference of emotions the group, such that one individual is able to *'feel'* the emotions of another as well as the prevalent emotion in the group.

Past scholarly work has understood GEI as the aggregate of individual emotional intelligence, thus promoting the idea of a combinatorial process by which the experiences of individual group members combines to create a separate concept. Group emotional intelligence includes the ability of the group to understand, manage, and regulate emotions, and as such *the combinatorial process of shared affect would play a key role in the ability of the group to create and foster a group emotional intelligence.* Thus in figure 1, shared *affect* is depicted as a circle that overlaps with group emotional intelligence such that it shares similarities in conceptualization and effects. It may be that the continued development of shared affect and emotional contagion in the group would assist in the gradual development of group emotional intelligence. The group emotional capability component of GEI may incorporate some level of shared affect since the mimicking and synchronization that is involved in shared affect would lead to a group level understanding and transference of the prevalent group emotion.

**Table 3: Concepts related to GEI**  
**Concepts related to Group Emotional Intelligence**

Terminology	Definition	Sharing with group emotional intelligence
<b>Shared Affect and emotional contagion</b>	A group mood that is created by the interaction and assimilation of individual members moods. Includes the ability of the each member of the group to understand the emotions of other group members as well as use empathy to share the emotion of other members of the group such that emotion can be understood, shared, transferred and, and regulated. (Reus & liu, 2004; Mayer et al, 2000)	Emotional intelligence includes the ability of the group to understand, manage, and regulate emotions. Thus the group mood would play a key role in the ability to foster a group emotional intelligence. The more time each individual group members spends within the more the more he/she is able to harmonize his/her emotional ability and emotional patterns with the group as a whole thus creating a separate group social system. GEI may develop as a result of shared affect and emotional contagion
<b>Group Mental models</b>	The mental map each team member has of a shared level of organized understanding and mental representation of knowledge about the important aspects of the team's environment. Shared amongst team members so that each member subconsciously anticipates and understands the other members in team and so is able to effectively coordinate his/her role within the team. (Klimoski & Mohammed , 1994; Nowak, Vallacher, Zochowski, 2002; Lim & Klein, 2006)	Group members, through social interactions with other team members, create a group level understanding of the mental and emotional abilities of the other members. Thus mental models would be linked with the development of group emotional intelligence. However It may be that mental models develop as a result of an increased level of GEI within the group.
<b>Transactive Memory Systems</b>	A group member's combined understanding of the individual level of knowledge he/she possesses & insight into what level of knowledge is possessed by the other group members (Wegner, 1986; Austin; 2003).	The ability of group members to understand each others cognitive mental states, allowing them to implicitly incorporate the knowledge of the group and also evaluate how that knowledge compares to their own. TMS may develop as a result of an increased level of GEI within the group.

**Transactive memory systems**

Another group process that bears on the discussion is *transactive memory systems* which has been defined as the “shared division of cognitive labor with respect to encoding, storing, and retrieving knowledge from different domains” (Lewis,

Belliveau, Herndon, Keller, 2007 p.160). Cognitive labor refers to the mental processes that occur in individual group members when they are processing and solving tasks. Transactive memory systems determine the implicit means that groups employ when dividing the responsibility of knowledge creation and task performance between group members. The use of implicit means would signify that the group members understand how group actions would be coordinated without the use of explicit means of communication such as talking with each other. Transactive memory systems therefore imply that through past interactions and experiences, each group member is subconsciously aware of the knowledge and experience base of the other group members and so the group as a whole implicitly recognizes how any particular performance task needs to be divided amongst the group members. This *shared understanding* of the expertise of the other group members' decreases the cognitive burden on any one individual and at the same time allows for the group output to be better understood in terms of quality and quantity (Lewis, et al 2007). Transactive memory systems require group members to be attuned to each other such that *over time*, individuals in such a system begin to attune their internal cognitive dynamic states to complement (or synchronize with) the other, and eventually become completely coordinated into a group level system (Nowak et al, 2002, Dansereau et al 1999). A shared understanding amongst the group members of each others' abilities would also involve an understanding of the group's ability to manage its emotional state and its emotional understanding when processing tasks. GEI therefore may be a developmental precursor to TMS, such that as the group members become more attuned with each other in terms of their knowledge of the others' abilities, others emotional states and

emotional management techniques, the group as a whole is able to create a group level system of sharing, encoding and retrieving information when processing tasks. Transactive memory can therefore also be understood as a group level concept has some relationship with group emotional intelligence and therefore is placed in figure 1 as a circle that overlaps with group emotional intelligence.

### **Group mental models**

Group mental models have been defined as “the mental map each team member has of a shared level of organized understanding and mental representation of knowledge about the important aspects of the team’s environment” (Lim & Klein, 2006). Lim and Klein (2006) demonstrate that group mental models are shared amongst team members so that each member subconsciously anticipates and understands the role and knowledge of the other members in the group. Each individual group member is thus able to effectively coordinate his/her role within the group. The literature on group mental models has elucidated that the members of a group are more likely to hold multiple mental models in their mind rather than just a group level model, i.e. the mental models are used to understand other group level aspects that affect the group’s ability to process work (Lim & Klein, 2006; Klimoski and Mohammed, 1994). Since mental models require an understanding of the group as well as knowledge about the group and the cumulative knowledge of its members, its association with the concept of group emotional intelligence can be clearly seen. Group emotional intelligence has been conceptualized as the group’s ability to understand and manage the emotions and emotional states of its members. Emotions and emotional states in groups have been

theorized to exist in part as a result of knowledge awareness and knowledge sharing and knowledge about the group environment (Gant & Agazarian, 2004). Thus, group mental models would have an association with GEI since part of the emotional capability component of GEI includes the awareness and perception of emotional states within the group (Gant & Agazarian, 2004; Mayer & Salovey, 1990). Thus group mental models can be diagrammatically represented as overlapping with GEI.

The above section has identified past group level concepts that overlap, and are correlated with the concept of group level emotional intelligence. Table 1 provides a list and summary of the processes. The list is not exhaustive and other concepts that have not been identified may also overlap with group emotional intelligence. The next section will condense the information of the past sections in terms of using that information to create a multifaceted definition for group emotional intelligence.

### **A definition of GEI**

A definition for group emotional intelligence should involve an understanding of the content and context, form and function of GEI. The definition should allow for GEI to be conceptualized as multi-faceted concept which has relationships with other associated group concepts discussed in the past section. This definition should allow for GEI to be understood in terms of its antecedents (what helps in the formation of GEI) as well as its outcomes (what are the advantages to of a group possessing GEI), since such an understanding will explain its usefulness as well in understanding and predicting group behavior. This dissertation's review of past literature on group emotional intelligence has shown that seminal work on a commonly accepted definition

may already exist and that this work can be utilized and incorporated to create a proposed multi-faceted definition.

In their critique of individual emotional intelligence, Moshe et al (2008) state that there are a number of reasons that individual emotional intelligence may possess more than one dimension. These reasons are the varying definitions of the concept (i.e. the lack of a common definition), the presence of various scales of the individual EI that seem to be measuring different emotional intelligences, as well as the weak correlation between the tests and questionnaires and the self reports (Moshe, et al. 2008). In a similar vein, this dissertation proposes that group emotional intelligence should also be considered a multidimensional concept similar to what has been proposed for individual emotional intelligence (Cherniss, 2010). It (GEI) seems to have a variety of definitions, which may have some similar themes but each tends to capture different aspects. Additionally as the past section has demonstrated, GEI has theoretical and conceptual relatedness with other group level concepts that describe group ability and shared group affect. So creating a definition of group emotional intelligence should allow for a recognition and explication its multifaceted nature.

This dissertation also utilizes Moshe and Roberts (2008) argument about defining individual emotional intelligence; that GEI requires a definition that should not be too restrictive (i.e. not being able to fully capture the concept) or too exhaustive (adding just about all that can be added by making it into a ‘laundry list of abilities’). In that regard, the table below (Table 4) posits what GEI should entail and how it can be understood in terms of a multifaceted, multi-component definition. This definition

allows GEI to incorporate the relevant aspects of what group emotional intelligence may involve, and the ways it may be related to the other previously mentioned concepts.

**Table 4 : Understanding the components of GEI**

<b>Utilizing past and related concepts to formulate a usable definition for group emotional intelligence</b>			
<b>Main Component</b>	<b>What this GEI component incorporates</b>	<b>What this GEI component may lead to</b>	<b>Group level concepts that may develop due to GEI</b>
<b>Relationship building Capacity</b>	A norm developing ability  Relationship building  Group Identity building	Efficacy , cooperation, collaboration, shared affect, emotional contagion	Group mental models : the mental map each team member has of a shared level of organized understanding and mental representation of knowledge about the important aspects of the team's environment. (Lim & Klein, 2006). GEI's development of group norms, group identity, and relationship building would be highly responsible for creating group mental models.
<b>Group emotional capability (Huy, 1999; Reus and Liu, 2004)</b>	to understand what the group thinks as a whole  to understand what the group feels as a whole  Shared affect  Emotional contagion	The development of: • transactive memory systems in individual members of the group  • mental models of group interaction in individual members of the group	Transactive Memory systems: A group member's combined understanding of the individual level of knowledge he/she possesses as well as insight into what level of knowledge is possessed by the other group members (Wegner, 1986; Austin; 2003).

In the first and second column GEI is divided into two main components: relationship building capacity and group emotional capability. Both components are further sub-divided into the aspects of GEI that they encompass. These aspects are



constituents of the main component that they are associated with. Some of these aspects are part of definitions and theoretical conceptualizations that have been posited by earlier scholarly work. The reason for the addition of these components in is because they have been shown (in past sections) to be theoretically linked with group emotion intelligence (see Table 3).

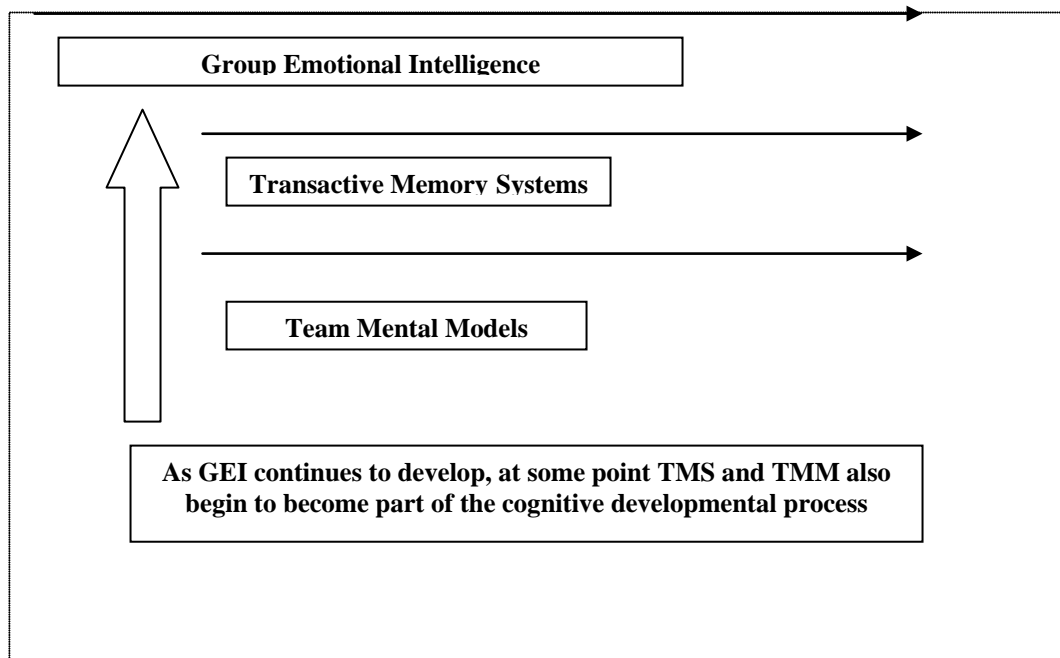
The third and fourth columns show the outcomes that might occur when group emotional intelligence (GEI) is utilized. Note that some of these outcomes were discussed as being associated with GEI. Transactive memory systems (TMS) and Group mental models (TMM) are such concepts. Both point to a state of affairs when the group has, as a result of interactions between group members, developed cognitive schema that assist with group output (TMS), and allow the group to possess a memory bank of past interactions (TMM). Hence both transactive memory systems (TMS) and group mental models (TMM) are learned behaviors and may start to develop as the group begins to develop, utilize and further enhance its group level emotional intelligence. It may difficult to theoretically and empirically demonstrate the “critical mass” of group emotional intelligence it takes to lead to the “creation” of transactive memory systems and team mental models in group members. Rather it can be ascertained that the steady formation, development and utilization of GEI by the group leads to the formation of team mental models and transactive memory systems in the group as well.

Past work on the development of group concepts have utilized an

input → process → output framework (I-P-O)

which may be a useful approach to group development, but is also a static perspective of group interaction (Ericksen & Dyer, 2004). The static perspective examines I-P-O

relationships within a single time period i.e. providing a snapshot of the group processes that are occurring. Erickson & Dyer (2004) as well as others advocate the use of a more “dynamic conception” where group development is seen occurring as a series of phases or cycles. I propose that the relationship between the concepts of GEI, transactive memory systems, and team mental models occurs along a continuum of development with the initial creation of GEI and the later formation of TMS and TMM occurring on a subsequent basis. Over time all three concepts can be theorized to continue to develop within the group. The figure below (Figure 2) illustrates this concept.



**Figure 2: GEI and other group concepts**

Using the first three columns from table 2, I offer the following definition of group emotional intelligence.

*Group emotional intelligence is the group level ability of developing emotional relationships between its members and the group level capability of utilizing its emotional awareness and management to process inputs and provides group outputs.*

The above definition incorporates the understanding:

That GEI exists at the group level and not at the individual level. GEI is a collective conceptualization of a group level process; not an aggregate of individual emotional intelligence. The use of “group level” in the definition points out a systems conceptualization, a group process that has moved past the aggregate of individual ability towards a more synergistic group level ability and capability where the sum is greater than the parts.

That GEI is a multi-faceted concept that incorporates aspects of relationship building capacity (creating group identity, group culture, and group norms) as well as emotional capability, (being emotionally aware of its group level ability). Thus GEI encompasses the ideas that a group has become emotionally aware of what it is (group identity), how it operates, the norms it operates within, the dominant culture that explain its behavior (group culture) and finally a group level ability of emotional management and perception towards performance and group output.

This definition of GEI is aligned with previous Cherniss’ (2010) recommendations on emotional intelligence (EI); that GEI like individual EI is a multifaceted concept that consists of the two components of group building ability as well as a group level system of collective emotional management. This definition is also aligned with Moshe et al.’s (2008) recommendation about theoretical

representations of emotional intelligence; firstly that they not be restrictive by focusing on one group level ability or provide a laundry list of abilities. This definition does not restrict GEI to a norm building ability like the Druskat and Wolff (2000) definition. It proposes that GEI consists of the ability of the group to develop norms of emotional management (relationship capability) as well as the ability of the group to perceive itself as a system that is able to collectively utilize its emotional perception and management towards group tasks.

### **Understanding the definition**

This section further explores the definition of GEI that has been proposed. Each component will be examined and its components discussed in terms of their relation to group emotional intelligence and why they contribute to it. The first component to be discussed is group relationship capability.

### **Group relationship capability (GRC)**

The term GRC focuses on that aspect of GEI which is utilized by the group to create a set of norms and the emotional interactions that the group can utilize to create a group culture i.e. a modus operandi for the group. This dissertation has shown in past sections that group level relationships of emotional management foster a group emotional intelligence. Druskatt and Wolff (2001) have stressed that social activity focused on emotional competence and the creation of norms of emotional management allow the group to build what they term as a group level emotional competence . Druskatt & Wolff (2008) develop a concept they term group emotional competence

(GEC) which they define as the ability of the group to create norms that build emotional competence and regulate group action such that group emotional intelligence is created, maintained and enhanced. Work group emotional intelligence thus requires certain actions by key individuals in the group that would promote the formation and sustenance of GEC. GEC is also fostered by the use of external inputs to the group such as championing the benefits of emotional intelligence (EI), training for group members in the advantages and the development of EI and having an organizational culture that promotes EI. Cherniss and Goleman (2001) have also posited that in order for the group to foster and build on its emotional intelligence it must create a group culture, with group norms and group rules of emotional management that help members understand and govern the relationships in the group. Ashkanasy (2003) has recommended that in order to foster emotional intelligence in organizational groups and work teams, the groups should utilize leadership and the culture that encourages the emotional perception and management. Goleman (1995) has also stressed that emotional intelligence in the group can be encouraged by the use of norms and socialization practices that allow group members to become more competent in emotional discourse. This dissertation has previously mentioned the study by Jordan et al. (2002) that first posited the idea of a group utilizing emotional intelligence. Over a 10 week period they (Jordan et al. 2002) monitored two sets of groups, one that were proactively inculcated in creating behaviors and norms that encouraged emotional management, and another control set. They found that initially the set of groups that were encouraged to promote a culture of EI did perform better than the control but over the 10 week period both sets of groups had a similar level of performance. Jordan et al.

(2002) and Ashkanasy (2003) theorized that such results were due to both sets of group developing norms of successful group level emotional management and utilizing these norms (or this culture) of emotional competence to successfully complete assigned tasks. . Hence group emotional intelligence can be partly defined as the group utilizing its group relationship capability to build relationships between group members. I have added norm developing, relationship building and group identity building, shared affect and emotional contagion as sub components of the relationship building component since they have been previously identified by authors that have theorized on the socialization practices that encourage group emotional intelligence. All these components are part of relationship building that group members engage in when developing group emotional intelligence. Emotional contagion and shared affect allows for the transmission of emotions and affect between group members, such that there is a group level emotion in the group.

### **Group emotional capability (GEC)**

To foster the development of group emotional intelligence, scholars have posited a concept that involves understanding the ability of the group to have the collective emotional intelligence to process group inputs to group outputs. This concept has been alternatively termed emotional capability.

My argument is that group emotional capability differs from relationship building capacity in the sense that group emotional capability is a measure of the group level *ability* to develop a sense of emotional understanding and emotional management whereas relationship building capacity would refer to the capability of the existing

socialization practices, norms and emotional culture building activities that are being employed by the group and their contributions to the group's emotional intelligence. Group emotional capability signifies a group level awareness of group level affect, a group level appreciation of the emotions of its members, an awareness of their emotional reactions and an ability to regulate the emotions their emotions, i.e. the ability to regulate group affect. As mentioned earlier, group emotional capability is aligned with a systems level concept, where the group is a separate entity that is aware and perceptive to its emotional state and is able to manage it with respect to group inputs and regulate group outcomes. Group emotional capability incorporates Cherniss' (2010) recommendation in using Mayer and Salovey's (1990) conceptualization of the four elements of an emotional intelligence; emotional awareness, emotional perception, emotional management of self and emotional management of others. The group emotional capability component of GEI allows a group level awareness of, perception of and understanding of the group's emotional self. The group is able to utilize the group emotional capability component of GEI to manage its internal group level affect with respect to its members as well as the inputs its receives from the organization. In this way the GEC component of GEI allows the group to process its inputs towards the successful management of group outputs. Thus the group utilizes its awareness of its emotional state to align itself with the emotional state of its group members as well as process whatever tasks it has been assigned so that it can address these tasks in the best manner possible.

In others words the group emotional capability (GEC) component of GEI is a *group level awareness* to develop relationships which contribute to the group's

emotional intelligence. The relationship building capacity can be utilized by the group as a means of performing further actions (based on the opportunity of the group emotional capability) that would enhance the emotional intelligence of the group.

### **Hypotheses: GEI and group outcomes**

From providing a model of GEI, the next step examines some relationships between group emotional intelligence and group outcomes. Table 4 shows that of the developmental outcomes of a group that utilizes a group emotional intelligence would be the creation of transactive memory systems and group mental models. Outcomes such as transactive memory systems and group mental models have been shown by past scholarly review to not have a reliable method of extraction and measurement (Klimoski & Mohammed, 1994, Wegner, 1987).

Since one of the principal aims of this dissertation is to provide a quantifiable measure of GEI, creating proper measures for the other possible outcomes of GEI are beyond the scope of this analysis. This section will propose a theoretical analysis of how the components GEI may affect the group and the possible measurable outcomes that can be empirically determined.

Relationship building has previously been identified as being involved in the utilization of group socialization processes and the development of a group culture (Druskatt and Wolff, 2000; Ashkanasy, 2003; Jordan et al. 2002; Goleman, 1995). As a result, the component of relationship building capability (GRC) present in group emotional intelligence should have a positive effect on group performance since groups that have established relationships, social practices and social norms have an established



understanding of how the group operates as a whole. The group norms and an established group culture allow for the group to process inputs such that tasks are assigned to members that are best able to process them and that tasks are processed within group norms and group culture practices. Working within established norms would imply that performance would be less affected by the group trying to figure out its own dynamics power struggles and differences of opinion. A group with competent, inbuilt norms of emotional perception and management, as well as a culture that promotes positive affect would be better able to process the task at hand and determine how best to address it. As a result a group in which GRC has allowed for the formation of competent norms of emotional perception and management is able to process tasks in a smooth, efficient manner allowing group performance to be positively affected. The following hypothesis is proposed:

*Hypotheses 1: The relationship building component (group relationship capability) of group emotional intelligence will have a positive effect on group performance such that the greater the relationship building capacity within the group, the greater the positive effect on group performance.*

Jerez-Go´mez, Ce´spedes-Lorente, & Valle-Cabrera (2005) state that learning in an organization occurs when there is leadership, shared vision (and learning is part of that vision), openness, experimentation and the ability to transfer explicit and implicit knowledge throughout the organization. At the group level, learning also requires such a *learning strategy*, i.e. leadership behaviors and proactive behaviors amongst group

members to increase and promote the level of knowledge within the group, a shared vision amongst the members of the group to increase the level of knowledge in the group, a culture of openness and experimentation such that the group is able to take risks and be open to new ideas, and finally the ability of group members to share that knowledge using implicit and explicit means of communication and within the norms and boundaries of group behavior (Jerez-Go'mez et al. 2005). GRC would be instrumental in creating such a learning strategy, since it is through the utilization and management of emotional relationships amongst group members that members would be able to sustain a culture of openness and innovation, be comfortable in sharing and promoting a vision of learning and increasing knowledge within the group and utilizing their emotional relationships to transfer knowledge (both explicit and implicit) within the group.

However the influence of negative affect needs should also be considered (Barsade and Kelly, 2001). If there is a prevalent negative emotion which is affecting the groups learning strategy, what effect would this negative emotion have on the group in terms of group learning ability? Would the relationship building component of the GEI also be affected? Barsade and Kelly (2001) point out that those individuals with negative affect tend to withdraw from the group and keep to themselves. Work groups usually have performance and learning requirements, and in the case of this dissertation, the GEI of workgroups is being considered. So, even though there exist high performing and low performing work groups, if the group is geared towards performance and group learning is a factor of that performance, then the relationship building of GEI will have a positive effect on group learning ability. Hypothesis 2 states that:

*Hypothesis 2: The relationship building component (group relationship capability) of group emotional intelligence will have a positive effect on group learning ability such that the greater the relationships building in the group the greater the learning ability of the group*

Huy (1999) theorized that the emotional capability of an organization is the ability of that organization to perceive, understand, monitor and regulate the emotions of its members in such a way the organization's routines and structures are built around its understanding of its members emotional state and ability. Huy (1999) states that if an organization is able to achieve such a state of emotional understanding with its members, then the emotional capability of the organization impacts its learning ability. At the group level, the emotional capability of the group may also affect the learning ability of the group. Since the group emotional capability (GEC) has been defined as the ability of group members to identify the emotional composition of the group (i.e. how the group thinks and feels collectively) and respond to that emotional composition in an effective manner, group emotional capability would be instrumental in group learning since emotional capability would allow for the sustenance of a shared vision of learning within the group, a group culture of openness to new ideas and innovation as well the transference of knowledge amongst group members. As group members socialize with each other based on established group norms and within the guidelines of the group culture, they will be able to share information and thereby create a repository of knowledge at the group level such that they are able to increase the collective

knowledge building capacity of the group. Thus the emotional capability component of group emotional intelligence can be viewed as the *ability* of the group to manage, understand and interpret the group level emotions such that the group is able to utilize the group emotions and emotional input to positively affect the group's knowledge sharing and knowledge building ability i.e. group learning ability. Positive emotions have been associated with positive performance as well as increased socialization within the group, i.e. group members are more apt to interact with each other and share knowledge towards any stated group outcome (Barsade and Kelly, 2001). Thus utilizing the emotional capability component of group emotional intelligence the following hypothesis is offered:

*Hypothesis 3: The emotional capability component of group emotional intelligence will have a positive effect on group's learning ability such that increased group emotional capability leads to a corresponding increase in group learning ability.*

Additionally we can also posit that increased sharing and an increased capacity of group level knowledge due to the emotional capability component of GEI will also positively effect group performance. Increased emotional capability would imply and increased level of group members being able to "tune in' to the overall emotional composition of the group. This increased capability to perceive, recognize and manage emotions would mean that the group is able to utilize its overall affect towards the intended group tasks and thus the greater the emotional capability of the group, the

greater the impact of group emotional capability on group performance. As a result we can offer the following hypothesis:

*Hypothesis 4: The emotional capability component of group emotional intelligence will have a positive impact on group performance, such that an increased in the group emotional capability would lead to an increase in the performance of the group.*

Both the components of GEI impact group performance and group learning. An increase in group performance and an increase in the learning ability of the group may point to a more effective group. Hence it can be hypothesized that group emotional intelligence has a direct positive relationship with group effectiveness, i.e. increased emotional intelligence at the group level would imply a more effective group. An effective group can also be termed a high performance group and conversely a less effective group can be termed as a low performing group (Akgun et al 2007). Thus it may be that high performance groups will have higher levels of GEI whereas low performance groups will have lower levels of GEI.

In their discussion of the effectiveness of groups and teams, Cohen & Bailey (1997) stated that for a group to be considered effective, it must demonstrate an increase in performance outcomes, attitudinal outcomes and behavioral outcomes. Performance outcomes were explained as an increased level of performance in the group based on the pre-determined conceptualizations of what would constitute good performance (Cohen & Bailey, 2007). Attitudinal and behavioral outcomes referred to issues such as increased job satisfaction and reduced turnover and absenteeism in the

group (Cohen & Bailey). In their framework of conceptualizing effectiveness in groups and teams, they (Cohen & Bailey, 2007) posited that certain group processes assist in the development of an effective team. The group processes that were mentioned were group cohesiveness, shared norms in the group; the concept of the collective mind that was initially espoused by Weick and Roberts (1993) and transactive memory systems (Lewis et al. 2007). Past sections of this dissertation have already theorized that an increase in the components of group emotional intelligence, namely group relationship capability and group emotional capability (GRC and GEC respectively), lead to increased group cohesiveness, increased development of group norms based on emotional management, and a fostering of the collective mind as well as development of transactive memory systems. Thus it may be inferred that if group emotional intelligence, by virtue of its two components of GRC and GEC, demonstrates an increase in group performance, it can be considered a group level process that promotes the effectiveness of the group. Oh, Chung and Labianca (2004) also demonstrated that group processes that increase the social capital in a work-group or team also increase the effectiveness of the team. Since GEI is a group process that has been hypothesized to increase social capital through the management of norms, creation of a group culture and the successful navigation of group level emotional management the following hypothesis can be proposed:

*Hypothesis 5: Group emotional intelligence has a positive relationship with group effectiveness, such that increased GEI will lead to an increase in the effectiveness of the group.*

The next section will address how to measure GEI such that the proposed five hypotheses can be tested.

## MEASURING GEI

Past studies that have tried to empirically determine group emotional intelligence (GEI) have used methods that are not congruent with understanding a group concept at a group level of analysis. The level of analysis error that occurs means that the GEI is not being properly determined at the group level. Scholars in the past have manipulated individual emotional intelligence scores to argue for a group level emotional intelligence (Cote, 2006; Ashkanasy, 2004, Jordan et al, 2002). These manipulations have included aggregation of individual scores, averaging of the sum of individual scores and questioning members about group beliefs and activities. This section will first deal with issues of aggregation and averaging of individual scores and then it will deal with questioning group members about group activities.

### **Aggregation and averaging**

Certain studies have also been utilized to theorize for the existence of GEI. One of the more prominent ones is an experimental study in which Jordan, Ashkanasy, Hartel and Hooper (2002) assessed performance between teams with varying scores of aggregated individual emotional intelligence. Over the course of their 10 week study they found that teams with a lower aggregate score of individual emotional intelligence initially had lower performance and problem solving scores. But after the 10 weeks, the

teams with lower aggregate emotional intelligence scores had similar performance scores as teams who had initially scored higher on their aggregate emotional intelligence. Jordan et al. (2002) attributed this to the input of training that all teams received over the 10 week period, but Ashkanasy (2003) in a later research article, used the basis of this study to argue for the possibility of the existence of a group level emotional intelligence. Ashkanasy (2003) speculated that a group level emotional intelligence may develop that causes a synergistic ability in the group such that a group with lower aggregate emotional intelligence would perform as well as the group with a higher aggregate emotional intelligence. Does aggregating the individual emotional intelligence scores of group members provide an adequate means of conceptualizing emotional intelligence at the group level?

In order for individual level scores to be aggregated to a group level concept, Klein, Dansereau and Hall (1994) have cautioned that the concept should have homogeneity within the individual units. As Klein et al. (1994) state “In specifying that the level of a theory is a group, a theorist predicts that group members are sufficiently similar with respect to the construct in question that they may be characterized as a whole” (p.199).

The homogeneity would indicate that the construct is equally present in all the group members, has been equally transmitted amongst members and thus may qualify for operationalization at the group level. Clearly this is not the case in with an individual EI since individuals having different levels of EI may exist in a group (Druskatt & Wolff, 2008; George 2002). Jordan et al. (2002) conducted an experimental study measuring individual emotional intelligence amongst group members and then



aggregated the individual scores of emotional intelligence (EI) to create a group level emotional intelligence. Yet Jordan et al (2002) acknowledge that group leaders may have different levels of emotional intelligence than the rest of the group and that the group leader's higher level of influence on the group may effect group ability in a differently than any other group members. As a result, construct homogeneity cannot exist within the group members and thus individual scores of emotional intelligence should not be aggregated to argue for group level emotional intelligence.

Since group members cannot be theorized to have a similar level of individual EI we can assume that there is heterogeneity of the level of EI within the group. Varying influences of the group members also signify that heterogeneity of the construct exists within the group (Klein, et al 1994). In order to measure a heterogeneous (within the group) construct Klein et al (1994) posit that the measure of the construct possess two key design characteristics. The first would be that the items in the measure focus on the activities of the entire group and not on individuals within the group, this allowing for the construct to be measured on a group level. This recommendation involves using items that are focused on group activities, i.e. rather than ask the individual on his/her activities, the questions are framed at the group level, such as "Our group is concerned with the feelings of all members". The level of analysis is no longer the individual unit but the group and so as per the recommendations of Klein et al (1994) the construct of interest is being measured at the group level.

The second recommended design characteristic is that the measure be designed to capture variability between groups and not within the group (also known as *between*

*group heterogeneity*), thus allowing for researchers to assess whether different groups can possess varying levels of the construct. Between group heterogeneity can be achieved when the items are designed to measure not a general idea of the construct under consideration but an individual's specific conceptualization of how his/her group is valued in terms of the construct. Since each group consists of a different set of individuals, it stands to reason that each group would have varying levels of the construct and this possess between group heterogeneity.

Such data can then be collected from various groups, and a measure of the group construct obtained such that the construct can be compared across groups and arguments made about the strength and explanatory power of the construct. From the above recommendations by Klein et al (1994) it can be assessed that the aggregation of group members' emotional intelligence scores would not suffice as a measure of group emotional intelligence. First, the aggregate score does not reflect a focus on the group as an entire unit and secondly, it is not explicitly designed to capture between group heterogeneity i.e. it is not a measure that can demonstrate that there are differences between groups as to the level of **group** emotional intelligence present in each of the groups. Rather it is merely demonstrates that a collection of individuals have a different aggregate score of emotional intelligence than another collection of individuals.

Averaging individual scores of EI can be dismissed along similar principles of construct heterogeneity at the individual level. Averaging presupposes that the varying levels of individual EI are somehow 'smoothed out' at the group level such that an average score of the group would reflect group EI level. Additionally, averaging the scores does not capture the activities in the group that might lead to a group level

emotional intelligence. However, scholars have demonstrated the use of certain indices that demonstrate whether data aggregation can be justified. These indices are the intraclass correlations and the *rwg* index (James, Demaree and Wolff, 1984; Castro 2002).

### **Intraclass correlations (ICC) and *rwg* indices**

According to Castro (2002), “The strength of the ICC is that they allow determination of how much of the total variance is due to group membership (ICC (1)), and whether this variability results in reliable group means (ICC (2)).” (Castro, 2002; p. 73). Interclass correlations allow the researcher to determine whether the data that has been obtained is significant at the group level, i.e. whether there are any relationships amongst the variables at the group level and also assess the reliability of these relationships (Castro, 2002; McGraw & Wong, 1996). Thus the variance in the responses (that have been recorded at the individual level) are not affected by the size or the number of the group and the variance can therefore be hypothesized to be as a result of the group activity (Castro, 2002). ICC (1) calculates inter-rater reliability using the group means whereas ICC (2) determines the reliability of the group means (Bliese, 1998). Interclass correlations therefore allow the researcher to understand whether the data that has been obtained does demonstrate variance at the group level.

As per the Klein et al (1994) recommendations group level data must also demonstrate that the aggregation of the responses at the individual level is justified. The intra-group agreement index (*rwg*) is used to assess whether there is agreement amongst members by comparing the variability of the variable of interest against an expected

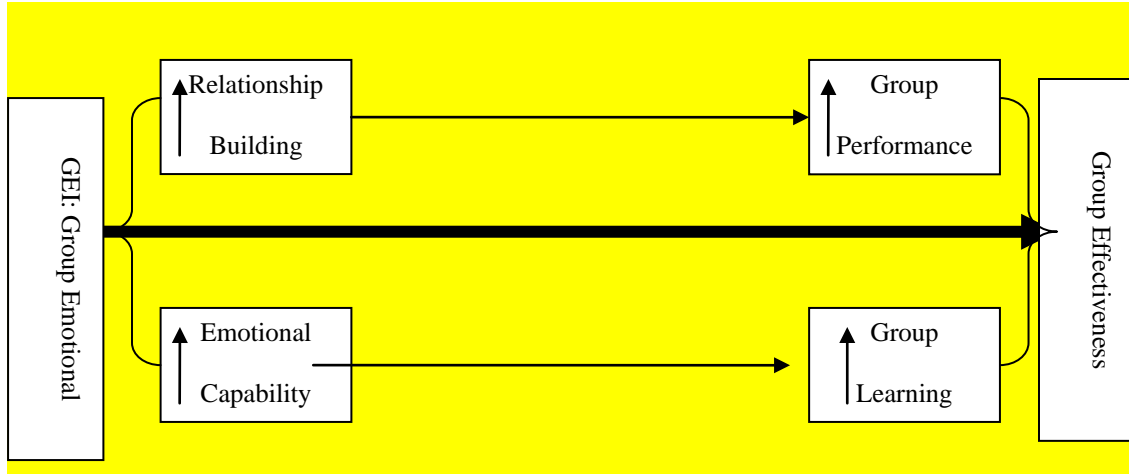
variance. The higher the magnitude of the ration obtained indicates a high level of agreement, i.e. that the variable of interest demonstrates a high degree of within group homogeneity. Thus the magnitude of the agreement index *rwg* would allow the researcher to assess whether the data does demonstrate the existence of group emotional intelligence or not. Ratings can be collected and the agreement amongst the observers on the existence of GEI is empirically determined using an intra-group agreement index *rwg* (James, Demaree and Wolf, 1984). Using such a method, this analysis enables us to study and understand the group on a group level of analysis and their subsequent ratings will assess within group homogeneity (i.e. the construct existing in a similar magnitude in all the group members thereby making it a group level construct). The ratings were converted to a group score for each group aligned with the Klein et al (1994) recommendation of being able to measure between group heterogeneity. In such a way group members can also be questioned on their assessment of group outcomes, i.e. their ratings of group performance and group learning ability. Since GEI (group emotional intelligence) is a group level concept, it needs to be measured at the group level, and hence the data needs to be understood from a group level perspective.

However there are certain issues with using the *rwg* that need to be taken into consideration. Firstly, although there is a criterion value that is used to signify agreement (in most cases 0.70), there is little justification for why this value is a cut off point (Castro, 2002). *Rwg* is also unable to rate the interaction terms of separate variables. In spite of the issues the *rwg* can be used to determine whether a variable has within group homogeneity regardless of the variability between groups

This dissertation has provided a definition of GEI. It has also provided hypotheses that demonstrate how GEI would be employed by the group and what group outcomes it would effect. It has shown that the current means of measuring GEI (i.e. averaging and aggregation) are incorrect from a level of analysis perspective but has shown that the use of certain indices may demonstrate that aggregation of individual level data does allow for a group level understanding of the data to take place. The next step is to propose a methodology that would allow for the measurement of GEI as well as creating a model that could be utilized to understand group emotional intelligence and its effects on group learning ability and group performance.

### **Model Conception**

This dissertation used an empirical model based on the conceptual definition developed earlier to create a survey to determine the group emotional intelligence in the group. Interviewing groups will provide descriptions of how each group interacts in terms of GEI and will allow researchers a further understanding into how GEI develops and how it is maintained in the group. The model shown below was a proposed model to demonstrate how group emotional intelligence and its components might affect group outcomes such as group effectiveness group performance and group ability.



**Figure 3: A proposed model of Group Emotional Intelligence**

### **Targeted groups**

Since the purpose of this dissertation is to evaluate the impact of group emotional intelligence on group performance and group learning, it is important to utilize those work groups that are performance oriented and tend to accumulate a level of group knowledge during their interactions. Thus it is important to select groups that have the potential to develop group norms, establish a group culture and where the group members interact with each other on a regular basis. For the purpose of this analysis, groups from the FCCMA (Florida City and Council Management Association) and the Florida League of Cities were contacted. The FCCMAS and Florida league of cities have memberships of cities, towns and villages in Florida. Using this database from both these organizations, cities, towns and villages in the south eastern region of Florida were contacted and city managers requested whether they would be open to allowing the groups in their cities to complete the online survey. Cities, towns and

villages possess groups that work together on issues related to local and state government. Membership in these groups is relatively stable and allows for the formation of a group culture and established group norms. Thus, the groups have been formed over a long period and are not ad-hoc i.e. groups or teams that have recently come together for a purpose and usually disbanded after the purpose has been met. Questionnaires were distributed to these groups using an online survey tool. Participation was anonymous since the groups were instructed to name themselves, i.e. the groups will choose a group name unknown to the researcher, and individuals that are members of the group responded to the online survey using this group name. Such a method ensured confidentiality of the group.

## EMPIRICAL ANALYSIS

The empirical analysis for this dissertation is a four step process. The first step consists of creating and administering the questionnaire that is able to correspond to the latent variables that are under analysis in this dissertation. The latent variables consist of the two components of GEI (group relationship capability and group emotional capability), as well as the two proposed outcomes that GEI has been hypothesized to affect, group learning ability and group performance. The items in the questionnaire will be modified from past questionnaires that dealt with the proposed latent variables (Hamme, 2003; Sears, 1989; Anderson & West, 1986), as well newly created items that correspond with the latent variables. The questionnaire will be administered to the city groups that have been specified in the previous section.

The second step of the analysis is to perform a factor analyses (EFA and CFA) on the data obtained. A factor analysis is a technique that allows for the researcher to determine the underlying structure among the variables in the analysis (Hair, Anderson & Black, 2010). Underlying structure implies that a factor analysis allows for analyzing the correlations amongst items by defining the items that are highly interrelated and compounding them into factors (Hair, et. al. 2010; Nunally, 1986). These factors can then be analyzed to see if they theoretically correspond with the proposed variables. Once an exploratory factor analysis is performed a confirmatory factor analysis was also undertaken. This was necessary since this dissertation has proposed a new definition of GEI as a multifaceted, two component concept and it is necessary to ascertain if this proposed definition and model of group emotional intelligence can be empirically demonstrated and confirmed using confirmatory fit indices.

The third step of the analysis involves the process of aggregation. This dissertation has pointed out that in order to predict a group level concept such as group emotional intelligence and its effects on groups in the public sector, the data must be at the group level. As explained earlier in this dissertation, for data to be at the group level, the components of GEI (namely group relationship capability and group emotional capability) need to be aggregated as a group. Aggregation must be justified using the tools specified earlier; namely an rwg analysis and ICC analysis. RWG and the ICC analysis demonstrate whether aggregation of the data is warranted, and the data was subsequently aggregated and the corresponding regressions run to test the hypotheses.



The fourth and final step is to test whether the components of GEI can predict the group outcomes; namely group performance and group learning ability. The initial design was to utilize a modeling technique such as structural equation modeling to assess whether the model that was proposed in figure 3 could be considered a good fit. Circumstances however, did not allow for the initial design to be performed. As a result, the fourth step is a multiple regression analysis. A multiple regression allows for the analysis of a relationship between a single dependent variable and several independent (predictor) variables (Hair et al. 2010). In this case the three predictor variables are the components of GEI, group emotional capability and group relationship capability, and new member conformity and the dependent variables are group emotional capability and group relationship capability. The hypotheses proposed are that the components of GEI (the independent variables) can predict group learning ability and group performance. A multiple regression will allow for the testing of such proposed hypotheses. If the regression demonstrates a positive, linear relationship between the dependent variables and the predictor variables, then the hypotheses are true, that is GEI does have a positive affect on group learning ability and group performance. The following sections expand further on the empirical analysis.

The above prescriptive steps will allow for the development of a greater body of knowledge about the issue of group emotional intelligence. Group level concepts such as group emotional intelligence may have a lot of intuitive appeal and such appeal may sometimes cause organizational theorists and consultants to bypass rigorous examination of the concept and fall headlong into utilizing the concept without a proper understanding of what it is. Rigorous examination and conceptualization allows

scholars to determine whether such concepts allow for a better understanding of group behavior. This dissertation's step by step process allows a proper determination and examination of group emotional intelligence.

### **Step 1: Questionnaire (construction and implementation)**

As mentioned the first step of the empirical analysis is to create a tool that is able to measure the components of GEI as well as the proposed dependent variables. This step includes questionnaire construction, addressing the format of the items to be used in the questionnaire, the inclusion of control variables in the questionnaire and any issues that may arise from using this questionnaire tool.

By reviewing past literature of group emotional intelligence this dissertation has demonstrated that GEI is a concept that requires further theoretical and empirical so that it can be better understood and utilized for predicting certain group outcomes. The goal of the questionnaire construction was to create and utilize items that reflected a group level of understanding and that could be geared towards public sector groups. Since there have been no past studies of group emotional intelligence in the public sector, new items were created from adapting past studies that examined emotional intelligence in groups or organizations (Hamme, 2003; Seers, 1989; Anderson & West, 1998). Item wording was altered to reflect a group level of analysis and new items were also created to capture the proposed definition of GEI and its multifaceted nature.

## **Past questionnaires on GEI**

As previously indicated, some of the items utilized in the survey were adapted from past works that focused on the emotional works of the group (Hamme, 2003). The items that were adapted from Hamme (2003), included some items that corresponded to the group relationship capability component (GRC) component of GEI. Hamme (2003) based her questionnaire on Hemphills (1956) subscales of group behavior. Her group emotional intelligence questionnaire was based on the constructs of group awareness of members, group regulation of members, group self awareness and group self regulation. Hamme's (2003) results demonstrated that factorial model where a single factor result was obtained and she states that the result may be due to inadequate discriminant validity between her proposed constructs. Additionally, some of her items were negatively worded items, where the Likert scale of response required a reversal to indicate level of agreement. Podsakoff et al (2003) have suggested that the negative wording of items may cause respondents to incorrectly answer the questions. Also the constructs such as group awareness of members and group awareness may have discriminant validity issues such that trying to extricate factors based on such constructs that are supposed to be distinguishable from each other may be difficult. As a result the items that were adapted so that they were not negatively worded, and were simplified in terms of language and selected on the basis that they were best likely to reflect the proposed components of GEI with as little confusion as possible.

The table below shows the questions that were adapted from Hamme (2003)

**Table 5 : Adapted questions from Hamme (2003) \***

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The perspectives of all members are considered useful to the group

Other members' points of view are solicited prior to making a decision

In any situation, our group could tell you what each member would be worried about

Members of the group act in ways that show they care about each other

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\* (source Hamme, 2003)

The resultant instrument was a questionnaire with items that intended to measure the four variables of interest, namely emotional capability, relationship capacity, group performance and group learning ability. In addition to using modified items from past works on group emotional intelligence, new items were also generated for the variables which aimed to capture the variance in the components of relationship capacity, and emotional capability.

The four latent variables that were measured are group emotional capability, group relationship capacity, group learning ability and group performance assessment and all items reflect the respondent's understanding of group level behavior that is unique to his/her group.

In addition to items dealing with the components of GEI, group performance and group learning ability, additional items were added that assessed the demographics of the individuals in the group, such as age, gender, education level, number of people in the group, and the number of times the group meets. These items were added as control

variables to assess whether the correlations between the items of interest were warranted after controlling for such variables.

## **Samples**

Two samples were utilized. The sample for the EFA was, as indicated earlier, the initial sample that was collected using student groups. Student groups that were in undergraduate and graduate classes in the business school of a major university in South Florida were approached during class sessions and provided with pencil and paper copies of the survey. The classes that were approached already had students working in pre-assigned groups. All the data collection took place during the end of the fall semester of 2010 and hence it can be assumed that the students in the groups had had some time to interact with each other and develop group level relationships. Data from 23 groups could be used in the exploratory factor analysis.

For the CFA, the proposed subjects for the sample were government employees of a city, a town or a village that were members of the FCCMA (Florida City Council Management Association). Most of the cities, towns and villages that responded had a number of groups/teams that worked together in various departments, and so all interested teams were invited to participate. Most individuals responded to the survey using an online survey method on [www.surveygizmo.com](http://www.surveygizmo.com). A total of 236 completed responses were collected of which a total of 217 were used due to some being incomplete or incorrectly answered. The total number of groups that responded to the survey was 44. The ages breakdown of the respondents were 18 – 35 constituted 53% of the respondents, 26 – 55 constituted 37% of the respondents and 3.7% were over 55

years of age. 44% identified as female and 44 % identified as male. 5.9% had a high school diploma, 79% had an associates or a bachelor's degree, 11% had a masters, and 1.4 % had either a PhD or a JD. Over 80% of the respondents had groups that met at least 4 times a month.

### **Sampling design**

To obtain the sample, the director of the FCCMA was initially contacted and a request made to contact the members of the FCCMA. Upon approval by the director, city, town and village managers in the Gold Coast Area of the Florida Chapter were contacted through e-mail. The initial e-mail request was usually sent to city manager and consisted of an invitation to participate and a copy of the survey. If a city manager (or the relevant authority) accepted the invitation, a link to complete the survey was provided. City managers passed the link to all groups in the organization.

The research design was anonymous, with no items in the questionnaire requesting any personal information about the respondent. Since the survey was about group activity, individuals in groups identified themselves by a self chosen group name. The name was not disclosed to the researcher. This allowed the researcher to know that the individuals who responded were in a city group that had a performance outcome but not know which city, town or village the group belonged to.

As indicated earlier the surveys to the student groups were administered using the paper and pencil method, and the surveys for the city groups were conducted using an online tool. Research on the differences between paper survey administration versus online demonstrates that online surveys have no appreciable difference in terms of the

psychometric characteristics and the factorial structure and the internal reliability of the latent variables (Riva, Teruzzi, Anolli, 2003). Newsted (1985) did suggest that online presentation of the survey increased the subject's understanding of the questions that were being asked in the items. As a result based on past research it may be same to assume that using an online survey for the city groups and a paper and pencil survey method for the students did not appreciable affect the factorial structure of the latent variables and so it is acceptable to use two different methods of questionnaire administration in this case. Additionally the resultant structure of the EFA model was tested using CFA and as this dissertation will demonstrate in a later section, the fit indices demonstrated an acceptable resultant model.

## **Step 2: Exploratory and confirmatory factor analysis (EFA & CFA)**

### **Exploratory Factor Analysis**

Since one of the main arguments of this dissertation the re-conceptualization of GEI it was necessary to create an instrument that incorporated items that reflected theoretical underpinnings of the new understanding of Group Emotional Intelligence. This dissertation contends that GEI consists of two separate components, a relationship building component and an emotional capability component. The relationship building capacity component of GEI was assessed using items that stressed the 'social intelligence' aspect of GEI, i.e. the ability to create a group level culture, build group norms, and in general share a group level understanding of activity centered group affect. The emotional capability component was assessed using items that demonstrate

group members' capability of identifying and assessing group emotion, understanding how emotions are processed within the group and the understanding the group's norms of emotions in the group.

Examples of items that were used in the initial survey are shown in Table 6. As mentioned earlier these items have been either modified from past literature on emotional intelligence, and some items have been developed for the questionnaire tool it is necessary to ascertain whether the modified items have construct validity.

Construct validity is defined as the extent to which a set of measurement items reflect the latent variable that they are designed to measure (Hair et al. 2010; Crocker and Algina, 1986). A method that is used to test and see if the items in a measurement tool (such as a questionnaire) correspond with the latent variables is a factor analysis (Hair et al. 2010). There are two types of factor analytic techniques, exploratory factor analysis and confirmatory factor analysis.

**Table 6: Some items that were used in initial survey**

<b>Some Items that were used in the initial exploratory survey to assess the components of Group Emotional Intelligence</b>	
<b>Emotional Capability</b>	<b>Relationship Capacity</b>
Members understand each other's emotions	The groups appreciates the efforts of all members of the group
Members understand the prevailing mood in the group	Groups members make an effort to get to know each other
We have the ability to understand the social cues and signals to determine emotions being expressed in the group	There is a feeling of camaraderie (togetherness) in the group
Members are aware of the group mood at all times	Group members consider all efforts the group makes as a team effort
Members of the group try and respond effectively to the groups emotions	Group members consider themselves interconnected with each other
Members are aware of the feelings of other members	Group members work with each other in a coordinated fashion



Exploratory factor analysis (EFA) is used when the researcher wishes to explore the underlying factor structure on a set of observed variables without imposing a preconceived theoretical structure on the outcome (Child, 1990). Thus an EFA is used when the researcher does not know what latent variables are being measured and how the resultant factors will explain the observed data and what latent variables such factors would represent (Suhr, 2003). Confirmatory factor analysis (CFA) is a statistical technique which is used to verify the factor structure of a set of observed variables. The CFA allows the researcher to test a predefined, hypothetical theoretical structure to assess whether the association predicted between the observed variables and underlying latent constructs did exist (Hair et al, 2010; Suhr, 2003). A CFA ascertains the construct validity of the measurement tool (Hair et al, 2010). The researcher uses a priori knowledge of past theoretical and empirical research to posit a research pattern before the analysis and then performs the analysis to test whether the predicted tool and the associated items did possess construct validity. In most cases a model is specified and then fit indices are used to test whether the model 'fits' in with the observed data, (Suhr, 2003).

Both EFA and CFA are at opposite ends of the factor analytic spectrum. For a CFA a model has already been specified, as have the number of factors and factor loadings are restricted so that each measured variable loads only on the latent factor it is supposed to represent (Stevens, 2002). On the other hand an EFA allows for a certain level of exploration, i.e. to assess whether the data will correspond to certain underlying factors that the researcher may have conceptualized.

For the purpose of this dissertation the correct factor analytic technique would be an exploratory factor analysis followed by a confirmatory factor analysis. An EFA allows the researcher to have some underlying theoretical notions of what the emergent factors may represent. Since this dissertation has created a new understanding of GEI that incorporates two separate components, the resultant questionnaire tool that has been created can be considered an exploratory tool. A factor analysis on the questionnaire may yield a better understanding on which items correspond with which factors.

It does need to be noted however that an EFA is different from a PCA (principal components analysis), although in most cases both are incorrectly considered the same technique (DeCoster, 1998). According to DeCoster (1998), the main purpose of a PCA is to obtain a small number of components that can account for the variability in a large number of measures. Thus a PCA is a data reduction technique and is performed when the researcher does not want to include all the original measures in the final analysis but may still want to work with all the information that they may contain. DeCoster (1998) advises that a PCA should be used for data reduction purposes but an EFA should be used when one is interested in making statements about the factors that they obtain. Hair et al (2010) also distinguishes between a PCA and an EFA by using the terms data summarization and data reduction. According to Hair et al (2010) data summarization involves the definition of a structure. i.e. conceptualizing how questionnaire items relate together to create a composite latent variable that can include generalized items as well as specific items that 'explain' the characteristics of the latent variable. Data reduction, on the other hand is simply a reductive process that helps in creating a new set of variables, much smaller in number, than the original variables that were in the data set.

Thus since our questionnaire requires an initial exploratory analysis that assumes that the factors obtained are theoretically aligned with the proposed latent variables, this dissertation will employ an EFA technique. An exploratory factor analysis used for such a purpose is in accordance with what researchers have used the EFA for, since as Conway and Huffcut (2003) mention “Another preliminary-evaluation purpose involves the use of EFA with new or ad hoc instruments to find out what the dimensionality is (so composite scores can be created for use in hypothesis testing).” (p. 149). The EFA will allow an initial understanding and refinement of the instrument that is being used to measure the components of GEI as well as the proposed outcomes. The student sample will be used to conduct the EFA analysis and the CFA analysis will be conducted using the data obtained from city groups. The next sections of the factor analysis will be a step by step description of how the analysis took place.

### **Assumption testing**

Assumption testing allows determination whether the factor analysis being performed will yield a theoretically and conceptually sound result that can be used for further analyses. The first assumption that needs to be tested is an overview of the conceptual issues, i.e. whether some underlying theoretical structure that exists for the selected variables. Factor analysis is a data analytic technique which by itself had no means of appropriateness other than the correlations of the variables (Hair et al, 2010). In this case the EFA is being employed upon a theoretically sound foundation and the items that are being used in the questionnaire have been created and modified from past

empirical analyses. As a result, I feel that the conceptual assumptions of performing a factor analysis are met.

Another method of determining the appropriateness of factor analysis is by using Bartlett's test of Sphericity which examines the entire correlation matrix (Hair et al, 2010). The Bartlett's test for Sphericity assumes a null hypothesis which states that the items in the correlation matrix are uncorrelated. If the test comes out statistically significant (i.e.  $\text{sig} < .05$ ) we can reject the null and assume that there are sufficient correlations amongst the variables to proceed. The test is sensitive to sample size, such that an increase in the sample size would lead to the test becoming more sensitive in detecting correlations amongst the variables. (Hair et al, 2010). Thus utilizing the Bartlett's test alone may not suffice as a means of determining whether the data has sufficient correlations between the items to warrant a factory analysis.

Due to the sensitivity of Bartlett's test to sample size, another test to determine adequacy of the factor analysis is the KMO or Kaiser-Meyer-Olkin MSA or measures of sampling adequacy. The MSA is an index that ranges from 0 to 1 with a value of 1 indicating that a variable is perfectly predicted by another variable. Hair et al. (2010) provides the following guideline whether there is sufficient inter-correlation between the variables to warrant a factor analysis: .80 and above, meritorious; .70 or above, middling; .60 or above mediocre; .50 or above miserable and below .50 is unacceptable. The MSA increases with increases in sample size, increases in the number of variables, increases in the average correlation or decreases in the number of factors. However utilizing both the Bartlett's test and the KMO measure of sampling adequacy has been shown to be an acceptable method for assessing whether a factor

analysis is warranted. Additionally the PASW SPSS program with which this analysis was conducted allows the researcher to use both the indices to determine whether the factor analysis conducted was valid.

In the case of this EFA, assumptions for sampling adequacy were conducted using the both KMO MSA test and Bartlett's test for Sphericity. For the final rotated solution that was utilized, the result of the KMO test was above 0.942 and the Bartlett's test was significant at the .0001 level. Both the results indicate that correlations between the items are significant and that the data will factor well based on correlations (Hair et. al. 2010, Suhr, 2003; Child 1990).

### **Type of FA (factor analysis) and rotation**

Most factor analysis models can be categorized as common factor models or component models (Gorusch, 1983). The PCA (principal components analysis) is the most popular component model and amongst the common factor models, the maximum likelihood and the principal axis factoring models are the most popular (Conway and Huffcutt, 2003). The goal of the PCA is to simply reduce the number of variables and the goal of the common factor models (such as maximum likelihood and the principal axis factoring) is to understand the latent (unobserved) variables that account for the relationships amongst the measured variables (Conway and Huffcutt, 2003). Additionally Conway and Huffcutt (2003) state that if the purpose of the research is to understand the latent structure of a set of variables then the use of a common factor model such as principal components or maximum likelihood is the best option. In addition when a principal components analysis has been used to understand the latent

structure of a set of variables, some scholars have reported that the results can be inflated and look better than they actually are (Gorusch, 1997). Conway & Huffcutt (2003) also report that a common factor analysis such as the maximum likelihood method tends to provide more accurate results in terms of determining the latent variables that are being explained by the observed items in the questionnaire.

Since the primary objective of the factor analysis was to identify the latent dimensions present in the data, a common factor analysis was performed and in this case the type that was used was the maximum likelihood method.

“In practice, the objective of all methods of rotation is to simplify the rows and columns of the factor matrix to facilitate interpretation” (Hair et al.2010; p.115). A rotation in a factor analysis allows for a more theoretically understandable result. Hair et al. (2010) and Conway & Huffcutt (2003) state that most researchers agree that an unrotated solution is not a sufficient end to the factor analysis, i.e. the goals of the factor analysis using a maximum likelihood method of extraction are to ascertain with the most accuracy, which items correspond to which previously theoretically posited variables . For that reason a rotation of the initial solution allows for a reduction of some of the ambiguities that initially accompany an initial un-rotated solution (Hair et al, 2010), i.e. the unrotated solution may not adequately represent which items correspond with which latent variables.

There are two types of rotation that are commonly used in factor analysis, an orthogonal rotation and oblique rotations. Hair et al. (2010) state that the orthogonal rotations are the most common for two reasons; most statistical packages offer mostly orthogonal rotations and because the analytic procedures for performing oblique

rotations are not as well developed and still subject to some controversy. In orthogonal rotations, the factors are maintained at 90 degree separations thus allowing for a solution in which the factors are uncorrelated with each other as possible, i.e. the factors are distinct from each other. There are three techniques for orthogonal rotations; quartimax, varimax and equimax. Of all three, Hair et al (2010) suggest that the varimax produces a better separation of the factors and has proved successful in obtaining an orthogonal rotation of the factors. Quartimax tends to create a large general factor which may not be aligned with the goals of the rotation. As a result of the above arguments, I chose to perform a varimax rotation on the factor analysis.

A varimax rotation was also performed on the prediction that the factors would correspond with the latent dimensions that were being examined in the test instrument. The factor analyses were performed using SPSS analytical software, and factor loadings that were below 0.4 were removed from the final rotated factor solution. Hair et al (2010) that factor loadings that are 0.4 and above be retained, and that factor loadings above 0.7 are an indicator of an ‘anchored’ item, i.e. an item that is definitely associated with the latent variable being measured. Since this was an exploratory analysis in which the next step would be a confirmatory factor analysis of the proposed model, I chose to retain all items that loaded over 0.4 on any particular factor.

Another issue of consideration was cross loadings. Cross loading is an outcome when an item loads at a level above the assigned cut off value on more than one factor (Hair et al, 2010). In the case of cross loading items, Hair et al (2010) suggests that dealing with the item should be based on a theoretical and empirical evaluation of the item. If a removal of the item and a subsequent factor analysis yields a more

parsimonious, better defined solution, then it may be best to remove the item. If the item may be critical to the description and understanding of one of the factors, the item may be retained with an explanation as to why this was so (Hair et al. 2010). The next section provides an analysis of the factor solution and the items that were retained as well as those that were discarded.

### **Analyzing the rotated factor solution**

One of the objectives of this dissertation was to determine the proposed theoretical components of group emotional intelligence, namely group emotional capability and relationship capacity, the final factor solution was examined to see how the items loaded on factors that could be identified with the proposed theory. The final factor solution provided five factors in which two factors corresponded to the dependent variables of learning ability and group performance and the other three extracted factors corresponded to emotional capability, relationship capacity and new member conformity. The table below indicates the extracted factors and the items that were associated with them.

Five items were removed from the initial factor analysis runs since they cross loaded onto factors and their position could not be theoretically justified. The removal of these items and a subsequent EFA resulted in a better defined model and figure 4 is the solution. Removal and inclusion of items is a two pronged analysis, which employs theoretical justification and empirical analysis (Hair et al, 2010). The subsequent factor analysis yielded a five factor solution.



	Items	Item Denotation	Factor				
			1	2	3	4	5
Group Learning Ability	Learning is open to all members of the group	ler6	0.8				
	Group members can express opinions and make suggestions regarding group practices	ler4	0.753				
	New ideas are openly discussed by the group	ler3	0.729				
	Members of the group are always open to new ideas	ler1	0.679				
	Learning is not confined to some group members	ler5	0.672				
	Our group does not limit the learning experience	ler7	0.649				
	Group Members are aware of how things are done in the group	rel8	0.532				
	Group members are encouraged to provide open and honest feedback	emo15	0.498				
	Members of the group are open to using the successful ideas from other groups	ler2	0.497				
	When the group makes a decision all members are considered	emo10	0.465				
Each group member knows what is expected of him or her	emo11	0.459					
Emotional capability	Group members understand the mood of the group at all times	emo2		0.798			
	Our group understands each others' emotions	emo1		0.77			
	Our group knows the 'overall' mood at all times	emo4		0.713			
	Group members respond to each others mood effectively	emo5		0.671			
	Members of our group understand the signal and cues expressed in the group that determine group emotion	emo3		0.652			
	Group members respond effectively to the feeling of other members	emo7		0.625			
	Group Members are aware of the feelings of other members	emo6		0.585			
	Members of our group can maintain their feelings while appreciating the emotions of other group members	emo18		0.495			
Group members are aware of how feelings are handled in the group	rel9		0.428				
Performance	Our group considers itself a better than average performer when ranked against other groups	per3			0.717		
	Our group is able to consistently achieve the standards it sets for itself	per2			0.703		
	There is a sense of achievement in the group	per4			0.696		
	The group considers itself a high performance group	per1			0.686		
	The group is generally satisfied with its progress	per5			0.642		
Relationship capability	There is a feeling of 'togetherness' in the group	rel3				0.605	
	All efforts the group makes are a team effort	rel4				0.54	
	The group responds as a unit when dealing with negative feelings	emo14				0.53	
	Group members consider themselves interconnected	rel5				0.518	
	Group members respond to criticism in a constructive manner	emo16				0.505	
	Group Members make an effort to get to know each other	rel2				0.497	
	Group failures are openly analyzed within the group	emo17				0.479	
	The group does not blame any particular member for a failure	rel7				0.46	
The group appreciates the efforts of all members of the group	rel1				0.43		
New Member conformity	New group members are expected to conform to the group culture (how things are done in the group)	rel10					0.903
	New group members are expected to conform to the group climate (how things are handled in the group)	rel11					0.9

Figure 4: Rotated factor solution

### **Group learning ability**

The final factor solution of learning ability (a dependent variable in the proposed hypotheses) included items that were initially theoretically attached to the emotional capability component of GEI (indicated in the table as emo15 and emo10). Group learning ability was explained as the ability of the group to foster learning which involves group members being able to openly ask questions of each other and communicate in a manner that does not limit successful dialogue. Both the items emo15 and emo10 correspond with such ability since they state “Group members are encouraged to provide open and honest feedback” and “when the group makes a decision all members are considered” respectively. As theorized earlier by Jerez-Gomez et al (2005), learning occurs when there is a shared sense of vision as well as the sharing of knowledge, as well as openness of communication. Openness and sharing and consideration thus become important aspects of learning in a group level setting and the items emo15 and emo10 allude to that sort of learning in the group. Similarly, the items emo11 “each group member knows what is expected of him/her” and rel8 “group members are aware of how things are done in the group” point to an understanding that group members have learned about group expectations as well as learning about how the group operates and so these items were retained in the factor of group learning ability.

### **Group emotional capability (GEC)**

For the latent variable of emotional capability, most of the items that were retained were initially theorized to be associated with the latent variable. However in

the final factor of solution of emotional capability, the item rel9 was also retained. The wording for rel9 is “Group members are aware of how feelings are handled in the group.” This item clearly corresponds with emotional management which has been identified in this dissertation as a facet of emotional capability and as a result was retained in the final factor solution along with the other items that were also originally conceptualized as part of the emotional capability component of GEI.

### **Group relationship capability (GRC)**

In the final factor solution for the relationship capability component of GEI, three items that were originally conceptualized as part of emotional capability were retained (namely emo14, emo16, and emo17). All three items described group behaviors which allow for the development of relationships amongst group members. The items are, “The group responds as a unit when dealing with negative feelings”, “Group members respond to criticism in a constructive manner”, and “Group failures are openly analyzed within the group” respectively. All three items deal with how a group would utilize its relationship building ability when dealing with negative affect, criticism and a group level failure. As noted earlier, a facet of relationship capacity is the ability of the group to constructively utilize negative affect, criticism or a negative outcome. As a result these items were retained in the final factor solution for relationship capability.

### **New member conformity (NMC)**

The final factor solution also created a fifth factor that was not originally part of the theoretical justification of the components of GEI. This factor consisted of two items that were worded around the group's treatment of new members. The items were, "New group members are expected to conform to the group culture (how things are done in the group)", and, "New group members are expected to conform to the group climate (how things are handled in the group)". Both items point towards a group's expectations on how new members should be incorporated in the group such that the group's original culture and climate are not affected and relationships between group members are retained. This factor can be considered to be part of the relationship capability component of GEI. Groups in the public sector are dynamic entities that will deal with the loss of old members and the addition of new ones. Groups that possess a relationship capacity component should have an understanding of how to integrate new members into the group. An established group culture and group climate that fosters emotionally competent group behavior will allow for the integration of new members into group norms and practices. This factor was retained on the basis that the way the group handles new members would be a component of the relationship capability component of GEI.

The exploratory factor analysis (EFA) allowed for the use of statistical results to determine an underlying factor structure. Hair et al, (2010) point out "When EFA is applied, the researcher uses established guidelines to determine which variables load on a particular factor and how many factors are appropriate. The factors that emerge can only be named *after* the factor analysis is performed" (p. 671). Thus an exploratory

factor analysis may have some theoretical basis but it is mainly a statistical technique that allows researchers to determine factor structure. In order to provide an a priori theoretical underpinning to an empirical measurement tool, Hair et al (2010) and Byrne (2006) recommend that researchers follow up their EFA with a confirmatory factor analysis (CFA). A confirmatory factor analysis (CFA) is a technique where the researcher specifies the structure (or model) of how the items in the questionnaire tool will correspond to the specified latent variables. Thus a CFA allows for the creation of an “*a priori* theoretical pattern of factor loadings on the pre-specified constructs” (Hair et al, 2010; p. 671). The confirmatory factor analysis in a respect becomes a tool that allows the researcher to reject or confirm preconceived theory (Hair et al, 2010). In addition the CFA provides a measurement model of the logical and theoretical bases by which the measurement models represent the constructs involved in a theoretical model (Hair et al, 2010). The next section outlines the steps that are taken to specify and test the CFA model that was created for this analysis.

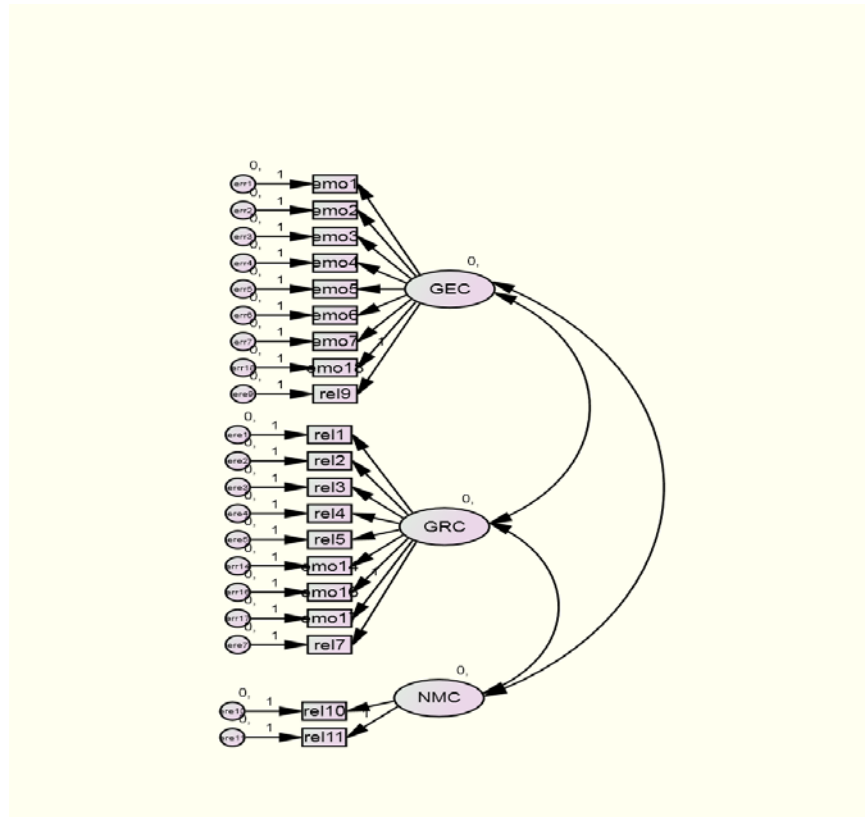
### **Confirmatory factor analysis**

This section concerns a confirmatory factor analysis of the proposed EFA of the items that corresponded to the latent constructs of emotional capability, relationship capability and new member conformity. Confirmatory factor analysis allows for the determination of what Hair et al (2010) term as a measurement model, a specification of how sets of items correspond to certain constructs. The CFA allows the researcher to substantiate a link between the proposed model its theoretical basis.

The first step towards a confirmatory factor analysis is model specification (Hair et al, 2010; Byrne 2010). The model specification is the part where the researcher specifies which items will correspond to the latent constructs that are being explored. The results of the EFA provide the basis for model specification and as such this model will be specified based on the measurement model that was proposed as a result of the EFA analysis. The diagrammatic representation of this model is shown in figure 5.

Based on the above figure it can be seen that the concept of GEI consists of the construct of group emotional capability (GEC which consists of 9 items), the construct of group relationship capability (GRC which consists of 9 items as well) and the construct of new member conformity (NMC which consists of two items). Hair et al (2010) recommends that in order to have construct validity in the measurement model, the constructs should have items that had factor loadings of 0.5 or higher, and that each construct should have at least three or more items. In this CFA, there are a few items in the constructs that have factor loadings below the recommended 0.5 cut off value and the construct of new member conformity has only two items. This may affect the results of the CFA but I chose to retain the items and maintain the construct of NMC due to their theoretical salience and theoretical importance. The measurement tool being proposed in this dissertation is an original tool and though it may need subsequent studies to further refine it, for this particular dissertation study I have chosen to retain certain items and constructs that I feel contribute significantly to the theoretical understanding of the concept of group emotional intelligence and its components. Figure 5 also demonstrates the first step of a CFA analysis which is a definition of the individual constructs, i.e. listing the constructs that will comprise the measurement

model (Hair et al 2010). Hair et al (2010) also recommends that all constructs must display adequate



**Figure 5: Measurement model for confirmatory factor analysis of GEI**

construct validity. Cook and Campbell (1979) define construct validity as the extent to which an operationalization measures the concept that it is supposed to measure. Campbell and Fiske (1959) recommended that the best means of determining construct validity is the MTMM matrix, the multi-trait, multi-method matrix. The MTMM ascertains the validity of a construct by measuring the construct using different types of measures as well as assessing the construct with other similar constructs. An ensuing

matrix is constructed and the construct validity is assessed by an analysis of the matrix (Campbell and Fiske, 1959). Researchers however have considered the MTMM an unlikely reality since most studies do not go to the length of creating and assessing different methods to measure the same construct for the sake of construct validity (Bagozzi and Philips, 1991). However researchers do emphasize that a means of assessing construct validity is to make sure that the items have a strong theoretical background, have theoretical precedence and can be judged qualitatively (Hair et al, 2010). The items in this CFA were all adapted from past measures on constructs of emotional intelligence and group emotional intelligence (Hamme, 2003; & Mayer and Salovey 1991). The items were also created based on the past discussions in this dissertation on what would constitute group emotional capability and group relationship capacity. Additionally the EFA section provided a detailed analysis of which items were retained, why they were retained and what latent construct these items corresponded to. Thus it can be said that this proposed CFA has a strong theoretical background, that the items possess theoretical precedence and that they can be judged qualitatively.

Hair et al (2010) also recommend that a pretest be used to ‘purify’ the measures before the confirmatory testing. In this case the EFA can be considered the pre-test that allowed for a more parsimonious model to be proposed in the measurement model for the CFA.

The confirmatory factor analysis (CFA) was conducted using SEM analysis in the AMOS program. The AMOS program is a sub-set of the SPSS analytical software and allows for the researcher to ‘build’ the theoretical model as a diagrammatic representation, then input the items that are part of the model and also propose the



relationships between the items, the latent variables and the error terms (Byrne, 2010). The resultant model is then linked with the empirical data set that contains the items and a confirmatory factor analysis run on the model. The resultant fit indices of the analysis provide a means of assessing whether CFA denotes an acceptable model. According to Byrne (2010) SEM (structural equation modeling) is an acceptable means of assessing confirmatory factor analysis for three reasons. The first reason is that SEM takes a confirmatory rather than exploratory approach to the data analysis, because it requires an a priori specification of the relations between the variables in the proposed model. By demanding a pre-specified structure, SEM allows for an inferential analysis to take place, i.e. the researcher can infer that the specified CFA model does measure the latent variables under consideration.

Secondly SEM provides explicit estimates for measurement error, which is the error between the observed variance and the actual variance for every item (Byrne, 2010). By specifying error the model for each proposed item and latent variable, SEM allows for a more accurate estimation of the model since the error is acknowledged and specified in the model. Thirdly although data analyses using other methods (such as regression) are based only on observed measurements, the SEM analysis allows the researcher to incorporate both unobserved (i.e. latent) and observed variables. Such a feature allows for the proposed model to be closer to the theoretical measurement model that Hair et al (2010) specifies is a requirement for CFA analysis.

**CFA results**

As per Byrne (2010) the first step to analyzing the CFA output is an assessment of the model summary. The number of variables in the model is as per calculations, i.e. 43 variables; 20 observed, 20 error terms and 3 latent variables (group emotional capability, group relationship capacity and new member conformity). The number of exogenous (dependent variables) is 23 (20 error terms and 3 latent variables). The number of endogenous variables is 20 (the 20 items that were used in the confirmatory factor analysis). Table 7 below lists this information

**Table 7: Properties of Confirmatory Factor Analysis**

No. of Variables (total)	No. of observed variables	No. of unobserved variables	No. of Exogenous Variables	No. Of endogenous variables	No. of sample momemts	No. of parameters to be estimated	Degrees of freedom
43	20	23	23	20	230	63	167

The next step is to examine the chi square statistic and its probability. This statistic is provided in the output as a under the CMIN goodness of fit statistic in table 8. As per Byrne (2010) CMIN represents the likelihood ration statistic also known as the Chi square statistic. It helps in the assessment of whether the null hypothesis is true. The null hypothesis in an SEM CFA analysis postulate that specification of the factor loadings, factor covariances, covariances and error variances are valid. Thus a null hypothesis that is true is the aim of an SEM. Additionally the higher the probability of the null, the closer the fit between the hypothesized model and the perfect fit (Byrne, 2010).

An examination of the chi square statistic and the probability associated with it for our model show that it has a very low probability (close to zero). This may indicate a bad fit but Byrne (2010) states that this statistic is grounded under large sample theories and most SEM analysis yield chi square values that denote inadequate fit. As she states “Thus findings of well-fitting hypothesized models where the chi-square approximates the degree of freedom have proven to be unrealistic on most SEM empirical research”. To avoid this issue Byrne (2010) states that researchers have spent the last three decades creating alternative fit indices that allow for a better examination of the CFA models (Gerbing and Anderson, 1993; Hu and Bentler, 1995; Marsh, Balla & McDonald, 1988; Tanaka, 1993).

Bentler and Bonnet (1980), Bollen (1986), Bollen, (1989b) & Bentler (1990), suggested the indices below the CMIN indices in the table. These indices range from zero to 1 with a value of 0.9 demonstrating a good fit. Byrne (2010) states that since the NFI has been shown to underestimate fit in small samples, Bentler proposed a CFI, which if it has a value of above 0.9, indicates a good fit. As can be seen from the table the NFI,RFI, IFI, TLI and CFI have the values of 0.874, 0.841, 0.919, and 0.918 respectively. Two values are above the 0.9 cut-off value that indicates a good fit while the other two are below. Since the model has two fit indices that are below the recommended value, the next step is to look at other indices that might show a better picture. Byrne (2010) states that the RMSEA index has been, “recognized as the most informative criteria in covariance structure modeling” (p. 80). The RMSEA index indicates that if the model had other unknown parameters (other latent constructs and

**Table 8: Model Fit Summary**

<b>CMIN</b>					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	63	430.337	167	0	2.577
Saturated model	230	0	0		
Ind. Model	20	3411.576	210	0	16.246
<b>Baseline Comparisons</b>					
Model	NFI	RFI	IFI	TLI	CFI
Model	Delta1	Rho1	Delta2	rho2	
Default model	0.874	0.841	0.919	0.897	0.918
Saturated model	1		1		1
Ind. Model	0	0	0	0	0
<b>Parsimony-Adjusted Measures</b>					
Model	PRATIO	PNFI	PCFI		
Default model	0.795	0.695	0.73		
Saturated model	0	0	0		
Ind. Model	1	0	0		
<b>NCP</b>					
Model	NCP	LO 90	HI 90		
Default model	263.337	205.868	328.482		
Saturated model	0	0	0		
Ind. Model	3201.576	3016.001	3394.473		
<b>FMIN</b>					
Model	FMIN	F0	LO 90	HI 90	
Default model	1.974	1.208	0.944	1.507	
Saturated model	0	0	0	0	
Ind. Model	15.649	14.686	13.835	15.571	
<b>RMSEA</b>					
Model	RMSEA	LO 90	HI 90	PCLOSE	
Default model	0.085	0.075	0.095	0	
Ind. Model	0.264	0.257	0.272	0	

variables and other items that better explained the model) that were not in the original covariance matrix added on, it would it be possible to get a better approximation to the actual model (Brown & Cudeck, 1993). Thus an exact fit, where all parameters in the model have been specified in the original model would yield an RMSEA of 0, and Brown & Cudeck (1993) state that a reasonable fit value should be around the 0.08 level. The RMSEA in this case is 0.085 representing a mediocre fit as per Byrne (2010).

The fit indices provided demonstrate that the confirmatory factor analysis is an acceptable but not an exceptional fit with the data. The purpose of the confirmatory factor analysis was to assess that the proposed structure of the items that corresponded with the latent variables was acceptable and that further research could be conducted using this proposed model. The fit indices demonstrate that the proposed questionnaire tool is an acceptable tool but that it could use further refining. This dissertation is limited by its data set and a suggestion for future research may be to further this study with a new data set and include items that are better able to capture the components of group emotional intelligence.

#### **Alternate single factor model**

To strengthen the acceptability of this questionnaire tool a “null model” CFA was also conducted. A null model would represent a single factor solution where all the items loaded on a single factor. If the fit indices of the single factor solution were higher or comparable to the proposed model then it could be suggested that this current three factor model does not adequately fit the data and that further exploration of the components of GEI is needed. However the highest fit index with the single factor CFA was .742 and the RMSEA was as high as 0.142 which indicates that the alternate single factor CFA is not an acceptable model for the data.

The confirmatory factor analysis results demonstrated that the questionnaire tool that has been created does capture the components of group emotional intelligence. Group emotional capability and group relationship capacity are captured by the current questionnaire tool.

Another measure of internal consistency that was conducted is Cronbach's Alpha. Cronbach's Alpha is a measure of internal consistency, i.e. how well related are a set of items as a group (Hair et al, 2010). A high value may be used as part evidence that the grouped items measure an underlying (latent) construct (Cook & Campbell, 1979; Crocker & Algina, 1986). However Hair et al (2010) caution that Cronbach's Alpha alone is not a substantive measure of internal consistency or uni-dimensionality, but suggest other analyses such as an EFA and a confirmatory factor analysis to demonstrate that the items are indeed inter-related and measure a single underlying construct. In this case both the CFA and the EFA have been conducted, so the Cronbach's Alpha is an additional measure to help bolster the claim that the measurement tool that has been created does indeed measure the components of GEI (group emotional intelligence), namely group emotional capability, group relationship capacity and new member conformity. The results of the Cronbach's Alpha are presented in Table 9 below.

Additionally correlation matrices were created for each variable and the items that constituted the variables. A correlation matrix can indicate whether some items in a scale may have little correlations with the other items and so ought to be removed from the scale. However the correlation matrices demonstrated that items for the scales were well correlated with each other. The correlation matrices are provided for in Appendix

### III

The next step in the analyses was to test the data for aggregation.

**Table 9: Cronbach's Alpha for the proposed measures**

Variable Name	No. of items	Cronbach's Alpha
Emotional Capability	9	0.923
Relationship Capacity	9	0.927
New Member Conformity	2	0.924
Learning Ability	11	0.924
Performance	5	0.91

### **Step 3 Data aggregation**

The last two steps in the analysis demonstrated that the questionnaire tool that has been created is an adequate fit for the data that was gathered. The next step is to test this data against the hypotheses that have been proposed. The hypotheses are concerned with a group level independent constructs affecting group level outcomes. As a result, the data needs to be manipulated such that it reflects a group level analysis. Currently the data consists of individual responses to questions that were posed at the level of the group, i.e. asking group members how their group behaves, feels or reacts as a group. In order for the data to reflect a group level idea of behavior it need to be aggregated at the group level (Castro, 2002; Klein, Dansereau and Hall, 1994).

Thus, in order to justify the aggregation of the data at the group level using the suggestions from Klein, Dansereau and Hall (1994) and Bliese (1996) the following prescriptions must be adhered to. Firstly the items must reflect a group level understanding of the concept that is being empirically examined. This suggestion has been fulfilled since all items related to the components of group emotional intelligence, reflect the respondents 'group level' understanding of the questioned behaviors and

attitudes. Secondly an analysis of the groups must show that there is sufficient agreement within the group to warrant an aggregation. The rwg statistical analyses for each group can demonstrate whether aggregation of the responses for each group was warranted. An arbitrary cutoff for the rwg is 0.70, which implies that a value above 0.7 warrants aggregation (Castro, 2002). Though Castro (2002), LeBreton, James, & Lindell (2005), Lance, Butts, & Michels, (2006) and other scholars have argued that the 0.70 cutoff for the rwg statistic may be an arbitrary cutoff, since there is scant literature to demonstrate what may constitute an 'adequate' value, I will consider values above 0.7 as satisfactory to merit group level aggregation. The third requirement is a demonstration that between group heterogeneity is greater than within group heterogeneity. This means that the variance within the group is less than the variance between groups, i.e. an indication of a greater level of agreement within the group. Castro (2002) suggests that an ICC value is a good indication of whether between group heterogeneity is greater than within group heterogeneity. As Castro (2002) points out "The ICC (1) coefficient estimates the variance in an individual's response that can be explained by group membership, or the degree to which a measure varies between versus within group" (p.73). Thus if the degree to which a measure varies between groups is greater than its variation within groups, one can assume a greater degree of within group homogeneity. This section will therefore measure the rwg and the ICC for the data so that aggregation of the data into group level measures can be warranted.

Before proceeding with the analysis it may need to be pointed out that both the rwj statistic and the ICC have certain data assumptions. The rwg assumes a uniform (null) distribution. This implies each response has an equal probability of being chosen



by the respondent in for each item. The uniform distribution is different from a standard bell shaped distribution which implies that each response has a different probability of being chosen. The ICCs are affected by group size and also have the same assumptions as an ANOVA (analysis of variance). These assumptions are homogeneity of variance (the variances within the units are statistically the same), normality (the population scores are normally distributed), the observations are statistically independent of each other and the measures in the Likert scale have equal psychological intervals (Castro, 2002). It is necessary to explicate these assumptions for the rwg and the ICC since they are not the same and at the same time require that we treat the results of the rwg and the ICC with caution.

### **Rwg analysis**

The first step in calculating the rwg for the data is to calculate the expected variance, since rwg is a statistic that measures the ration of the observed variance to the expected variance. Biemann, Cole & Voelpel (in press), as well as other sources have suggested the following formula for calculating expected variance in a uniform distribution:  $\text{Expected variance} = (A^2-1)/12$ , where A is the number of response options. Since the questionnaire in this survey utilized a Likert type scale with 5 response options for measuring the components of GEI, the expected variance would be 2. The next step is to calculate the variance for each group. Variance was calculated by using the variance calculator in the Microsoft Excel program. The variance within the group was then divided by the expected variance and the ratio subtracted by 1 as per the rwg equation (James et al. 1984). The result of the analysis is shown in appendix II. The avg

rwg for the group emotional capability component (GEC) was 0.73, the average rwg for the group relationship capability component (GRC) was 0.68 and the average rwg for the new member conformity component was 0.76. Of the three components the GRC component fell below the 0.7 cut off mark that states that the data is suitable for aggregation. At this point two things need to be remembered. Firstly, as mentioned earlier, the new member conformity component is an aspect of GRC that has been separated due to the EFA results. If the average of the two rwgs is calculated then the resultant ratio is above 0.7 and so the rwg statistic is fulfilled and in this case the average rwg is 0.72. Secondly Castro (2002) along with other scholars did point out that the rwg cut off is an arbitrary number and should be interpreted with caution. Based on the two previous arguments made and that 0.68 is close enough to 0.7, I feel that the the rwg statistic in this case warrants aggregation. Appendix II shows the rwg analysis table.

### **ICC analysis**

In addition to an rwg analysis Castro (2002) recommends an ICC analysis. The ICC (1) estimates the degree to which a measure varies between versus within groups. Bliese (2000) and Williams, Scandura and Gavin (2009) posit that in general ICC (1) values in the range of 0.1 to 0.2 or higher indicate that there is support in the data for aggregation. ICC (1) can be calculated using the SPSS program and the ICC value for group emotional capability, group relationship capability and new member conformity were .610, 0.588 & 0.858 respectively; all values demonstrate support for aggregation. Table 10 on the next page shows the different ICC values.

**Table 10 : ICC (1) Values for the Independent variables  
Intraclass Correlation Coefficient**

		Intraclass Correlation	95% Confidence Interval	
			Lower Bound	Upper Bound
Group	Emotional Capability	.610	.558	.662
Group	Relationship Capability	.588	.536	.642
New	Member Conformity	.858	.819	.890

The analysis of the data using rwg and ICC(1) allows for the researcher to conduct an aggregation with a data set that has shown that an aggregation of the items that represent the dependent variables an empirically sound decision. As this dissertation pointed out earlier, a lot of past empirical studies on group emotional intelligence aggregated their data but did not check to assess whether aggregation was warranted. Due to this, the results obtained in their analysis are subject to controversy. In the case of this empirical analysis, since aggregation indices have been utilized, the data can be said to be empirically sound with respect to aggregation.

Aggregation of the data set was performed using SPSS statistical software. Since each group had separate names, it was possible to aggregate the individual responses for each group. The aggregated data set yielded 45 groups. The next stage of the analysis was to conduct a linear multiple regression with the dependent variables of group performance and group learning ability and the independent variables of group emotional capability (GEC), group relationship capability (GRC) and new member conformity (NMC).

#### **Step 4: Multiple regression analysis**

A multiple regression involves predicting a dependent variable using two or more independent variables (Hair, et al. 2010). The hypotheses that this dissertation proposed are as follows:

*H1: The relationship building component of group emotional intelligence will have a positive effect on group performance such that the greater the relationship building capacity within the group, the greater the positive effect on group performance.*

*Hypothesis 2: The relationship building component of group emotional intelligence will have a positive effect on group learning ability such that the greater the relationships building in the group the greater the learning ability of the group*

*Hypothesis 3: The emotional capability component of group emotional intelligence will have a positive effect on group's learning ability such that increased group emotional capability leads to a corresponding increase in group learning ability*

*Hypothesis 4: The emotional capability component of group emotional intelligence will have a positive impact on group performance such that increased group emotional capability leads to an increase in the group's performance*

The next section deals with the corresponding regression models (equations) and how these regression equations can help predict the proposed hypotheses.

### **Regression models**

Based on the regression equations that were explicated in the previous section, the first four hypotheses predict that the dependent variables (DV) of group performance and group learning ability have a positive relationship with the independent variables (IV) of emotional capability and relationship building capacity. For these four regression equations, this dissertation proposes the use of two multiple regression equations. One regression equation involves the dependent variable (DV) of performance and the Independent Variables (IV) of group relationship capacity, group emotional capability and new member conformity. The other regression equation involves changing the DV from group performance to group learning ability and using the same IVs.

Thus the first regression equation (EQ1) was:

$$\mathbf{GP = C + GRC + GEC + NMC \dots\dots\dots EQ1}$$

Where GP is group performance and is the dependent variable, and GRC, GEC and NMC are group relationship capacity, group emotional capacity and new member conformity respectively. C is the constant in the linear equation.

The second regression equation (EQ2) was:

$$\text{GLA} = \text{C} + \text{GRC} + \text{GEC} + \text{NMC} \dots\dots\dots\text{EQ2}$$

Where GLA is the group learning ability (The other acronyms have already been identified).

### **Regression data**

The independent variables in the multiple regressions were the aggregated factor scores that were produced by the factor analysis on the city groups' sample. Since factor analysis was an orthogonal rotation, the use of such scores reduced the chances of multicollinearity between the independent variables (Hair et al, 2010). For the dependent variables, the data employed was the aggregate of the average scores from the items that constituted the dependent variable (as a result of the factor analysis). The factor scores of the dependent variables could not be used in this case since an orthogonal factor analysis would render the factor scores of the dependent variables to have the least amount of correlation with the IVs and a multiple regression requires correlation between the IVs and the DVs respectively (Hair et. al, 2010). Tables 9 and 10 show the results of the regression analysis of the equations 1 and 2.

### **Assumption testing**

Before a regression can be analyzed certain assumptions to test the validity of the regression analysis need to be met. As per Hair et al (2010), the following assumptions need to be considered:

**Linearity:** The relationships between the dependent variables and the independent variables should be linear.

**Normality:** The errors should be normally distributed

**Homogeneity of variance (homoscedasticity):** The error variance should be constant

**Independence of error:** The error terms of one observation are not correlated with the errors of another observation.

Additionally the other regression issues will also be considered are outliers that may cause undue influence on the regression data and IV's that have high multi-collinearity. Both these issues will also be checked during both multiple regressions.

## **Outliers**

Outliers can be assessed in the following ways:

Analyzing the scatterplots of the dependent variables against independent variables to assess any unusual data points.

Assessing a histogram of the standardized residuals (the random error that is assumed in a multiple regression) of the regression analysis to check for any extreme values on either end of the histogram.

Using performance ability, and groups learning abilities as the IV, both assessments were performed and both the scatter-plot diagrams and the histogram did not display any extreme outliers. Please see Appendix V for the scatterplot diagrams and the histograms and of the residual plots used to assess multi-collinearity.

**Table 11: Results of Regression analyses with Group Performance as the Dependent variable**

<b>Group Performance Ability</b>						
<b>Independent variable</b>	<b>Beta</b>	<b>t</b>	<b>sig</b>	<b>tolerance</b>	<b>VIF</b>	
<b>Group Emotional Capability (GEC)</b>	0.438*	3.379	.002	.810	1.234	
<b>Group Relationship Capacity (GRC)</b>	0.328*	2.467	.018	.771	1.298	
<b>New Member Conformity (NMC)</b>	0.252	1.996	.053	.856	1.169	
<b>R-squared</b>	0.454					
<b>Durbin Watson</b>	2.097					

\* p< 0.05

**Table 12: Results of Regression analyses with Group Relationship Capacity as the Dependent variable**

<b>Group Relationship Capacity</b>						
<b>Independent variable</b>	<b>Beta</b>	<b>t</b>	<b>sig</b>	<b>tolerance</b>	<b>VIF</b>	
<b>Group Emotional Capability (GEC)</b>	0.429*	3.185	.003	.810	1.234	
<b>Group Relationship Capacity (GRC)</b>	0.309*	2.237	.031	.771	1.298	
<b>New Member Conformity (NMC)</b>	0.215	1.640	.109	.856	1.169	
<b>R-squared</b>	0.412					
<b>Durbin Watson</b>	2.077					

\* p< 0.05



## **Collinearity**

Collinearity implies that the variables in the regression equation are perfect linear combinations of each other (Hair et al, 2010). Collinearity can be an issue if the IV's are linear combinations of each other, the coefficients of the regression equation are not accurate and the standard errors for the equation can also be inaccurate. To check for collinearity, the SPSS output provides the two values, the VIF and a "tolerance" value. Tolerance indicates the percentage of variance in the independent variables that cannot be accounted for by the other independent (predictor) variables. A percentage that is below 0.10 would indicate that the variable is unnecessary and may require further analysis. VIF or the variance inflation factor is the inverse of the tolerance and so any values about 10 would require further investigation. In the case of this analysis, neither regression had tolerance factors below 0.10 and VIF's above 10. Therefore collinearity is not an issue in this case. Tables 9 and 10 show the tolerance and VIF statistics of the regression equation demonstrating that that the collinearity is not an issue.

## **Linearity**

Linearity assumption of regression testing can be tested by plotting a scatterplot of the IV variables and the dependent variable. Scatterplot diagrams did demonstrate a linear relationship between the independent variables and the dependent variables. (Appendix V)

## Normality

The normality of the residuals for the regression analysis can be explored using SPSS. The three standard methods for examining the normality of the residual error is by a Q-Q plot, the tests for normality (Kologomorov-Smirnov and Shapiro-Wilk) (Hair et al 2010). A Q-Q plot should reveal a linear relationship, the tests should be non-significant and the KS and SW tests should be non-significant (a non-significant result implies that the null hypothesis, which attests that the data are not normal, is not true) (Hair et al, 2010). Table 10 below shows the levels of significance for the KS and the SW tests for each variable in the regression equation. Appendix IV is a result of the q-q plots for all the variables in the regression equation. As per these tests, the data can be considered normal. The SW test for the variable of group relationship capability (GRC) was significant at the  $p < 0.05$  level, but the KS test was not. Hair et al (2010) posit that that the KS (Kologomorov-Smirnov) and the SW (Shapiro- Wilks) can be over-ridden if the Q-Q plots demonstrate normality. In this case since only the SW test for the GRC variable was significant by .02 units, the assumption of normality can be upheld.

**Table 13: Tests of Normality**

	Kolmogorov-Smirnov	Shapiro-Wilk
GEC	0.2	0.1
GRC	0.2	0.048*
NMC	0.2	0.546
Group Learning Ability	0.083	0.328
Group Performance ability	0.112	0.092

\*  $p < 0.05$

### **Homoscedasticity**

The assumption of homoscedasticity states that the residuals (errors of the regression) are homogenous across all levels of the predicted values. This scatterplot of the predicted values against the standardized residuals should have points all over the graph. This requirement was fulfilled in both cases which demonstrate that the assumption of homoscedasticity has been fulfilled. Evidence is in the appendix

### **Independence of error terms**

This assumption of regression analysis assumes that the errors associated with one observation are not correlated with the errors of another observation. This assumption can be tested using the Durbin Watson (DW) statistic which has a range of 0 – 4 and should usually be around 2 which means that there is no correlation and the errors are independent. In this case both the DW statistics were both around the 2.0 range (see tables 9 – 10) respectively for the two regression equations and so the error terms are independent of each other. To further bolster this claim it needs to be pointed out that most of the data was generated by respondents using an online questionnaire that could be accessed at any time, so it may be that respondents did not need to complete the survey at one sitting all as a group. Such a means of collecting data does reduce the possibility of correlations between the error terms.

Table 14 below shows the correlations between the independent and the dependent variables, controlling for age, gender, race, education, the number of individuals in the group and the number of times the group meets per month.

**Table 14: Correlation table**

	<b>Group Relationship Capability</b>	<b>New Member Conformity</b>	<b>Group Emotional Capability</b>	<b>Group Learning ability</b>	<b>Group Performance</b>
<b>Group Relationship Capability (GRC)</b>	1.000	-0.394*	0.301	0.377*	0.381*
<b>New Member Conformity (NMC)</b>	-0.394*	1.000	-0.080	0.056	0.053
<b>Group Emotional Capability</b>	0.301	-0.080	1.000	0.512**	0.501**
<b>Group Learning ability</b>	0.377*	0.056	0.512**	1.000	0.704**
<b>Group Performance</b>	0.381*	0.053	0.501**	0.704**	1.000

\*p < .05, \*\*p < 0.001

### **Regression results**

Regression equation 1 (EQ1) assessed the linearity of the relationship between group performance (dependent variable) and the independent predictor variables of group emotional capability, group relationship capacity and new member conformity. As the table (table 11) indicates the r-squared is 0.454 which demonstrates a positive linear relationship between the dependent and the independent variables. The coefficient table in the SPSS output indicated that all three predictor variables had a positive linear relationship with the dependent variable and GRC and GEC were

significant at the  $p < .05$  level but NMC was not. The regression equation can be summarized in the following manner.

$$\mathbf{GP = C + GRC (0.438) + GEC (0.328) + NMC (0.252) \dots\dots\dots EQ1}$$

Regression equation 2 (EQ2) assessed the linearity of the relationship between group learning ability (dependent variable) and the independent predictor variables of group emotional capability, group relationship capability and new member conformity. As the table (Table 12) indicates the r-squared in this case is 0.412 which demonstrates a positive, linear relationship between the dependent and the independent variables. The coefficient table in the SPSS output indicated that all three predictor variables had a positive linear relationship with the dependent variable and that GRC and GEC were significant at the  $p < 0.05$  level but NMC was not. The regression equation can be summarized in the following manner.

$$\mathbf{GP = C + GRC (0.429) + GEC (0.309) + NMC (0.215) \dots\dots\dots EQ2}$$

Based on the above regressions, it can be ascertained that both the components of group emotional intelligence have a positive linear relationship with group performance and group learning ability. This implies that both the components of group emotional intelligence, group relationship capacity and group emotional capability positively affect the dependent variables of group performance and group learning ability respectively. A positive, linear relationship implies that an increase in the independent variables would lead to an increase in the dependent variables. The regression models show support for hypothesis H1, H2, and H3 and H4; that is both

components of group emotional intelligence, group relationship capacity (GRC) and group emotional capability (GEC)

**Table 14: Proposed Hypotheses**

<b>Hypothesis</b>	<b>Statement</b>	<b>Support</b>
H1	<i>The relationship building component of group emotional intelligence will have a positive effect on group performance such that the greater the relationship building capacity within the group, the greater the positive effect on group performance.</i>	Yes
H2	<i>The relationship building component of group emotional intelligence will have a positive effect on group learning ability such that the greater the relationships building in the group the greater the learning ability of the group</i>	Yes
H3	<i>The emotional capability component of group emotional intelligence will have a positive effect on group's learning ability such that increased group emotional capability leads to a corresponding increase in group learning ability</i>	Yes
H4	<i>The emotional capability component of group emotional intelligence will have a positive impact on group performance such that increased group emotional capability leads to an increase in the group's performance</i>	Yes

have a positive, linear relationship with the two dependent variables, group performance and group learning ability respectively.

The component of new member conformity (NMC) had a beta value that was not significant at the 0.05 level. Norusis (2008) notes that a non-significant beta value for an independent variable in the regression equation may imply that the variable does not contribute as much in a regression model which has the variables of GRC and GEC respectively. The effect of the two variables of GRC and GEC may contribute most of

the unique information but ruling out NMC as an important predictor should be evaluated based non a subsequent analysis of the Pearson correlation table (Norusis, 2008). Norusis suggests looking at a Pearson correlation table between the independent variables and the dependent variables to see if there is a significant correlation between them. If a correlation table does demonstrate a correlation, it might be that NMC does not contribute as much unique variation in the equation when combined with the other independent variables in the regression equation. A Pearson correlation was conducted and it showed that NMC was not significantly correlated with both the dependent variables of group performance and group learning ability. Thus it can be inferred that NMC does not contribute to the regression, and does not significantly affect the dependent variables. Appendix III and Table 13 show the results of the correlation table.

### **Interaction terms**

In certain regressions interactions terms between the independent variables can strengthen the r squared of a regression analysis. A correlation matrix of the covariates of the instrument (such as age, gender, number of people in the group, number of times the group meets, education level of respondent) and the components of group emotional intelligence was examined. A high correlation between such covariates implies that an interaction term may benefit the predictability of the regression equations (Hair. et al 2010, Kachigan, 1991). Examination of the correlation matrix did not reveal any correlations of magnitude that may significantly affect the predictive value of the

regression equations. Appendix III shows the correlation matrix with the control variables.

### **Analysis of the residuals**

As Norusis (2008) states "... a residual is what is left over after the model is fit". Residuals are the difference between the observed value of the data and the value predicted by the proposed regression equation. In a regression equation it is necessary for residuals to have certain characteristics so that the assumptions for the regression equation are met. These characteristics are that the residuals should be normally distributed, the variance should be the same for all values of the independent variable, residuals should show no pattern when plotted against predicted values and successive residuals should be approximately independent (Norusis, 2008). This section will explore the residuals to ascertain that the assumptions for the regression equation have been met.

### **Normality**

For the normality assumption to be met, the distribution of the ordinary, the standardized and the studentized residuals should be normal. Norusis (2008) suggests that stem and leaf plots, standardized Q-Q plots and detrended Q-Q plots be examined. The stem and leaf plots should show an even distribution, the standardized Q-Q plots should have the data fall along a straight line and the detrended Q-Q plots should show data points randomly situated around the graph. Stem and leaf plots, Q-Q plots and

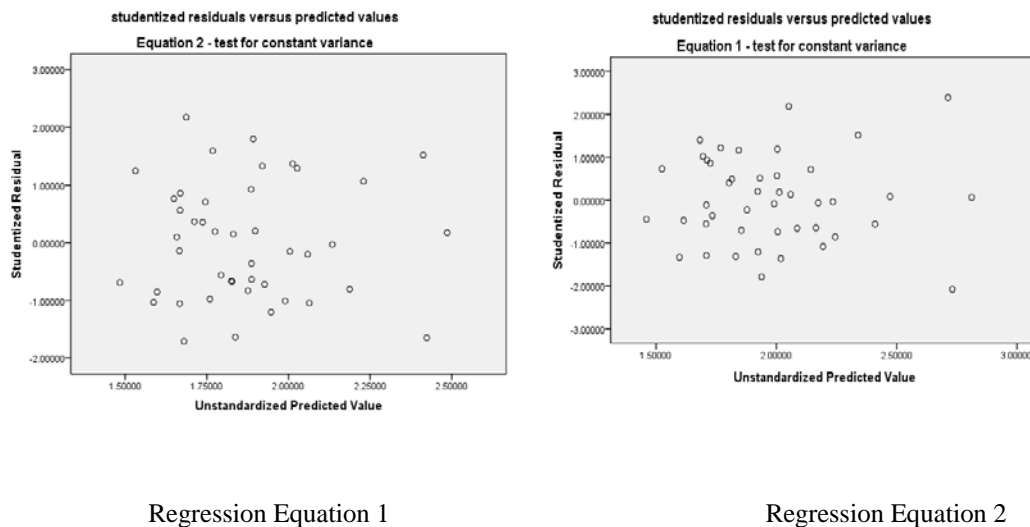


detrended Q-Q plots were conducted for both regression equations, and results of these tests of normality did not indicate any deviation that would require further inspection.

### Variance and linearity

Norusis (2008) suggests using a plot of the studentized residuals against the predicted values to check for constant variance. If the variance is constant then there will be no pattern in the data points. The figure below (figure 6) shows the results of the two plots which reveal no pattern.

The assumption of the linearity of the residuals can also be ascertained using these plots. Norusis (2008) posits that if the linearity assumption is not fulfilled, then the plots of the studentized residuals against the predicted values would be represented as a curved line. As can be seen, this is not the case and hence the linearity assumption is fulfilled.



**Figure 6: Studentized residuals versus predicted values**

### **Independence of observations**

The assumption of independence of observations concerns the issue that the observations in the regression equation are independent of each other. Norusis (2008) suggests that one technique of determining whether the observations are independent is to conduct a Durbin-Watson (DW) test of the studentized residuals. If the DW test of the studentized residuals has a value that is close to 2, then independence of observations can be assumed. For regression equation EQ1 the DW value was 2.017 and for regression equation EQ2 the DW was 2.106 which falls within the range of around 2 as indicated by Norusis (2008). As a result it can be assumed that the data had independence of observations.

### **Discussion of Results**

This dissertation had three objectives. The first was to provide a theoretical contribution and conceptualization of group emotional intelligence in terms of content, utilization and process. Analyzing past theoretical contributions on emotional intelligence, this dissertation proposes that group emotional intelligence (GEI) is a multi-faceted concept that should be studied at the group level and may include two components; one related to the emotional capability of the group and the other related to the capability of the group to build emotional relationships within the group. GEI is explored in terms of precedents and antecedents and the important issue of applicability, i.e. whether GEI can affect group outcomes such as group performance and group

learning ability. To investigate the applicability of GEI, a model of how GEI may affect group outcomes is proposed (Figure 3).

The second objective was to create a tool that was able to measure the components of GEI that have been conceptualized by this dissertation. A measurement tool was created that allowed for the researcher to test if groups in public sector organizations developed group emotional intelligence. The tool was tested with an exploratory factor analysis and a confirmatory factor analysis and the results concluded that the tool was able to measure the components of group emotional intelligence, namely group relationship capability and group emotional capability.

To demonstrate the applicability of GEI in a public sector setting, the proposed hypotheses concerning the performance and the learning ability of the group were empirically tested using multiple regression analyses. Data was first aggregated to the group level and the regression results demonstrate a positive linear relationship between the components of group emotional intelligence and outcomes of group performance and group learning ability. Tests of the regression models reveal that the models are empirically sound and conform to the required assumptions of a multiple regression as well as the assumptions of the residuals of the regression equations. This result signifies that GEI and the components of GEI are group level concepts that demonstrate effects on group performance and the groups learning ability. The next section discusses the significance of such findings.

## **Significance of Findings**

Druskat and Wolff (2000) posited that a group level emotional intelligence is related to the group developing a set of emotionally competent norms that are focused on the management of the group's emotions. Hamme (2003) utilized Druskatt and Wolff's (2000) conceptualization of group emotional intelligence to create a measure that included the components of group awareness, group regulation, group self-awareness and group self-regulation. Though the components did address the group relationship capacity aspect of the group emotional intelligence, they did not include the aspects that Mayer and Salovey (1990) identified in their definition of individual emotional intelligence. These are emotional perception, emotional recognition, emotional regulation and management of emotions. A recent examination of emotional intelligence by Cherniss (2010) posited that the Mayer et al (1990) definition of emotional intelligence is the most acceptable definition of the concept. This dissertation combines both concepts of the relationship building aspect of group emotional intelligence (underscored by Hamme (2003) and Druskatt and Wolff (2000)) and the emotional perception, recognition, management and regulation aspect provided by Cherniss (2010) and Mayer et al. (1990). This is accomplished by creating a two component, multifaceted understanding of GEI which posits that group emotional intelligence consists of relationship building capabilities and group emotional management capabilities.

In addition to providing a different theoretical conceptualization GEI, this dissertation also accomplishes two empirical objectives. Firstly an instrument is created that can measure the proposed components of group emotional capability and group

relationship capacity. Items in the instrument address the issues of emotional perception, emotional recognition, emotional regulation and emotional management at the group level. The items also address the group aspects of group awareness, group regulation, and development of emotionally competent group norms concerning both existing and new members. The instrument is refined using a factorial analysis and the resultant factors are theoretically examined for construct and content validity to ensure that they measure and represent the proposed components of group emotional intelligence.

Secondly, to demonstrate the predictive validity of the instrument a series of regression analyses are conducted that predict whether the theoretically elucidated and empirically determined components of group emotional intelligence predict the group performance and group learning ability. A positive  $r$  squared indicates that a linear predictive relationship does exist and that the components of group emotional intelligence do predict group performance and group learning ability.

The significance of such findings is that an instrument that explores the multifaceted nature of group emotional intelligence has been created. This instrument has been demonstrated that it can predict group performance, and group learning ability and this predict the effectiveness of the group. Past studies that have analyzed a relationship between group emotional intelligence and group performance utilized measures that were geared towards an individual level of analysis (Koman and Wolff, 2007; Jordan et al 2002). In such cases the instruments that were used to measure individual emotional intelligence were utilized and responses were aggregated or averaged to create what was considered a group or team level emotional intelligence but

such methods of aggregation were not explored in terms of whether aggregation was warranted. In this case however, the instrument had items that were theorized for a group level understanding of emotional intelligence and a subsequent factor analysis and regression analyses bolstered the claim about the validity and predictive nature of the created instrument. The results were aggregated and indices or aggregation demonstrated that the data that was obtained was applicable at the group level of analysis.

Current research studies on emotional intelligence in the public sector have stressed the importance of emotional intelligence amongst senior managers and city officials (Carmeli, 2003) as well as amongst other public sector employees (Vigoda-Gadot & Meisler 2010) as a means of assessing performance and effectiveness in public sector organization. These studies have been limited in their utilization of emotional intelligence as a factor of performance in public sector employees since the instruments have been designed for an evaluation of individual emotional intelligence. Various researchers and scholars of the public sector have pointed towards the growing importance of teams and groups as a means of improving performance in public sector organizations (Klinger, Nalbadian, Llorens, 2010; Starling 2010). The growing importance of groups and teams in the public sector necessitates that researchers understand how emotional intelligence impacts public sector groups and teams since most scholars have posited that public sector organizations are utilizing groups more often. As a result, there is a need for instruments that are able to measure group level concepts and how such concepts relate to group performance. In order to assess the impact that emotional intelligence may have on these public sector groups and teams it

is important to create, test and validate an instrument that allows for understanding whether a group level emotional intelligence impacts group performance, group learning and group effectiveness. It should be pointed out that this researcher encountered a number of city management groups that were keenly interested in the results of the study and aware that emotional intelligence is a construct that they are interested in exploring further for their organization. As a result the creation of such an instrument that is able to measure the emotional intelligence of work groups in the public sector fulfils a need in public sector research to further understand how groups in public administration develop a level of group level emotional intelligence.

From a practical standpoint measuring a group level concept with little 'real world' applicability is a futile exercise. Hence in addition to developing an empirically sound and empirically defensible measurement tool, a model of how the components of GEI affect important group outcomes such as group performance and group learning ability was proposed. This model was tested using regression analysis and the empirically significant findings demonstrated a positive linear relationship between group emotional intelligence and the performance of the group as well as the learning ability of the group. As a result such findings underpin the applicability of the concept of group emotional intelligence. Based on these results GEI can be considered a noteworthy addition in terms of how public sector groups can utilize group concepts that improve group relations, group learning and ultimately group performance.

## **CONCLUSIONS**

The study of GEI allows for the exploration of a group process that is able to positively affect the performance and the learning ability of the group. Past sections in this dissertation have shown how scholars in the realm of public administration have criticized the lack of small group research in the public sector (Foldy & Buckley, 2009). Scholars in the public sector have tended to utilize the findings from private sector organizational research and extend these conclusions in public sector groups (Foldy & Buckley, 2009). This dissertation has added to the body of small group research in the public sector and focuses on understanding how group level concepts affect public sector groups in public organizations.

Though there have been past attempts by scholars to show how work groups may benefit the public sector, most of these attempts have either focused on the characteristics of the group or the characteristics of the group members (Foldy & Buckley, 2009; Altman, 1963). The conclusions of Lawrence (1997) and Pelled et al (1999) demonstrate that group level processes are better indicators of group performance than focusing on the characteristics of group members or the characteristics of the groups themselves. The findings of this dissertation demonstrate how a group level process such as GEI can affect the performance and learning ability of the group, This dissertation contributes to small group literature by demonstrating



theoretically and empirically how GEI is a group process that contributes towards enhancing the abilities and the performance of work groups.

Past sections of this dissertation have also noted that the current trend in public administration research has been towards New Public Management, which stresses a participative management style and the use of work groups and teams in the public sector to accomplish the goals of the public organization. From the standpoint of New Public Management, the use of groups and teams has become an important means of harnessing the power of the involved employee as well as a means of allowing employees from different departments to work together to fulfill the demands of the 'customer oriented' citizenry (Carnevale, 2003; Vigoda and Golembiewski, 2001). This dissertation adds to the body of literature that builds upon the use of participative employees that work in groups and teams aligned with the principles of New Public management.

The above paragraphs demonstrate the applicability of this dissertation from a variety of perspectives. Its builds upon the body of research fro groups in the public sector, it helps understand another group process that can enhance the ability and performance of work groups and finally it aligns with the current trend in public management towards a more participative, team and group friendly public organization. From such conclusions, it may be stated that this dissertation advances the body of knowledge in public administration from multiple perspectives.

In addition to it's the applicability and salience of this dissertation towards increasing knowledge in public administration, this dissertation also demonstrates that a group level concept is best understood at the group level of analysis. Past

understandings of emotional intelligence at the group level have sometimes incorrectly aggregated individual responses to make conclusions about group level concepts (Klein et al, 1994). Or they have performed aggregations of data without justifying whether such aggregation was warranted (Hamme, 2003; Klein et al, 1994). This dissertation has taken steps to ensure that the results of the empirical analysis can be correctly assigned to group level outcomes and that the aggregation of the data is warranted. These two aspects of group level understanding add to the body of understanding about group emotional intelligence.

Finally it needs to be noted that this dissertation promotes a multifaceted conceptualization of GEI. GEI is not just the creation and management of emotional norms within the group (as proposed by Druskat & Wolff; 2001) , but also a higher order concept that related to emotional intelligence at the group level (Druskat & Wolff, 2001; Mayer and Salovey, 1990). As a result, this dissertation proposes a new understanding of GEI; that it consists of group emotional capability (GEC) and group relationship capability (GRC) and both these components work together to create a group level ability that develops norms of emotional management as well as a group level understanding of emotional perception, emotional understanding and successfully utilizing emotions towards group outcomes. Thus this dissertation's theoretical and empirical conclusions about GEI help in advancing the body of theoretical and empirical knowledge concerning group processes.

Based on this dissertation it can be concluded that public sector groups that that develop group emotional capability (a group level ability to recognize, perceive, understand and manage the groups emotions), and group relationship capability (the

development of group norms regarding emotional management, group socialization practices that manage group effect, the promotion of a group culture that is sensitive to the emotions of group members and the prevailing emotions in the group) may be said to positively affect the performance and the learning ability of the group.

### **Limitations and suggestions for future research**

This study is an initial foray into theoretically and empirically understanding a two component model of GEI and the effect of such a model on group outcomes such as group performance and group learning. As such a primary goal of future research would be to replicate the findings in multiple studies that employ the instrument that has been created in this dissertation across multiple settings in the public sector. This study allowed its sample to consist mostly of work groups in city departments in the public sector. To expand the generalizability of the conclusions proposed by this dissertation, future research could focus on different kinds of work groups in the public sector to assess whether GEI is a factor towards performance in diverse types of public sector work groups. Therefore expanding the diversity of the data set as well as expanding the N of the data set would be one avenue for future research. Multiple studies may also alleviate some of the issues that were presented in the study. The CFA measurement model that was proposed demonstrated fit indices that though acceptable were not exceptional. Further analysis of the concept of GEI may reveal a better measurement model, and the use of multiple samples may allow for a better perspective on the CFA analysis.

Additionally one of the subcomponents of GEI posed some issues. The component of new member conformity (NMC) had a couple of problems. Firstly in terms of measurement it consisted of only two items that measured the ability of new members to confirm and accept to the group's culture. A two item measure has been criticized in the past as being too limited to capture the variability of the construct and most scholars recommend a measure with 3 or more items (Crocker & Algina, 1986; Nunnally, 1988). NMC also did not have a beta value that was significant in the regression models. This could be due to its measurement issues and so future research should examine this construct and determine how to best address it. The construct could have been removed but I feel that work groups in real life situations can have a relatively fluid membership and new members would affect the established group norms and established group emotional intelligence. As a result of that I chose not to omit it, but to assess how the construct of NMC would 'fare' in the empirical analyses. Thus even though the construct could be considered empirically "problematic" for the sake of theoretical salience it was retained. The suggestion therefore would be to explore new member conformity and its relationship with group emotional intelligence further.

The proposed understanding of the antecedents of group emotional intelligence show that the GEI may be an important factor in the development of the transactive memory systems (TMS) and the group mental models in a group (Lewis et al. 2007; Klimoski and Mohammed, 1994). However Mohammed, Ferzandi and Hamilton (2010) state that despite the many studies done on team mental models and transactive memory systems, there is still a level of confusion on how these concepts should be measured

and empirically examined. Since both team mental models and transactive memory systems have been theorized as developing from a group's ability to manage its group emotion, a possible direction for future research could be to further explore that link and propose an empirical study that examines the relationship between GEI and team mental models and TMS.

There is an increased focus on the promotion and utilization of groups in online settings. As a result research needs to address how group processes 'fare' in an online group setting. A very salient topic of future research would be to examine the development of group emotional intelligence in online work groups. Questions that may need to be addressed concern whether (it at all) group emotional intelligence plays a part in online work groups, and whether it does affect the performance and other outcomes of online group settings.

One of the limitations of this dissertation was subject centered evaluation of the performance and learning ability of the group. Future research into group emotional intelligence and its proposed outcomes would benefit from an organizational measure of performance and learning that can be used in the model. Though Perry and Porter (1982) have stated that the goals of groups in the public sector are at best a 'murky' proposition, it is possible to locate public sector groups with clear, definable goals and measure GEI against such goals.

## APPENDIX I SURVEY INSTRUMENT

Group Identifier  
Age of respondent  
Gender of respondent  
Ethnicity of respondent  
Highest Level of Education received  
Number of people in your group/team  
How many times does your group meet per month

---

### **Group Emotional Capability**

**The following questions refer to your perception of the groups emotional abilities. Please answer the questions as accurately as possible.**

Members of our group have the ability to understand each others emotions  
Members of our group have the ability to understand the prevailing mood in the group  
Members of our group have the ability to understand the social cues and signals to determine what emotions are being expressed in the group  
Members are aware of the group mood at all times  
Members of the group try and respond effectively to the groups emotions  
Group members are aware of the feelings of other members  
Group members respond effectively to the feelings of other members.  
Group members know what to expect from each other

In typical situations experienced by the group, members know what other members would be worried about  
When the group makes a decision, the points of view of all members are considered  
Each group member knows what is expected of him/her during group activities  
Group members try and maintain a positive group feeling  
If a member of the group is upset, the rest of the group is aware of that member's feelings  
The group responds as a unit when dealing with negative feelings  
Group members are encouraged to provide open and honest feedback to each other  
Group members respond to criticism in a constructive manner  
Group failures are analyzed openly within the group  
Members in our group can maintain their feelings while appreciating the emotions of other group members

---

**The following questions refer to the ability of the group to create and maintain relationships within the group**

The groups appreciates the efforts of all members of the group  
Groups members make an effort to get to know each other  
There is a feeling of camaraderie (togetherness) in the group  
Group members consider all efforts the group makes as a team effort  
Group members consider themselves interconnected with each other  
Group members work with each other in a coordinated fashion  
The group does not blame any particular member for a group level failure  
Group members are aware of the group culture i.e. how things are done in the group  
Group members are aware of the group's climate i.e. how feelings are handled in the group  
New group members are expected to conform to the group culture  
New group members are expected to conform to the group's climate

---

**Group Learning Ability**

**The following questions refer to the ability of the group to promote a learning ability and environment**

---

Members of the group are always open to new ideas  
Members of the group are open to using the successful ideas from other groups  
New ideas are openly discussed by the group i.e. both the good and the bad are taken into consideration  
It is part of the groups culture that group members can express opinions and make suggestions regarding group practices  
Learning is not confined to some members of the group  
Learning is open to all members of the group  
Our group does not limit the learning experience

---

**Group Performance Assessment**

**The following questions refer to the ability of the group to promote a learning ability and environment**

---

The group considers itself a high performance group  
Our group is able to consistently achieve the standards it sets for itself  
Our group considers itself a better than average performer when ranked amongst other groups  
There is a sense of achievement in the group  
Our group is generally satisfied with its progress  
Our group is aware of its limitations

## APPENDIX II

Appendix ii Calculating RWG for the groups

	GEC	GRC	NMC
Group Number	1 - w/e (rwj)	1 - w/e (rwj)	1 - w/e (rwj)
1	0.60	0.45	0.94
2	0.65	0.63	0.79
3	0.72	0.76	0.89
4	0.60	0.44	0.46
5	0.56	0.57	0.40
6	0.67	0.54	0.87
7	0.87	0.94	1.00
8	0.57	0.45	0.71
9	0.79	0.76	0.91
10	0.83	0.83	0.89
11	0.57	0.54	1.00
12	0.66	0.43	0.76
13	0.85	0.74	0.52
14	0.74	0.69	0.94
15	0.76	0.75	0.86
16	0.86	0.55	0.60
17	0.49	0.80	0.72
18	0.85	0.68	0.83
19	0.81	0.73	0.33
20	0.84	0.57	1.00
21	0.87	0.84	0.89
22	0.56	0.66	0.40
23	0.84	0.88	0.92

(continued)



## APPENDIX II

Group Number	1 - w/e (rwj)	1 - w/e (rwj)	1 - w/e (rwj)
24	0.66	0.53	1.00
25	0.87	0.84	1.00
26	0.89	0.75	1.00
27	0.74	0.81	0.14
28	0.49	0.42	0.79
29	0.79	0.73	0.87
30	0.73	0.62	0.93
31	0.64	0.53	0.87
32	0.58	0.73	0.65
33	0.89	0.90	0.61
34	0.61	0.38	0.61
35	0.66	0.50	0.72
36	0.53	0.44	0.08
37	0.49	0.57	0.87
38	0.79	0.72	0.57
39	0.63	0.81	0.61
40	0.90	0.75	0.57
41	0.81	0.71	0.61
42	0.78	0.61	0.63
43	0.89	0.83	1.00
44	0.85	0.84	0.71
45	0.68	0.68	0.87
Total :	32.49	29.89	33.35
Avg rwg :	0.73	0.68	0.76

### APPENDIX III CORRELATION TABLES

Correlation table							
	Mean	Standard	GEC	GRC	NMC	Grp.	Grp.
GEC	0.03	0.66	1	.349*	0.157	.571**	.593**
GRC	0.01	0.56		1	-0.269	.401**	.413**
NMC	-0.01	0.49			1	0.199	0.233
Grp. Learning	1.87	0.38				1	.675**
Grp. Perf	1.98	0.49					1

\*. Correlation is significant at the 0.05 level.

N = 44

\*\*. Correlation is significant at the 0.01 level

Correlation table with partialled out SD scale							
	Mean	Standard	GEC	GRC	NMC	Grp.	Grp.
		Deviations				Learning	Perf.
GEC			1	.353*	.550**	.605**	0.099
GRC			.353*	1	.376*	.417**	-0.275
NMC			.550**	.376*	1	.656**	0.152
Grp. Learning			.605**	.417**	.656**	1	0.222
Grp. Perf			0.099	-0.275	0.152	0.222	1

\*. Correlation is significant at the 0.05 level.

\*\*. Correlation is significant at the 0.01 level

### APPENDIX III

Correlations with SD scale

	Mean	Standard Deviations	GEC	GRC	NMC	Grp. Learning	Grp. Perf.	SD scale
GEC	0.03	0.66	1	.349*	0.157	.571**	.593**	-0.065
GRC	0.01	0.56		1	-0.269	.401**	.413**	0.294
NMC	-0.01	0.49			1	0.199	0.233	-0.037
Grp. Learning	1.87	0.38				1	.675**	0.044
Grp. Perf	1.98	0.49					1	-0.086
SD scale	2.92	0.23						1

\*. Correlation is significant at the 0.05 level (2-tailed).

N = 44

\*\*. Correlation is significant at the 0.01 level (2-tailed).

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