THE UNIVERSITY OF HULL

The Effects of Interpersonal Relationship Variables on Organisational Citizenship Behaviours and their Implications for Learning Design in Chinese Organisations

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Abstract

The present research examines how emotional intelligence, cognitive styles and leader-member exchange influence Organisational Citizenship Behaviours (OCB) on different levels (individual level and group level). There is increasing evidence to indicate that individuals' perceptions and abilities play an essential role in explaining and predicting organisational citizenship behaviours (e.g. Van Dyne and Butler Ellis, 2004; Morrison and Phelps, 1999). The focus of this study is building on this body of research by examining the influence of cognitive style theory, leader-member exchange (LMX) and emotional intelligence (EI) on OCB. Although cognitive style preferences are known to influence one's attitudes and behaviours toward others (e.g. Kirton, 2003; Charbonneau and Nicol, 2002), no study has previously focused on the relationship between cognitive styles and OCB. Another growing body of literature indicates that emotional intelligence (EI) and cognitive styles can be considered as predictors of the quality of leader member exchange relationships (LMX) (e.g. Allinson et al, 2001; Charbonneau and Nicol, 2002), which positively relate to OCB (e.g. Ilies et al. 2007). However, no previous studies have considered the mediating role of LMX in the relationship between EI, cognitive styles and OCB. Furthermore, no study has yet examined the effects of group level emotional intelligence and group composition in relation to cognitive style diversity on OCB. These are the areas where the present study attempts to make a significant contribution to new knowledge in the field of organisational citizenship behaviour research.

Based on the extant literature, a research framework has been developed to identify the relationship between the three factors of cognitive styles, EI and LMX on organisational citizenship behaviours. The overarching purpose of the research is to enhance our understanding of how to cultivate employees' organisational citizenship behaviours and how to better organize group members into more effective working groups.

The research is conducted in the context of Chinese manufacturing firms and employs a quantitative approach using a range of reliable and valid instruments. Structural Equation Modelling (SEM) and multilevel modelling (MLWIN) are then applied to analyze the relationship between the independent variables (cognitive styles, EI and LMX) and the dependent variable (organisational citizenship behaviours).

Results from a final sample size of 865 individuals comprising supervisors and their immediate subordinates are reported. The study successfully determines the relationship between emotional intelligence, LMX, cognitive style and organisational citizenship behaviour. As expected, high level of emotional intelligence leads to higher quality organisational citizenship behaviours at both individual and group levels. Moreover, as hypothesised, the quality of LMX plays a mediating role in the relationship between both leaders' emotional intelligence and intuitive style and followers' organisational citizenship behaviours. Practical implications are given and recommendation made for future research.

Keywords: organisational citizenship behaviours, emotional intelligence, cognitive styles, leader-member exchange, working group, group diversity

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Abbreviations

AGFI	Adjusted Goodness-of-fit Index
AMOS	Analysis of Moment Structures
ANOVA	Analysis of Variance
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMIN	Chi-square
CSI	Cognitive style Index
EI	Emotional Intelligence
EQ-I	Emotional Quotient Inventory
FLMX	Followers' Perceived Quality of Leader-member Exchange
FOCB	Followers' Organisational Citizenship Behaviours
FOCBI	Followers' Individual-target Citizenship Behaviours
FOCBO	Followers' Organisational-target Citizenship Behaviours
GEI	Group-level Emotional Intelligence
GFI	Goodness-of-fit Index
GOCB	Group-level Organizational Citizenship Behaviour
GOCBI	Group-level Individual-target Citizenship Behaviour
GOCBO	Group-level Organisation-target Citizenship Behaviour
ICC	Intra-class Correlation
IFI	Incremental Index of Fit
IOCB	Individual-level Citizenship Behaviour
LLMX	Leaders' Perceived Quality of Leader-member Exchange
LMX	Leader-member Exchange
LMX7	7-item Leader-member Exchange
MBTI	Myers-Briggs Type Indicator
MLM	Multilevel Linear Model

MSCEIT	Mayer-Salovey-Caruso Emotional Intelligence Test
NFI	Normed Fit Index
OCB	Organizational Citizenship Behaviour
OCBI	Individual-target Citizenship Behaviour
OCBO	Organisation-target Citizenship Behaviour
OEA	Others' Emotion Appraisal
PCFI	Parsimony Comparative Fit Index
PGFI	Parsimony Goodness-of-fit Index
PNFI	Parsimonious Normed Fit Index
RMR	Root Mean Square Residual
ROE	Regulation of Emotion
Rwg	Within-group Agreement
SEA	Self-emotion Appraisal
SEM	Structural Equation Modelling
TLI	Tucker-Lewis Index
UOE	Use of Emotion
WLEIS	Wong and Law Emotional Intelligence Scale

1 Introduction

1.1 Introduction

In practice, organisations have transformed from traditional hierarchical organisational structures and job-limited functions to autonomous team-based work structures which stress cooperation and individual initiative (Ilgen and Pulakos, 1999). As a result of this process, research interest in Organisational Citizenship Behaviour (OCB), which is defined as discretionary behaviours and non task-related behaviours, has dramatically increased. Indeed, more than 1500 articles on OCB have been published in the last four years (Podsakoff, Podsakoff, MacKenzie, Maynes and Spoelma, 2014). Undoubtedly, this trend can be attributed to a number of factors. Firstly, OCB is normally regarded as a significant criterion measure in organisational behaviour literature and is closely related to effective interdependence and interpersonal relationships between members in work units (Netemeyer, Boles, McKee and McMurrian, 1997).

Secondly, Shore et al. (1995) indicate that OCB is somewhat more volitional than task performance, so managers may use such behaviours as indicators of how encouraged employees are to make the organisational more effective. Therefore, OCB is considered as behavioural cues of an employees' commitment to the success of the organisation (Podsakoff, MacKenzie and Bommer, 1996; Podsakoff, Whiting, Podsakoff and Blume, 2009).

Thirdly, OCB may improve group- or organisational-level measures of effectiveness. For instance, experienced employees who exhibit OCB may improve the productivity of less experienced employees by teaching them best practices. Similarily, workers who join in civic virtue (one perspective of citizenship behaviour) may give valuable ideas to leaders that improve group effectiveness and cut down costs (Podsakoff et al., 2009). In addition, OCB may improve group cohesiveness and spirit, so reducing the amout of time and energy spent on group maintenance functions and improving the organisational ability to attract the best individuals (George and Bettenhausen, 1990; Podsakoff et al., 2009).

Because of its contribution to organisational and individual success, and because "*we know little about citizenship behaviour in a global context*" (Farh et al., p, 412), it is also important to understand the causes of OCB in non-Anglo cultures where there has been a relative dearth of previous studies. China, as the second-largest economy in the word hiring more than 243 million workers (China Statistical Yearbook, 2010), has the largest workforce in the world. Because of its distinctive political and socio-cultural environment, the country offers a novel setting for scholars to investigate OCB-related questions in depth. Therefore, this study is conducted in a Chinese context.

Podsakoff et al. (2000) stress that antecedents of citizenship behaviours provide multiple mechanisms to achieve organisational success. In a review of organisational citizenship behaviour (OCB) literature, Podsakoff et al. (2000) stress that the future direction of theory needs to be concentrated on identifying unique antecedents of different types and levels of OCB. Some scholars also state that OCB includes some characteristically different, though related, forms of behaviours and that individuals normally perform one or two types of behaviours rather than joining equally in them all (Motowidlo, 2000; Organ, 1997; Van Dyne, Cummings, and McLean-Parks, 1995). For instance, OCB can be divided into two aspects: individual-target organisational citizenship behaviour (OCBI) and organisation-target citizenship behaviour (OCBO) (Williams and Anderson, 1991). These two types of OCB are associated with different antecedents, consequences and behaviours (Williams and Anderson, 1991; Somech and Drach-zahavy, 2004). For instance, OCBI is more closely related to interpersonal factors than OCBO, while OCBO directly contributes to organisational effectiveness more than OCBI (Podsakoff, Whiting, Podsakoff and Blume, 2009).

At the individual level, some studies indicate that individuals who work in the same environment may have different beliefs about, and abilities in, interpersonal helping (Hofmann et al., 2003; Korsgaard et al., 2002, Lam et al., 1999; Robinson et al., 1994). In other words, some individuals with a high level of abilities and positive attitudes towards others may help colleagues, while others with low levels of abilities and negative attitudes to others may not help colleagues.

However, Korsgaard et al. (1997) stress that current psychological models do not provide sufficient evidence to understand helping behaviours. With a few exceptions (e.g., McAllister, 1995), researchers have largely neglected the forms of citizenship behaviour that occur within a relational framework, although they occur most frequently within the confines of interpersonal relationships. Moreover, there is a lack of studies on the relationship between different forms of OCB and a variety of situations. In order to solve these issues, this research focuses on the relationship between OCBI and two other important organisational variables. The first one is emotional intelligence (EI) defined as the ability to manage emotion. When someone has a high level of EI, he or she may possibly turn towards the use of positive emotions; but when someone has a low level of EI, he or she may be less likely to turn toward the use of positive emotions. It is reasoned, therefore, that EI may be considered as a predictor of OCB. The second important variable is cognitive style, defined as individual differences in ways of thinking and interacting with others in social settings (Witkin et al. 1977). There has been increased attention to the application of cognitive approaches to industrial, work, and organisational psychology and the role that cognitive styles play in workplace performance and behaviours (Armstrong, 2011).

As pointed out by Organ (1988), OCB research at group/organisational level or cross-level is required. However, most empirical studies concentrate mainly on the individual level rather than the group level (Bommer, Dierdorff and Rubin, 2007; Organ, Podsakoff and MacKenzie, 2006). This gap is significant because it "*falls short of fully capturing the OCB phenomenon*" (Somech and Drach-Zahavy, 2004, p. 292). Interpersonal relationships such as social connections and associations among two or more individuals can be used to predict multilevel OCB (Dreu and Van Vianen, 2001; Choi and Thomas, 2010). Specifically, in positive interpersonal relationships, group members easily trust and cooperate with each other. Furthermore, Bowler and Brass (2006) argue that group members are more likely to help others who have a close interpersonal relationship with them. In leader-subordinate relationships, if leaders have close relationships with their followers, followers may commit to leaders or organisations, leading to improved organisational effectiveness (Ilies et al., 2007). During the last twenty-five years, researchers have identified a range of interpersonal variables with connection to OCB, including: interpersonal trust/loyalty (e.g. Podsakoff et al., 1990), personality (Organ and Lingl, 1995), and interpersonal conflict (Dreu and Van Vianen, 2001; Choi and Thomas, 2010). However, their full implications are still unclear. In order to investigate the antecedents of group-level OCB (GOCB), this study examines the influence of group composition in terms of emotional intelligence (EI), leader-member exchange (LMX) and cognitive styles.

1.2 Research background

This sub-chapter will briefly discuss the basic themes and definitions of key variables

1.2.1 Group

A work group can be considered as a collection of individuals who have a common goal and interdependent outcomes and behaviours, and who are perceived by themselves and others as a social entity in an organisational background (Cohen and Bailey, 1997; Hackman, 1987; Sundstrom, 1999). A wide variety of studies have indicated that groups play an important role in enhancing performance, behaviours and problem solving (Levi, 2001; Stewart et al, 1999; Manz and Sims, 1987). As a corollary of this, groups are increasingly being embraced by the business community (Lawler, 1993; Kozlowski and Ilgen, 2006). For instance, 67% of Fortune 1000 organisations apply different types of group structure to promote organisational development (Lawler et al., 1992).

In organisational studies, work groups can be defined as having many different forms. Group characteristics relevant to the effect of group functioning vary across different kinds of groups. This research focuses on the kind of group in which group members interact and communicate with each other and whose group size is fewer than 20 members, because when group members are less than 20, it is possible for them to maintain close interpersonal interaction (West, 1996). If group members maintain high interdependence and interaction between each other, inter-member dynamics (such as interpersonal relationships) may strongly influence GOCB in small work groups (Choi and Sy, 2010). In China, interpersonal relationships or interaction are more significantly related to OCB than in many other countries (such as the United Kingdom and United States) because in Chinese society, close interpersonal relationships are more likely to result in successfully securing desired resources, whereas in the West, resource allocation is more likely to be dependent on rules, procedure and positions of power (Farh et al., 2004; Fok et al., 1996).

According to Devine's classification (2002), if a group only exists for a short period or a brief work cycle, group members have less opportunity to participate in organisational behaviours, and they are less likely to develop long term interpersonal relationship, thus reducing the chances for exchange or reciprocity (Blau, 1964) and leading to negative group outcomes (Higgs et al., 2005). For these reasons, this study is conducted in organisational departments which have existed for a long period and may offer many opportunities to engage in organisational citizenship behaviours.

1.2.2 Leader-member exchange

The dominant theoretical basis for most OCB investigations is social exchange theory or its offshoots (e.g. Dyne et al., 1994; Eisenberger et al., 1986, Shore and Wayne, 1993). In order to better understand the effects of variables on OCB, this study adopts the variable of LMX, which refers to the exchange relationship between a follower and a leader.

LMX theory originally developed from social exchange theory (Blau, 1964) to assess the development of dyadic relationships and the connections between leadership processes and outcomes (Dansereau, Graen and Haga 1975; Graen and Scandura 1987). It is different from average leadership theories and posits that leaders do not treat every follower identically. In other words, leaders treat subordinates differently in their working relationships (Graen and Uhl-Bien 1995). Different relationships may influence leaders' and members' behaviours and attitudes (Gerstner and Day, 1997; Liden et al., 1997; Sparrowe and Liden, 1997). When a high quality exchange relationship is established between followers and leaders, followers may obtain some advantages, such as a high degree of emotional support, trust, more resources and respect, and then they may want to reciprocate through showing a high level of organisational commitment, performance and more extra-role behaviours (Graen and Uhl-Bien 1995; Gerstner and Day 1997; Maslyn and Uhl-Bien 2001). However, followers in a low-level exchange relationship may obtain fewer resources, less respect and a low degree of emotional support, and then they may tend towards a greater turnover, less organisational commitment, lower performance and fewer extra-role behaviours (e.g., Gerstner and Day 1997; Graen and Scandura 1987; Setton et al., 1996; Liden et al., 1997). Although some researchers have focused on the relationship between leaders' behaviours and OCB (e.g. Hackett et al., 2003; Ilies et al., 2007), it has been suggested that LMX needs to be further considered as a mediating variable (Podsakoff et al., 2000).

Additionally, although the quality of LMX plays an important role in predicting the interpersonal social exchange behaviours and motives in the leader-member relationship, there is a dearth of studies on how the quality of LMX arising from within-group differentiation and the social comparisons appearing in this context are further related to individuals' attitudes and actions (Henderson et al., 2008).

According to differentiation theory (Liden et al., 1997, 2006), leaders may foster a work group context variable in nature and quality if it contains dyadic LMX relationships. The level of differentiation between leaders and followers tends to differ across groups. In some groups, leaders have a high quality of exchange with some followers, but not with others; while in other groups, leaders have a similar quality of exchange with all members (Liden, Erdogan, Wayne and Sparrowe, 2006). Considering the source of LMX differentiation, this study posits that LMX differentiation is more likely to be identified by group member characteristics.

1.2.3 Cognitive styles

Cognitive style is defined as individuals' differences in their ways of dealing with information based on different brain-based mechanisms, and is also considered to be a stable feature that influences individual behaviours (Franco, Meadows and Armstrong, 2013). Empirical studies have indicated that cognitive styles can better predict individuals' performance in particular situations than general abilities (Armstrong, 1999; Kirton, 2003) and individual differences in cognitive styles are associated with different perceptions of interpersonal relationships (Armstrong, 1999; Kirton, 2003) and related to different preferences for interpersonal-related behaviours (Witkin and Goodenough, 1977). For instance, in the organisational context, a person with an analytic style would prefer to work in a task-oriented and structured work environment (Armstrong, 2000; Kirton, 1976) and care about self-related benefits (e.g. promotions and rewards) (Witkin and Goodenough, 1977) rather than personal relationships (Pascual-Leone, 1989), while an individual with an intuitive style prefers to work in a work environment that is less structured and not task-oriented (Kirton, 1976). In order to keep effective functioning, such individuals tend to exhibit warm and friendly interpersonal behaviour and maintain positive interpersonal relationships (Armstrong, 2000).

Based on this theoretical knowledge, the research content is not only connected with interpersonal relationship but also with individual-target organisational citizenship behaviours as a kind of interpersonal-related behaviour. Kamdar, McAllister and Turban (2006) state that individual difference factors play an important role in predicting OCB. As mentioned previously, different forms of OCB are associated with different antecedents, consequences and behaviours (Williams and Anderson, 1991; Somech and Drach-zahavy, 2004). For instance, OCBI is more closely related to interpersonal factors than OCBO (Podsakoff, Whiting, Podsakoff and Blume, 2009).

Therefore, both cognitive styles and individual-target citizenship behaviours overlap in the field of interpersonal relationships.

Additionally, cognitive styles play an important role in group behaviours and effectiveness. Karn et al. (2007) investigate software engineering groups' cohesion and performance to demonstrate that the highest performing groups are related to a dominant cognitive style. However, groups with different cognitive styles may have more conflicts and lower quality of performance than homogeneous groups.

In the field of leadership, some studies (e.g. Atwater and Yammarino, 1992) reveal that according to the MBTI category of cognitive styles, leaders with a feeling style are found to be rated higher by both leaders and followers than those with a thinking style. Additionally, information processing with an intuitive style may lead to more effective leadership than information processing with an analytic style (Allinson et al., 2001).

1.2.4 Emotional intelligence

Emotional intelligence (EI) influences one's ability to appraise and regulate emotions in self and others (Mayer and Salovey, 1997; Wong and Law, 2002). In the workplace, emotional intelligence plays an important role in influencing a wide variety of work-related behaviours, such as group work, innovation, trust and commitment. As Cooper (1997) points out, individuals who have a high level of EI may more easily achieve career success and promote positive interpersonal relationships and effective behaviours than those with a low level of EI.

The reasons why EI promotes job success are that it facilitates individuals to express thinking, ideas and goals in an effective way, and then make others feel good in the work environment (Goleman, 1998). At the group level, EI plays an important role in group effectiveness because it enhances individuals' ability to understand each other's weaknesses and strengths and to leverage strengths whenever possible; therefore, it may encourage effective and smooth group work (Bar-On, 1997). Emotional intelligence may also facilitate individuals' ability to succeed in managing different tasks (Bar-On, 1997).

Regarding leadership, George (2000) indicates that EI may help leaders to understand followers' feelings and affect their emotions. They can also better predict how well their subordinates will respond in different situations (Mayer and Salovey, 1997; Sjoberg, 2001). Leaders who have high EI may promote optimism in work situations and can maintain a high level of interaction and trust by developing high levels of interpersonal relationship (George, 2000).

Abraham (1999) indicates that individuals may make responses and take actions according to emotions of themselves and others. Positive emotions or moods may be positively related to OCB, whereas negative moods or emotions are likely to be negatively related OCB. Thus, individuals with high EI may effectively manage their emotions and compel themselves or others to engage in extra-role behaviours (Wong and Law, 2002).

1.4 Research questions

The preceding discussions lead the author to put forward the following research questions. These will be further refined in order to develop detailed research hypotheses resulting from a more in-depth review of appropriate literature in a later chapter:

Research question 1: What is the relationship between cognitive style and OCB?

Research question 2: What is the relationship between cognitive style diversity and group-level OCB?

Research question 3: What is the relationship between cognitive style and emotional intelligence?

Research question 4: What is the role of leader-member exchange in the relationship between leaders' cognitive style and followers' organisational citizenship behaviour?

Research question 5: What is the relationship between cognitive style diversity and LMX differentiation?

Research question 6: What is the role of leader-member exchange in the relationship between leaders' emotional intelligence and followers' organisational citizenship behaviour?

1.5 Significance of the research

This study makes several important basic and applied contributions. First, little attention has been paid to the influence of a range of psychological traits on OCB which are currently perceived to be strong predictors of individual performance. This study adds to the factors of individual differences predicting OCBI by examining the different cognitive styles predicting OCBI (Podaskoff et al., 2000).

Second, empirical studies of OCB mainly focus on it at an individual level. However, Somech and Drach-Zahavy (2004) indicate that individual-level OCB cannot fully represent the OCB phenomenon because antecedents at the individual-level cannot be generalised to group-level (Choi and Sy, 2010). This study offers a greater understanding of the group characteristics that cause GOCB by identifying the theoretical contribution of emotional intelligence and cognitive style diversity.

Third, empirical findings in this study provide an elaborated understanding of leader-member exchange as a meaningful mediator between cognitive styles and organisational citizenship behaviour.

Fourth, although some studies have been carried out on benefits of the Group-level Emotional Intelligence (GEI) and the antecedents of GOCB (Antonakis, Ashkanasy and Basborough, 2009), the ways in which GEI affects GOCB has rarely been examined, and this study develops a new group-level EI instrument (based on Wong and Law's Emotional intelligence Scale - WLEIS) to test the relationship between GEI and GOCB.

Finally, prior studies do not clarify how within-group LMX differentiation is predicted by group-level variables (e.g. group size and group culture) (Henderson et al., 2009). This study intends to contribute to overcoming this limitation by testing whether LMX differentiation can be explained by group-level cognitive style diversity.

In practice, this study will help Chinese organisations to understand how to cultivate employees' organisational citizenship behaviours and how to organise members in the work units successfully.

2 Literature review

2.1 Organisational citizenship behaviours (Dependent variable)

2.1.1 The Definition of organisational citizenship behaviours

The term "*Organisational Citizenship Behaviours*" (OCB) was firstly introduced by Dennis Organ and his colleagues (Bateman and Organ, 1983; Smith et al., 1983) in the early 1980s. It stems from the definition of "*willingness to cooperate*" (Barnard, 1938) and the difference between "*innovative and spontaneous behaviour*" and dependable role performance (Katz, 1964; Katz and Kahn, 1966, 1978).

Over the past two decades, interest in the domain of OCB has increased dramatically (Podsakoff et al., 2000), but its full implications are still unclear. Some scholars try to explain OCB using other labels, such as organisational spontaneity (e.g. George and Brief, 1992; George and Jones, 1997), prosocial organisational behaviour (e.g. Brief and Motowidlo, 1986; George, 1990, 1991) and contextual performance (e.g. Borman and Motowildo, 1997) as the characteristics between these and OCB overlap considerably. For instance, both contextual performance and OCB focus on volunteering and cooperating (Motowidlo, 2000).

However, in later studies, some scholars (such as Motowidlo, 2000) indicate that although there are many similarities between these definitions, there remain differences between them. One of the main differences between OCB and contextual performance is that OCB is not recognised by a formal reward system, which is the main factor considered by contextual performance. Another difference between these two theories is that OCB can be considered as a type of extra-role behaviour, while contextual performance does not require behaviours to be extra-role. Additionally, the aim of prosocial organisational behaviours is to help others. Individuals may sometimes exhibit prosocial behaviours for personal matters but not for organisational effectiveness (Brief and Motowidlo, 1986). Nevertheless, all forms of organisational citizenship behaviours may directly or indirectly relate to organisational effectiveness (Van Dyne et al., 1995). In this study, OCB is considered as a different term to prosocial organisational behaviours and contextual performance.

Organ et al. (1988) define the term ‘OCB’ as discretionary behaviours, not defined by a formal reward system, and which may enhance organisational effectiveness. There are two traits of OCB emphasised in this term. First, behaviours need to be carried out willingly and not be limited to formal job duties. Second, behaviours should not only occur haphazardly within an organisation, but also directly or indirectly benefit the organisation (Van Dyne et al., 1995). Some scholars follow this definition to develop OCB, as organisational effectiveness and organisational efficiency, which are two of most important factors of organisational design, are taken into account (Burton and Obel, 2004). Although this definition is confirmed by many researchers (e.g. Burton and Obel, 2004; Van Dyne et al., 1995), the debate about its definition is continuous (LePine et al., 2002). In response to this conception, some scholars (e.g. Morrison, 1993; Podsakoff et al., 2014) argue that OCB is sometimes not discretionary when it is perceived by leaders and co-workers. A revised description is offered by Organ (1997, p.95), which is that OCB “*supports the social and psychological environment in which task performance takes place*”. Compared with the original definition, this one has more advantages. First, it stresses the differences between task performance and OCB. Second, it removes the requirement that OCB must be discretionary and has little relation to rewards (Motowidlo, 2000). This definition is applied in this study.

However, regardless of the specific definition, scholars always conceive of OCB from several behavioural aspects. The dimensionality of OCB will be discussed in detail, as follows.

2.1.2 Dimensionality of OCB

In order to further distinguish OCB from other types of performance (e.g. task performance), many authors indicate that it is necessary to define the domain of OCB clearly (Podsakoff et al., 2000). Smith et al. (1983) first proposed two factors of OCB. The first is altruism, which refers to helping individuals in a face-to-face situation (one item is “*volunteering to help others who have a high workload*”). Another one is generalised compliance, which refers to compliance with norms (one item is "*no extra breaking in work*").

Later, Organ (1988) systematically indicated five aspects of OCB: altruism (which refers to some voluntary behaviours to help people in the organisation); courtesy (which refers to helping others to solve problems); conscientiousness (one's internalisation and acceptance of the organisational procedures and rules); sportsmanship ("a willingness to tolerate the inevitable inconveniences and impositions of work without complaining."); and civic virtue (a macro-level commitment to an organisation).

In later studies, researchers further identify more than 30 dimensions of OCB in the literature, such as organisational support or loyalty altruism, courtesy, compliance, voice behaviour, sportsmanship, and personal initiative taking (Coleman and Borman, 2000; LePine, Erez and Johnson, 2002; Organ et al., 2006; Podsakoff, MacKenzie, Paine and Bachrach, 2000).

However, other researchers indicate that OCB is unidimensional (LePine et al., 2002, Hoffman et al., 2007). For instance, based on their meta-analytic study, LePine et al. (2002) concluded that Organ's five OCB dimensions are strongly related to each other. Various OCB dimensions have equivalent relationship with different attitudinal measures (such as commitment and satisfaction). Additionally, the various dimensions of OCB do not explain variance beyond an overall measure of the OCB construct. Therefore, they considered the dimensions of OCB as "*equivalent indicators of OCB*" and scholars began to explicitly think of Organ's (1988) OCB as "*a latent construct*" (LePine et al., 2002, p.61).

Also consistent with this idea, it is not suggested that researchers focus on specific dimensions of OCB when carrying out research and analysing results. This would be similar to interpreting relationships with individual items from a multi-item measure of a uni-dimensional construct. It is problematic to test relationships between dimensions as the differences between them only arise from sampling error or "*a reflection of the relative imperfection inherent in individual indicators*" (LePine et al., 2002, p.61). Indeed, some OCB researchers have integrated scores on the behavioural dimensions into a composite score (e.g., Allen and Rush, 1998; Deckop, Mangel and Cirka, 1999; Hui, et al., 1999; Netemeyer et al., 1997). Nevertheless, the finding concerning the high correlation between different dimensions of OCB is influenced by statistical power. Specifically, the low number of effect sizes may hinder the discovery of the differences in relationships between dimensions. In addition, the uni-dimension of OCB is not supported by the construct definition.

The construct and definition of OCB have developed over time and it is normally considered as multi-dimensional, depending on its status (e.g. Podsakoff et al., 2014, Williams and Anderson, 1991). Regarding the conceptualisation of the five dimensions of OCB, there are differences between them. Assuming that the dimensions of OCB are organised differently according to different consequences, it is appropriate to regard them individually. For instance, it is normal that some individuals are likely to help others and tend to have a high level of cooperation (high level of altruism) but at the same time, they may not like to take actions to contribute towards organisational development (low level of civic virtue). Altruistic behaviour plays an important role in group members' work, while the behaviour of civic virtue is important for organisational development and effectiveness. Therefore, this study considers OCB as a mutidimensional construct.

According to Organ's (1988) study, some scholars point out that different elements of OCB overlap with each other into two different subgroups (e.g. Williams and Anderson, 1991). They hold that these two subgroups are second-order dimensions of OCB. For instance, Van Dyne, Cummings, and Parks (1995) define these two categories as challenge-oriented citizenship behaviours (COCB) and affiliation-oriented citizenship behaviours (AOCB). AOCB focuses on the interpersonal nature and promoting or maintaining relationships with others. It is composed of altruism, courtesy, peacekeeping, cheerleading (Organ, 1988), and interpersonal facilitation (Van Scotter and Motowidlo, 1996). In comparison, COCB, a combination of civic virtue, challenges the status quo and aims to promote positive change in the organisation (Podsakoff, 2014). COCB is normally considered as a voice behaviour, which is defined as "*promotive behaviour that emphasizes expression of constructive challenge intended to improve rather than merely criticize. Voice is making innovative suggestions for change and recommending modifications to standard procedures even when others disagree*" (Van Dyne and LePine, 1998, p. 109).

A further conceptualisation suggested by Williams and Anderson (1991) is the definition of two categories of OCB as individual-target organisational citizenship behaviours (OCBI) and organisation-target organisational citizenship behaviours (OCBO). OCBI refers to those behaviours directly benefitting individuals and indirectly benefitting organisations (e.g. co-workers immersed in a problem). Thus, OCBI involves voluntarily helping others with work-related problems, while OCBO refers to those behaviours directly benefitting the organisation as a whole (e.g. complying with informal rules to keep order). Podsakoff et al. (2000) further indicate that OCBO promote one's acceptance of the organisational procedures and regulations, and lead to a scrupulous adherence to them, even when nobody monitors them. There are many differences between the constructs of OCBI and OCBO. First, OCBO and OCBI imply different assumptions about extra rewards. For example, OCBI does not relate to external rewards. In comparison, OCBO relates to external rewards. Second, two dimensions of OCB have different antecedents (e.g. Brief and Motowidlo, 1986; Smith et al., 1983). For example, the surviving prosocial behaviour items are related only to OCBO items and not OCBI items (Williams and Anderson, 1991). Based on different characteristics of OCBO and OCBI, Van Dyne et al. (1994) combine five dimensions into two subgroups: altruism and courtesy overlap with OCBI; sportsmanship, civic virtue, and conscientiousness overlap with OCBO.

As mentioned above, literature relating to the constructs of OCB varies somewhat. Considering the nature of OCB dimensions, Organ's (1988) 24-item scale is adopted in the present research, because it allows a connection between different levels of organisational targets (i.e. individual/organisation) with different levels of antecedents (i.e. personal, contextual) (Somech and Drach-zahavy, 2004, P282). Additionally, Podsakoff and his colleagues have carried out many empirical studies (e.g. Podsakoff et al., 1990; Podsakoff et al., 1996) to test Organ's framework and have reported encouraging validity characteristics for the five-dimensions and reliability coefficients reaching (α= .94). Further, Hoffman et al. (2007) emphasise that there are high correlations between the OCBI/OCBO framework and the five-dimension OCB. In other words, the five dimensions in Organ's framework can be further divided into two categories. Specifically, altruism and courtesy in the five-factor model represent individual-target organisational citizenship behaviours (OCBI), while sportsmanship, civic virtue and conscientiousness in the five-factor model represent organisation-target organisational citizenship behaviours (OCBO). In this study, altruism, courtesy, sportsmanship, civic virtue and conscientiousness are not only used to represent OCB, but also further catergorised into OCBI and OCBO dimensions.

2.1.3 Group-level organisational citizenship behaviour (GOCB)

2.1.3.1 The definition of GOCB

Guzzo et al. (1993) argue that the most important part of developing knowledge related to the OCB construct is to find and test the validity of operationalising it as a group construct. As the literature in the field of GOCB has not fully explored this, it is significant to discover an appropriate way to operationalise the construct.

Most organisational variables are defined as "*inherently multilevel as opposed to occurring at a single level or in a level vacuum*" (Chan, 1998, p. 234). Therefore, identifying and investigating the OCB construct at different levels is very important. However, the classic definition of OCB is normally limited to the individual-level (Organ, 1988). Until recently, some scholars describe OCB at team or group level by applying different terms, such unit-level OCB, team OCB and collective citizenship behaviour (Karam and Kwantes, 2006; Koys, 2001; Pearce and Herbik, 2004; Podsakoff, Ahearne and MacKenzie, 1997). The term, group-level OCB (GOCB) which is introduced by Chen, Lam, Schaubroeck, and Naumann (2002) is applied in this study

With connection to group-level OCB, it is significant to clarify whether GOCB is measured by group members' self-evaluation or they are evaluating other group members' behaviours (Kozlowski and Klein, 2000). Brown (2000) stresses that the GOCB focuses on how the groups as a whole are assessed. Moreover, GOCB is considered as non-task limited and can transcend different jobs and contexts (Chen, 1998), which is called a "*referent-shift consensus model*" (Chen, 1998). According to this theory, the assessment of group-level OCB implies a shared view by group members. Kozlowski and Klein (2000) suggest that "*researchers employ measures consistent with the conceptualization of their constructs, using unit-level referents, if possible, to assess shared unit-level constructs*" (p. 38). Borman and Motowidlo (1997) describe GOCB as the combined behaviour of group members that shapes the group's psychological and social background, and promotes its task performance effectiveness.

Moreover, Ehrhart (2004) highlights that GOCB is more than simply the sum of each part and neither is it the mean of the OCB of each member of the groups. It rather refers to a group's shared understanding of a level of behaviour which occurs in the group and supports the future behaviours of the group members. Rousseau (1985) stresses that potential misspecification errors may occur when a relationship is extrapolated from one level to another. In line with this point, Morgeson and Hofmann (1999) stress that there is a difference between the average individual-level OCB and group-level OCB in that the latter one includes interactive factors of the construct which do not appear in individual-level research.

Furthermore, the importance of GOCB is reflected in the ways in which group members assess their behaviours, whether they consider themselves normative and how closely they are connected to the identity of the group. All of these factors are part of group-level OCB and therefore they serve to distinguish it from the average individual-level OCB (Ehrhart, 2004).

It also should be noted that GOCB is different from group performance (Chen, 2007). First, group performance is normally measured by types of group output (such as levels of service and number of produced products) in relation to quantity and quality. However, GOCB focuses on some kinds of behaviour that may help or promote groups to finish tasks or to achieve goals; for example, helping group members with high workload is regarded as GOCB rather than quantity and quality of group outcomes. Second, group performance refers to how well a group performs a set of tasks, while GOCB is a set of behaviours directed to groups as whole, but not similar to task-related actions. Finally, GOCB is different from group performance in that it is less likely to be related to formal rewards.

2.1.3.2 The measurement of group-level OCB

Although the definition has been confirmed as representing group-level OCB, it is also important to review some key points and suggestions related to the measurement of group-level OCB in this sub-section.

In developing a group-level OCB measurement, it is important to consider references applied in the items. Developed from the theory of group-level OCB, self-oriented or individual-oriented measurement and group-referenced measurement are two common ways of testing group-level OCB. Self-oriented or individual-oriented measurement collects data from asking about an individual's behaviour. A sample of a self-oriented item is "*Member A feels pressure from group members to help my fellow co-workers when needed*" (Podsakoff et al., 1990). Organ and Konovsky (1989) assert that the self-oriented model is closely related to individual-level OCB and is considered to be an independent model (Klein et al., 1994) in which group members are not influenced by their group membership. By comparison, group-referenced measurement asks about the behaviour of the group as whole. Two examples of items are "*Group members believe in giving an honest day's work for an honest day"s pay*' and "*Group members are always ready to lend a helping hand to those around him/her*" (Podsakoff et al., 1990)

Ehrhart and Naumann (2004) stress that the difference between individual-oriented measurement and group-oriented measurement is that the former asks respondents about their own behaviours and the latter indicates the whole group's behaviours (Podsakoff et al., 1990). As mentioned in the previous chapter, the assumption of an individual's behaviour fails to consider that group members are interdependent with each other. Choi (2009) also states that the aggregation of individual OCB to the group level does not lead to a strong indicator of group-level OCB. Following the conception of group-level OCB, the appropriate approach to measure group-level OCB is to gather data from the responses of all group members. Klein and Kozlowski (2000) also stress that after comparison with a large number of popular measures, it is considered the most appropriate way to describe statistics. However, Kozlowski and Klein (2000) point out that this problem of individual-oriented items is unclear, and claim that "*researchers employ measures consistent with the conceptualization of their constructs, using unit-level referents, if possible, to assess shared unit-level constructs*" (p. 38). Consistent with these ideas, Ehrhart and Naumann (2003) insist that when individual-oriented items are aggregated to group level, it is appropriate to represent average OCB, while, when group-oriented items are used to analyse group level, it is appropriate to represent the whole group situation. As mentioned above, GOCB can be considered as groups' shared understanding of the level of behaviour. Therefore, in this study, group-oriented items are used to measure group-level OCB.

2.1.3.3 The distinction between multi-level citizenship behaviour

Although OCB can be considered from both individual level and group level, the construct of individual-level OCB does differ from that of group-level OCB. First, group-level OCB and individual-level OCB focus on different levels of analysis (Choi, 2009). Second, Choi (2010) argues that antecedents of individual-level OCB are different from those of group-level OCB. For instance, attitudes and individual dispositions play an essential role in predicting individual-level OCB, while collective properties (such as group processes, task interdependence) play an essential role in group-level OCB (Choi, 2010). Some empirical findings indicate that antecedents of individual-level OCB cannot be applied to the group level because of structural distances in the construct at different levels of analysis (Morgenson and Hofmann, 1999) and that there are some potential misspecification mistakes in the process of extrapolating a relationship that researchers observed at one level to another (Rousseau, 1985).

Although group-level OCB can sometimes be predicted by the same factors that connect with individual-level OCB, group-level OCB is more strongly related to group characteristics (Marotto et al., 2007; Morgeson and Hofmann, 1999). Podsakoff et al. (2000) also indicate that most of the OCB research examines the relationship between individual-level OCB and individual-level antecedents. Therefore, individual-level OCB and group-level OCB have different antecedents and effects on organisations. This study needs to test individual-level OCB and group-level OCB with different different antecedents.

Although increasing attention has been paid to group-level OCB, there remain a number of gaps in the understanding of it. For example, little progress has been made in understanding the conditions under which high levels of group-level OCB are formed. Somech and Drach-Zahavy (2004) indicate that the absence of information at group or team level is the situation of "*pluralistic ignorance*". This appears when individuals do not believe that their own behaviour is a typical case of a group or team, and they have less information about other group or team members than themselves. Hence, they may give different evaluations of their own behaviours and other members' behaviours in the same situation.

Hence, group-level OCB needs to be further explored. Choi and Sy (2010) indicate that GOCB can be better understood by looking into inter-member dynamics in groups, which is influenced by interaction and interdependence. Inter-member relationships, in place of or in addition to leader-member relationships, play an important part in GOCB, as they can promote members' contributions beyond those required and voluntary collaborations (Organ et al., 2006). According to different degrees of interaction and interdependence, groups may have different reactions to GOCB. Different types of groups and group composition are discussed in connection with interaction and interdependence, as follows.

2.2 Groups

Groups are considered as a basic unit in the organisation (West, 1996). The organisational daily work is often organised at group level because most of the time, organisational tasks cannot be finished by individuals working alone. Before focusing on target groups, it is necessary to review the definition of the group and its composition.

2.2.1 Defining a group

Research on organisational groups with a connection with management and psychological background has a history of more than sixty years. Scholars tend to define groups from different perspectives. Lewin (1948) indicates that individuals bond together in groups when they focus on similar purposes or outcomes. For instance, in order to get rewards collectively, individuals may come together in a group. Sherif and Sherif (1969) assert that some forms of social structure play an essential role in defining a group because social structure may strengthen the collection of individuals. Additionally, Tajifel (1981) indicates that individuals need to interact face-to-face and have shared identity in groups.

From the psychological perspective, the conception of a group is defined from two perspectives: social identification and social representation (Hayes, 1997). Social identification indicates the recognition that a group exists separately from others. It is the creation of a belief in "*us vs. them*". Identification can be considered as not only a cognitive process (categorising different situations into different forms) but also an emotional process (considering ones' own group as better than other groups). In comparison, social representation refers to shared beliefs and thinking that individuals have toward the world. With the passing of time, a group may change group members' ways of seeing the world, and the group may develop a shared view through member interactions.

Rather than identify a black-or-white definition of the group, more and more scholars (such as Campbell, 1958; McGrath, 1984) stress that it is more useful to view "*entitativity*" as an essential standard for groups. Group entitativity refers to a collection of individuals being perceived as linked together in coherent units (Campbell, 1958). In particular, face-to-face interaction, shared identity and social structure can be considered as components of group entitativity (McGrath, 1984).

Lickel et al. (2000) indicate that group entitativity positively relates to group interdependence, the importance of group members to each other, the degree of interaction between members, duration and the degree of similarity, and negatively connect to group size and permeability (table 2.2.1.1). In small work units, when group members have a high degree of similarity they are likely to maintain close interactions between each other, and they are more likely to bond together as a group.

Table 2.2.1.1: Important group characteristics

Characteristic	Description of characteristic	Relation with characteristic
Interdependence	The degree to which group members depend on one another to achieve their goals or important outcomes	+
Importance	The degree to which the group is important to its members	+
Interaction	The degree to which group members meet on a regular basis	+
Size	The number of people that are member of the group	-
Duration	How long the group stays together as a group	+
Permeability	The degree to which it is easy to join or leave the group	-
Similarity	The degree to which group members are similar to one another on one or more attributes	+

Source: based on Livkel et al. 2000; Nifstad, 2009. + indicates a positive relation; - indicates a negative relation.

2.2.2 Group types

Groups can be defined by ways other than the types of activities individuals perform (Devine, 1999). Many scholars posit that groups need to be classified by whether they are permanent or temporary, how much internal specialisation and interdependence they need, and how much integration and coordination they have with other parts of the organisation (Mohrman, 1993; Sundstrom et al., 1990).

McGrath (1984) provides three categories organising individuals into work groups according to power, leadership, decision making and activities or task. The first is a work group in which group members work on independent tasks which are linked by leaders or the work system. This kind of group is organised according to organisational hierarchy and decisions are made by leaders. A second category of work group is the kind of group that is given some power and authority and independence within the organisational hierarchy. Managerial power is given to group leaders in the process of making decisions. Group leaders' work is interdependent and coordinated with their direct leaders. The third category refers to a self-managing team which has more power and is more independent from the organisational hierarchy than traditional work groups. Group leaders have power to choose their group members and facilities rather than control group operations, and they have no power to force all group members to accept decisions. Group members are highly interdependent in coordinating activities.

In view of group entitativity, different work groups are connected with different perceptions of group entitativity (Nijstad, 2009). West (1996) further distinguishes work groups as two types: formal and informal work groups. The latter refers to those groups which are organised in the organisation, but do not have organisational identity. These can be social groups, such as individuals coming together to talk about religious orientation or to play sports. Lickel et al. (2001) point out that social groups are perceived as having a low level of interaction and interdependence. The formal work group refers to those groups which have a range of functions and an identity in order to achieve organisational objectives. Some authors (Alderfer, 1977; Hackman, 1987) define a formal work group in the organisation from five attributes: first, they are organised in large social systems (such as organisations). Second, they perform one or more tasks which relate to missions of organisations. Third, their task performance may influence not only organisational members but also individuals outside groups. Fourth, group members need to be interdependent with each other. Fifth, they have identifiable membership. An example of this is the following: "*team membership is quite clear – everybody knows exactly who is and isn't on this team*." (Wageman et al., 2005, p. 382). Wageman et al. (2005) suggest that the original conception of formal group can be revised and categorised in three features, which are clear delineation between group members and non-members, interdependence between group members and moderate stability (i.e., group membership is stable over time). Hackman (2002) indicates that groups with stable membership may have a good performance due to the length of time they have spent together, providing group members with opportunities to build relationships and learn how they can work best together.

However, Katzenbach and Smith (1998) conceptualise the components of formal work groups somewhat differently from Alderfer (1977) and Hackman (1987). Although both of them focus on the composition and task elements of a group, Katzenbach and Smith (1998) state that organisational formal work groups may have unstable membership. In practice, many organisational groups exist for a short time because of the short period of task completion, so group members are unfamiliar with each other although they work together. They are independent in completing a task. Nevertheless, Hackman's conceptualisation suggests that these groups cannot be considered as real formal work groups.

Formal work groups can be identified as many forms, such as semi-autonomous work groups (these groups mainly focus on their own work plans) and project groups (such as a research group trying to find a new way of putting plastic cabling on wheels). Compared with informal groups, formal groups are perceived as having a higher level of interaction and interdependence (West, 1996). This study will focus on groups with interdependence and interaction between members (formal work groups) because if group members keep high interdependence and interaction between each other, inter-member dynamics (such as interpersonal relationships) have a strong influence on GOCB in small work groups (Choi and Sy, 2010). Much detail about the interdependence and how to measure it will be discussed in the next section.

Group research is normally related to studies of teams. In the next section, these two conceptions are discussed.

2.2.3 Work groups and teams

In classifications of groups, many group studies tend to compare with the characteristics of teams. As is pointed out by some scholars, there is a blurred distinction between the team and group. They tend to consider both team and group as the same term because there are few differences between groups and teams. Both teams and groups share some of the same characteristics: (a) consisting of two or more persons; (b) interactive socially (c) owning one or more common missions (d) maintaining and managing boundaries (e) doing tasks related to the organisation (f) showing task interdependencies (i.e., workflow, goals, outcomes) (g) existing in the organisation which promotes or constrains organisational development and affects exchanges with other units (e.g. Alderfer, 1977; Hackman, 1987).

However, others indicate that there are more differences than similarities between these two terms. Some main differences identified are related to size, power of control and performance results. First, there is no strict limitation on group size. It can range from two to a thousand. Nevertheless, the team size is strictly limited to between 4 and 20 (Levi, 2001). McGrath (1984) asserts that the group is conceptualised as being "*fuzzy*" in that it is unclear how many individuals are in a group, and the scope of behaviours and situations in which the group perform interdependently. Second, there are rigid controls on team members' performance of tasks. However, there is no rigid control on group performance. Third, the difference between teams and groups is a result of performance. Katzenbach and Smith (1993) stress that groups' performance is considered as what members do as individuals, whereas teams' performance is considered as including individuals' and collective or joint work products. For instance, groups perform additive tasks as a sum of individuals' contributions (Steiner, 1972). There is no task-oriented interdependence in groups when doing additive tasks as members co-act rather than interact with each other to produce outcomes. Further, Katzenbach and Smith (1993) attempt to restrict the use of the term 'group' , in order to make room for the term 'team', the use of the term of 'group' to some situations in which additive tasks exist. However, in doing so they restrict groups to a very narrow set of situations for, as is pointed out by Steiner, "*(in groups) outside the laboratory, complete additivity is probably rather rare*" (p.33).

In the latter studies, West (1996, p9) claims, "*all teams are groups but that not all groups are teams*" because the conception of group has been used very expansively in general social science. One example can explain "*not all groups are teams*": if there is no interdependence between members, then they can be considered as groups rather than teams. In an organisational context, West (1996) asserts that the work group is defined more appropriately as an organisation with an internal structure of horizontal and vertical relationship with fewer than 20 members. In this study, West (1996)'s conception about group size is adopted because if there are fewer than 20 group members, they will likely maintain interpersonal interaction between each other (Beebe and Masterson, 2006; House, Rousseau and Thomas-Hunt, 1995). The work group traits defined by West (1996) are very similar to the team traits as discussed above.

Compared with different studies, this research accepts that there are many differences between the general conception of "*group*" and "*team*" from a psychological perspective, but in the organisational background, the characteristics of some work groups are similar to characteristics of teams. In other words, the meaning of a formal group rather than a informal work group is highly relevant to the conceptualisation of a team, in terms of the criteria applied to define teams and the situation of continuum, in the organisational background. Therefore~~,~~ in this study, the formal work group can be considered the same as a team, but an informal work group is different from a team. In the following, some findings and criteria applied in the team research are also used to explain a formal work group.

In order to understand how to promote group effectiveness, a wide variety of studies focus on interpersonal perspectives (Moreland et al., 1994; Levine and Moreland, 1990). The interdependence theory will be discussed in relation to group effectiveness, as follows.

2.2.4 Interdependence

Interdependence is considered to be an important topic in group research (Barrick et al., 2007). Some scholars stress that it plays an important role in forming group activities (DeChurch and Mesmer-Magnus, 2010; Kozlowski and Bell, 2003) because normally organisational tasks cannot be completed by an individual (Wageman and Gordon, 2005). Additionally, interdependence is an important factor for fostering group effectiveness (Kozlowski and Bell, 2003). In order to construct formal work groups, groups need to do 'group work' (Hackman, 2002) and recognise the importance of interdependent working (in the field of tasks, goal and outcome interdependence).

Before reviewing the specific context of interdependence, it is necessary to, first of all, consider its theoretical foundation, and then discuss it within the context of OCB.

2.2.4.1 Interdependence theory implications

Interdependence theory focuses on interpersonal phenomenon rather than individual actors and concentrates on how individuals interact with others in different situational structures. It is significant to consider organisational research in which an interpersonal situation is formed, interactions take place, and motivation is inspired.

The development of interdependence studies mainly stems from social psychology (McGrath et al., 2000; Shaw, 1973; Wageman, 1995) and organisational theory (Thompson, 1967; Van de Ven and Ferry, 1980). According to the main assumption of organisational theory, the traits of interdependence are closely related to group task, and the needs of task further determine group-level outcomes and goals (Thompson, 1967). According to this assumption, different groups have different tasks, and so they have different levels of interdependence. However, other scholars indicate that although groups have the same kinds of structure and technologies, and perform the same types of task, they may have different levels of interdependence (Campion et al., 1993; Shea and Guzzo, 1987; Wageman, 1995; Wageman and Gordon, 2005).

In comparison, according to the assumptions of social psychology, interdependence is considered as "*cooperation needs*" (Shaw, 1973) that take social interaction and cooperation needs into account to meet collective objectives and group needs (McGrath et al., 2000; Wageman, 1995).

In the field of organisational literature, the theories of competition and cooperation and independence are considered as the most important elements of interdependence to guide individuals' actions (Deutsch, 1969, 1973). The cooperative context appears when group members perceive leaders' goals and receive a joint reward for the successful completion of a task (Johnson and Johnson, 1989). Additionally, cooperative interdependence guides individuals to consider goals as interrelated. When individuals reach their own goals, they may help others by social or task oriented interactions. By comparison, a competitive context exists when the rewards and goals of different group members are mutually exclusive (Johnson and Johnson, 1989). There is a negative relationship between individuals' own goals and others' goals in the situation of competitive interdependence. Individuals are less likely to support other members' goals. By comparison, there is no relationship between individuals' own goals and others' goals in the situation of independence. Therefore, there is no relationship between others' performance and one's own performance. In reality, organisational groups may experience competition and cooperation and independence in different situations (Deutsch, 1969).

Antoni (2005) stresses that the fundamental perspectives of group work are closely related to cooperative and competitive interdependence because they provide answers for why and how individuals work in the groups. "*If individual tasks are independent of each other neither co-ordination nor common planning is required nor does real group work exist*" (Antoni, 2005; p. 176). However, some studies (e.g. Johnson and Johnson, 1989) show that cooperative contexts are better than competitive contexts in terms of collaborative behaviours, social support, committed relationships and feelings of satisfaction. However, these studies are criticised on the grounds that the boundary between the two types of interdependence (cooperative and competitive interdependence) is blurred (Rosenbaum et al., 1980).

In group work, interdependence can be further developed into different types of interdependence and shared objectives (Richardson, 2010). In the next sub-section, these two fields are discussed.

2.2.4.2 Types of interdependence

The degree and type of interdependence at group level stem from several antecedents, such as different roles, distribution of outcomes and skills, defined or achieved goals, the way the task is rewarded, the way feedback is provided, and technological and task requirements (Tjosvold, 1986; Wageman, 1995). It has been proposed by some scholars that interdependence can be categorised into three types: task interdependence, goal interdependence and outcome interdependence (Mitchell and Silver, 1990; Johnson and Johnson, 1989; Saavedra et al., 1993; Wageman, 1995).

Task interdependence is defined as the level of task-related interaction among group members (Shea and Guzzo, 1987). Group members are task interdependent when they need to share information or materials in order to obtain desired outcomes or performance (Cummings, 1978; Susman, 1976). The increase of level of task interdependence is related to their missions becoming difficult and so individuals need help from others. For instance, coal miners mostly depend on the output of their colleagues. Hospital nurses, with the myriad procedures they perform, are examples of group members occupying jobs with considerable task interdependence

Reviewing task interdependence studies, it seems that not all group members are equally interdependent. Some scholars (e.g. Wageman, 1995; Wageman and Baker, 1997) stress that group members are differently related to task interdependence. For instance, in some hybrid groups, some group members are less related to one another when they perform group tasks. There is relative independence among these group members, while there is high task interdependence among other group members.

Another form of interdependence is goal interdependence. Van de Vegt and Janssen (2001) define it as "*the extent to which an individual team member believes that his or her goals can be achieved only when the goals of other team members are also met*'' (pp.732). Another perspective to define goal interdependence is the extent to which group members are assigned to joint group goals and obtain group feedback (Deutsch, 1973; Thomas, 1957). Joint group goals mean that quantitative and qualitative actions are to be carried out by every member working together; they reflect group purpose and mission (Perrow, 1961), while group feedback includes information on the actual achievement of the group goal (Algera, 1990). In groups, group goals need to be highly correlated with group feedback (Erez, 1977; Matsui et al., 1987) because effectiveness and synergistic gain are maximised when group feedback is accompanied by group goals (Saavedra et al., 1993). In the literature, goal interdependence is considered as one of the best ways to capture both group goals and group feedback (Van der vegt et al., 2001).

Wageman (1999) considers goal interdependence as a function of how overall performance is evaluated, whether this is by group performance, individual performance or a sum of the two. For optimal group performance, it is important that goals not only need to involve every group member, but are also aligned with the collective goal of group (Campion et al., 1993)

The last form of interdependence refers to outcome interdependence, whereby individuals get rewards according to performance as a group, as in a gainsharing plan (Van der vegt et al., 2001). The significant outcomes some group members get depend on the performance of other group members (Wageman, 1995). Shea and Guzzo (1987) indicate that outcome interdependence ensures groups maintain performance effectiveness because it provides evidence whether shared significant consequence are reached or not (Shea and Guzzo, 1987; Wageman, 1995). Additionally, outcome interdependence is likely to promote a group spirit and enable group members to contribute to the group success (DeMatteo, Eby, and Sundstrom, 1998; Mohrman et al., 1995; Snell and Dean, 1994).

Wageman (1995) indicates that outcome interdependence is independent from task interdependence: outcome interdependence can exist without task interdependence, and vice versa. For instance, group members are highly interdependent on tasks without getting a clear group goal. However, a rich variety of studies demonstrate that all forms of interdependence are related to generate an overall measure of interdependence (Campion et al, 1993, Campion et al., 1996; Gully et al., 2002). In some situations, group members work in situations of high task interdependence. Positive outcomes can result from high outcome interdependence, high goal interdependence, high task interdependence, or a combination of all three. Additionally, some studies demonstrate that individuals are less likely to make efforts in a group with a high level of outcome interdependence but low task interdependence (Sheppard, 1993; Leibowitz and Tollison, 1980), while individuals make more efforts in a group with high levels of outcome interdependence and high task interdependence. In other words, when all types of interdependence reach a high level, groups may obtain positive outcomes (Van Den Vliert, 2002). In this study, all types of interdependence are considered as a whole in the instrument of group scale.

2.2.4.3 Shared objectives

As has been reviewed in the different forms of interdependence, formal work groups are operated in the situation of goal interdependence, whereby group members consider their goals are positively interrelated and shared. The shared group objective may promote the development of shared vision, underpinned by some collective goals. Some reasons why groups need to obtain shared objectives are now discussed as follows.

As mentioned previously, goal-orientation is considered as a basic assumption of groups (Wittenbaum et al., 2004), and so shared objectives are required. A rich variety of studies have demonstrated that goals and objectives are important for facilitating group behaviours and goal setting (Locke and Latham, 1990). Erez and Kanfer (1983) also state that goals and objectives are regarded as controllers of behaviours and an end state towards which a person or group strives.

One of the most important characteristics in formal groups is that group members are united by shared objectives. Group objectives involving defined mission statement and purpose are considered as important for group effectiveness and behaviours (Gladstein, 1984; Guzzo and Shea, 1992; Hackman and Walton, 1986; Sundstrom et al., 1990) because they motivate group members to combine their efforts closely when working together (Weldon and Weingart, 1993).

Considering the significant role of interdependence on group performance and group behaviours, in the next section, the main focus is on how interaction among group members and group functioning influences group-level OCB.

2.2.5 Group traits and OCB

In view of the effects of group context on group members' attitudes and behaviours, both attitudes and behaviours are normally based on interaction of group members' traits and have a subtle but powerful effect on the group as a whole. In highly cohesive groups, group members wish to be sensitive to one another and to help each other (Schachter et al., 1951). It also enhances intra-group communication and positive interpersonal assessments in groups (Cartwright, 1968). A positive or close relationship, or high level of cohesiveness, may improve group members' assessment of other group members' behaviour (Kidwell and Mossholder, 1997).

Kidwell and Mossholder (1997) stress that the theoretical foundation of group-level OCB results from the research of social exchange and helping. According to social exchange theory, it is expected that non-cohesive groups exhibit less positive and frequent social exchanges than cohesive groups. Organ (1990) stresses that OCB is more related to social exchange than economic exchange. In some groups, cooperation and trust promote social exchanges among group members, and so OCB, as a kind of social exchange, is expected to be reciprocated. Dobbins and Zaccaro (1986) are consistent with the point that the bond between group members may generate expectations for group members to adopt extra-role behaviours, while, without such a bond, group members are not motivated to perform. In other words, the weak link between group members may lead to a weak relationship of social exchange. Group members do not feel an obligation to reciprocate OCB (Jr. Kidwell and Mossholder, 1997). Moreover, George and Bettenhausen (1990) argue that the close link between group members may influence OCB through its influence on group members' mood states. A positive mood may push individuals to exhibiting altruism toward others (Isen and Baron, 1991).

Moreover, Feldman (1984) stresses that OCB are likely to be formed when group members help each other to avoid "*embarrassing interpersonal issues*" (p.49). Hackman (1992) further confirms the idea that the high level of group norms for OCB results from interpersonal rewards that are confirmed through within-group interactions. In other words, with an increase in within-group interaction and interpersonal rewards, the higher the level of group norm for OCB will be. However, although the group norm for OCB is improved by interpersonal rewards, they are subject to social control through social rewards (Ehrhart and Naumann, 2004). Additionally, others (e.g. George and Bettenhausen, 1997) stress that although group norms provide evidence for the close relationship between group-level OCB and within-group interaction, the relationship may be realised when group members consider group functioning to be important.

Group functioning plays an important role in predicting OCB. "*Individuals who perform or fail to perform spontaneous behaviours are not doing so in a vacuum and it is likely that the group context in which these behaviours are performed serves to encourage or discourage them*" (George and Jones, 1997, p. 156). When group members are attracted to a group and would like to keep a relationship with other group members, they are likely to support others' actions and adopt appropriate behaviours (Hackman, 1992). For instance, expectations of cooperation and social responsibility may be felt by group members to be values that, when put into practice, may increase feelings of self-worth, but otherwise may engender negative feelings and decrease members' sense of self-worth (Shamir, 1990). In other words, individuals' behaviours are influenced by whether their needs and requirements are satisfied. When membership in a group is fulfilling to individuals, they will consider other group members as models of behaviour in order to consider how to keep membership in the group. However, individuals are less likely to consider group members as models for their behaviour when they are not attracted to the group (Ehrhart and Naumann, 2004). Axelrod (1984) and Schnake (1991) indicate that organisational citizenship behaviour is increasingly visible as it is reciprocated in group members. Under such circumstances, members may become models for one another in demonstrating appropriate OCB (Schnake, 1991).

Therefore, as discussed above, individuals' interdependence and interpersonal relationships can be considered as an important group trait determining the levels of group-level OCB. Another group factor to influence OCB is differences between group members. It is discussed in the next section with connection to OCB.

2.2.6 Group diversity

Diversity comes from differences in demographic, psychological and organisational characteristics. Van Knippenberg, De Dreu, and Homan (2004) define it as "*differences between individuals on any attribute that may lead to the perception that another person is different from the self*" (p. 1008). Nowadays, diversity is the core of group work because it is possible to develop different abilities and skills. Therefore, organisations tend to employ group compositions, combined with individual differences, to influence group performance and effectiveness (Kozlowski and Bell, 2003; Ilgen et al. 2005).

Research indicates different influences of diversity in connection to different types of diversity identified and different types of task performed. In some situations, diversity may lead to good results once a group knows a way to support diversity. A group with different group members may exhibit good performance in problem solving and creativity missions. However, group diversity causes issues when there is competition between subgroups and misperceptions between members. These issues can hamper the communications between group members and enable a group ineffectively to use resources. Nevertheless, the disadvantages can be ruled out when effective measures are taken (Levi, 2014). Two aspects of diversity and its influence on groups will now be discussed.

2.2.6.1 Group composition with surface-level and deep-level diversity

Diversity is meaningful in a much broader sense and can be applied in connection to any variables (King et al., 2009). However, Harrison and Sin (2006) suggest that it is appropriate to study diversity in "*the realm of demographics, skills, abilities, cognitive styles, perceptual orientations, personality dimensions, values, attitudes and beliefs that are germane to group functioning given a specific research context and theoretical orientation toward groups*" (p. 196). Consistent with this point, some scholars have attempted to define the major models of diversity.

Some studies indicate that group diversity can be categorised as demographic variances and differences in psychological traits. The demographic variances are surface-level diversity, in that group members are different in their demographic and physical traits (Harrison et al., 1998). Physical traits refer to observable characteristics formulated since birth (Alderfer, 1987). It can be used to categorise individual unique characteristics and can be used to interpret behaviour and create social consciousness (e.g. Alderfer, 1987 and Tajfel, 1978; Turner, 1987). Almost immediately, individuals can make reasonable predictions for the gender, age or background of someone else, and so, it is possible to make judgement whether there is similarity or dis-similarity between these individuals and themselves (Jackson et al., 1995). Individuals who are similar in surface-level elements are likely to be immediately attracted to each other and generate stronger social attachments (Levi, 2014). More importantly, individuals can use these traits to assign themselves and others to social classification in a short time (e.g. Fiske, 2000)

In comparison, members' psychological traits (Jackson and Ruderman, 1995) are defined as deep-level diversity (Harrison et al., 1998), such as personality factors and values (Bell, 2007). Individuals need to spend time to interact with others to find out more about these latent individual differences because these differences unfold over time. Deep-level diversity appears through verbal and non-verbal communication, the observation of behaviour characteristics and the exchange of individual information. Similarly, the influences of the deep-level variances on groups take time to develop (Levi, 2014).

One of the main differences between deep-level diversity and surface-level diversity is that surface-level diversity can be found at the beginning of a group construction, while deep-level diversity is not found until after a period of interpersonal interaction (verbal and non-verbal communication; expressed in behaviour patterns). The effect of different types of diversity on groups will now be discussed.

2.2.6.2 The effects of diversity on groups

Many studies on the influences of diversity on groups have inconsistent results. This may be because of the nature of the tasks the group is performing. Diversity provides advantages for some kinds of tasks but leads to issues for other tasks. Further, McGrath et al. (1995) consider that there are two approaches to consider when analysing how diversity influences a group. The trait approach indicates that diversity influences how individuals act. In other words, individuals from different backgrounds may have different values and skills and may have different ways of interacting with each other, while the approach of expectation concentrates on individuals' ideas about what others prefer. In other words, group members may have expectations of others' behaviours and contributions.

To clarify the study on the influences of group diversity, some scholars have reviewed more than a hundred studies (Bell et al., 2010; Jackson, 1992; Mannix and Klimoski, 2005; Van Knippenberg and Schipper, 2007) and posited two main theories to assess the inconsistent influences of diversity on groups. One is the decision-making/information theory, which stresses that improved behaviour, high quality, and more creative decisions are caused by differences in skills and knowledge. Conversely, the social categorisation theory stresses that in-group/out-group divisions in the groups which are caused by group members' differences may disrupt group progress and decrease group members' interaction and trust (Levi, 2014).

As mentioned above, diversity can be divided into surface-level diversity and deep-level diversity. Some scholars (e.g. Jackson et al., 1991) use self-categorisation theories and social identity (Taifel, 1978) to indicate a negative relationship between surface-level diversity and group performance; a negative relationship between surface-level diversity and group functioning. These theories stress that group members define and differentiate themselves from others according to the differences that can be discovered such as age and gender. In order to keep or promote group members' social identities, they tend to give positive assessment to group members who have similar overt traits to them and negative assessment to those members who have different overt traits from them (Tajfel and Turner, 1986). Moreover, some scholars stress that surface-level diversity may not only cause issues of group cohesion, conflicts (O'Reilly et al., 1989), and problems of communication between group members (Zenger and Lawrence, 1989), but also lead to negative influences on overall group performance (Levi, 2014). For instance, within-group variance in race may lead to lower performance rating (Kraiger and Ford, 1985), reduced commitment of members (Tsui et al., 1992), and lack of communication (Larkey, 1996). Age differences may lead to negative individual or within-group functioning, such as a high level of turnover (Jackson, et al., 1991; O'Reilly et al., 1989; Tsui, Egan, and O'Reilly, 1992) and social isolation (Kirchmeyer, 1995). However, it is possible to have exceptional situations. Surface-level diversity sometimes may have positive effects on group outcomes. For example, diversity in terms of skills and expertise is positively related to group effectiveness (Mohammed and Angell, 2004).

A review of the literature reveals that most of the research focuses on demographic variances, such as gender, age, ethnicity, tenure, and functional area rather than psychological variance (e.g. Gibson and Vermeulen, 2003). However, nowadays, a growing number of studies indicate that demographic variances have no direct influence on group processes or outcomes (Bantel and Jackson, 1989; Wiersema and Bird, 1993). For instance, there is no relationship between sex diversity and group outcomes (Chattopadhyay, 1999; Riordan and Shore, 1997)

Moreover, Pelled, Eisenhardt, and Xin (1999) surveyed 45 groups in a large company to assert that according to the evaluation of group managers, work group variety (age, tenure and ethnicity) has no significant influence on group performance. By comparison, some scholars (Harrison et al., 2002; Hollenbeck et al., 2004) claim that deep-level composition variables have strong effects on team performance. Therefore, it is necessary to consider the role of non- demographic factors in group outcomes and behaviours.

In terms of deep-level diversity, Tsui et al. (1992) argue that the underlying deep-level variance is based on fit or the similarity- attraction paradigm, organisational behaviour theories about similarity in values and personality (e.g., Schneider, 1987), and social psychological theories about similarity in attitudes (e.g., Newcomb, 1961; Byrne, 1971). According to the similarity- attraction paradigm, individuals prefer to communicate with others who have similar psychological characteristics, as this supports and improves their own feeling and behaviours (Swann, Stein-Seroussi, and Giesler, 1992). The attraction between group members may even occur when feelings are bad ("*I dislike this project*") or when individuals' feelings are dysphoric toward to the environment that they are in (Locke and Horowitz, 1990). In other words, deep-level variance has a negative influence on interaction between group members. However, the contrary is stressed by Levi (2014) and Jackson et al. (1995), that is, that deep-level diversity has positive effects on decision making, performance and creativity because it plays an important role in developing multiple ideas to avoiding the pitfall of group thinking (Janis, 1972). Specifically, the positive effects of deep-level diversity are more likely to appear in complex, creative work and less routine work.

In summary, studies have reported that deep-level diversity may have both negative and positive influences on group outcomes. Argote and McGrath (1993) indicate that the different influences of diversity result for several reasons. First, the influence of diversity is according to the nature of groups' tasks. For instance, Jackson et al. (1995) point out that deep-level diversity more likely has positive effects on innovative tasks and has negative influences on tasks which are related to interpersonal communication. Second, the influence of diversity is different across time. For instance, Watson, Kumar, and Michaelsen (1993) discovered that heterogeneous groups show worse initial performance than homogeneous groups, but after a period of time, heterogeneous groups may perform better than homogenous groups. Finally, the influence of diversity is based on the traits on which homogeneity-heterogeneity is assessed. Moreover, Argote and McGrath (1993) also stress that it is possible that other unexplored factors may influence the effects of diversity on group outcome. This study will use a range of variables to test the influence of group diversity.

In the organisation, work groups consist of different members to complete tasks. These differences among group members can be reflected in many forms, such as individual differences in perceiving information and managing emotions. In this research, interpersonal difference will be discussed in the field of cognitive styles, emotional intelligence and leader-member exchange which will now be discussed in more detail.

2.3 Interpersonal Relationship Variables (Independent Variables)

2.3.1 Cognitive Style

The nature of interpersonal relationships can be fundamentally influenced by cognitive styles because cognitive styles imply individual differences in preferences in perception, thinking, and decision making (Witkin et al. 1977). Based on the preceding discussions, it is therefore reasonable to assume that cognitive styles may influence OCB. The main characteristics of cognitive styles will now be discussed in connection with OCB.

2.3.1.1 The Development and Definition of Cognitive Style

Cognitive style has been a topic that has been frequently debated in the field of organisational behaviour for several decades. The development of cognitive style research is an important and interesting part of the history of psychology. In fact, the early studies related to cognitive styles go back to James (1890), Galton (1883), Jung (1923) and Allport (1937). However, activities did not peak until the period between the 1940s and 1970s. Most activities related to experimental work focusing on individual differences in cognition (e.g. Witkin and Ash, 1948).

The notion was first systematically introduced by Klein and Schlesinger (1951) and Klein (1951) that individuals manage their cognitive functioning to adapt to our outer world. In the process of adaptation, it is necessary to balance the requirements from the inner and outer environment. Additionally, cognitive style expresses "*a central or executive directive of the ego-control system . . . it acts very much as "a selective valve" which regulates intake – i.e. what is, or not to be ignored*" (Klein, 1951, p. 333). Therefore, individuals need to develop "*special mechanisms that constitute his or her ego control system*" (Klein, 1951, p. 330). Klein (1951) stresses that cognitive style is a kind of control element guiding individuals' activities related to meaning of cognitive executive characteristics, which determine where, when, and in what measure a person applies specific cognitive skills and strategies. Furthermore, Witkin and his colleagues define cognitive style as individuals' differences in processing information, solving issues and relating to others (Witkin et al., 1954; Witkin et al., 1962). According to a continuum of modes of perception, these differences can be categorised into two forms: field dependent (FD) -perception is highly dependent on the surrounding environment. Individuals may take a global perspective to managing information and passively respond to influence of the environment and use interpersonal measure to solve issues and like to work in unstructured situations, while, field independent (FI) - perception is less dependent on the surrounding environment. Individuals may take an analytical perspective to managing information and use impersonal measures to solve issues and like to work in structured situations. Both types of cognitive style are equally useful but depend on various cognitive strategies and lead to different views of the world. The studies of Witkin and his colleagues play an important role in development of understanding of the concept of cognitive style and provide a clear direction to subsequent studies.

Following on from the work of Witkin and his colleagues, Messick (1984) further considers that, in most situations, cognitive styles occur spontaneously and do not relate to conscious choice and consideration. Cognitive styles are normally regarded as a permanent dimension (Curry, 1983; Riding and Cheema, 1991) and stable for a long time (Witkin et al., 1977), unlike learning styles (Kolb, 1976). In some empirical tests, individuals' preferred styles are not changed after applying training (Zelniker, 1989).

In recent years with a growing attention to cognitive style in connection to industrial, work, and organisational psychology (Hodgkinson, 2003), more and more scholars attempt to understand the effect of individual differences on cognition. For instance, Franco et al. (2013) define cognitive style as individual differences in ways of processing information according to different brain-based mechanisms; it is also a stable feature that may affect individual behaviours. In other words, cognitive style is one's preferred way to collect, process and interpret data and affects how individuals treat information from inner or outer environments, how they organise and evaluate it, and how they connect individuals' evaluation to mental models and subjective theories which guide individuals' behaviour. In this study, this definition will be adopted, because it comprehensively considers cognitive styles' features from different theoretical perspectives (e.g. brain-based mechanisms). Additionally, it demonstrates that cognitive styles can be seen as good predictors of individual performances in some situations.

2.3.1.2 Clarifying Cognitive Style

Although the dimension of cognitive styles was introduced over 50 years ago (Witkin et al., 1954; Witkin et al., 1962), research into the construct continues. Cognitive styles have different classifications in different contexts. Hayes and Allinson (1994) indicate 29 different styles, including, for instance, convergence- divergence, serialism-holism and rationality-intuition. Armstrong (1999) indicates 54 different dimensions of cognitive styles according to different contexts. Additionally, Coffield et al (2004) stress that 71 kinds of learning styles and cognitive styles can be categorised according to a rich variety of theoretical models. Some scholars (Globerson and Zelniker 1989; Streufert and Nogami 1989) argue that the sheer complexity of cognition is reflected by this multiplicity of descriptors.

However, Riding and Rayner (1998) argue that the profusion of labels is symptomatic of a fragmented field of study lacking in agreement over basic terminology. Riding and

Cheema (1991) propose that measures of styles are tested inadequately and lack empirical evidence. Hodgkinson and Sadler-Smith (2003) stress regarding these unacceptable instruments of style that "*It is this basic lack of agreement over nomenclature, accompanied by a dearth of reliable and valid instruments suitable for the assessment of cognitive style in applied settings, which has threatened the viability of the construct for academics and practitioners alike*" (p.244).

In order to identify reliable measures, Lewis (1976) suggests that it requires more focus and they suggest researchers should seek "*individual differences which are basic, in the sense that they underlie (and to that extent explain), a whole range of more readily observable differences*" (1976:304-305). Following this point, Sadler Smith and Badger (1998) suggest that only three measures constitute valid and reliable assessment instruments convenient for adoption in education and organisational background, which are Riding's Wholist – Analytical dimensions measured using the CSA, Kirton's Adaptors and Innovators (KAI) and Allinson and Hayes's Cognitive Style index (CSI). Specifically, the CSA was developed in an education setting, while the KAI and CSI were developed in an organisational setting.

Moreover, some researchers (e.g. Kogan, 1983; Riding and Sadler-Smith, 1992) claim that many styles are simply different conceptions of a generic dimension which is related to the traditional notion of "*the dual nature of human consciousness*" (Robey and Taggart, 1981). In other words, various categories of cognitive style are based on the same dimension. Kozhevnikov (2007) assert that different dimensions of cognitive styles can be categorised as two different types of thinking. One type is analytic, deductive, and rigorous. The other type is synthetic, inductive, and expansive. Ornstein (1977) differentiates between analytic thinking and holistic thinking, stating that analytic thinking focuses on managing knowledge or information in an ordered and linear sequence, while holistic thinking focuses on all of the situations at one time in order to manage the synthesis of all data. These measures basically focus on the intuitive and rational sides of individuals. In order to keep in line with established terminology, these two types of thinking are commonly described as intuitive-analytic (e.g. Agor, 1986; Allinson and Hayes, 1996; Simon, 1987). In this research, the dimension of intuitive-analytic is used to represent cognitive style.

2.3.1.2.1 Allinson and Hayes's Cognitive Style index (CSI)

As mentioned previously, the Cognitive Style Index (CSI) evaluates individuals' differences in generic analytic-intuitive styles. The development of the Cognitive Style Index (CSI) is based on earlier work in the 1960s (Sadler Smith and Badger, 1998) related to the tendency to specialise in one of two cerebral hemispheres (Dokter, 1978; Ornstein, 1977). The left cerebral hemisphere tends to focus on rational, spatial orientation, visual imagery and sequential data processing, while the right cerebral hemisphere tends to focus on holistic, linear processing, verbal functions and simultaneous data processing. Hayes and Allinson (1996) designed their intuitive/analytic instrument according to brain mechanism. Intuitive domain reflects the traits related to right brain thinking, while analytic domain reflects the traits related to left brain thinking. These right-left mechanisms are not just transient. Individuals tend to have a rather permanent stylistic habit of the application of one hemisphere. Intuitivists (right-brain mechanism) are more likely to use open-ended measures to solve issues depending on random ways of exploration, and are more likely to be relatively nonconformist and remember spatial pictures. By comparison, analysts (left-brain mechanism) are more likely to use structured measures to solve issues that rely on systematic measures of investigation and more likely to be relatively compliant and remember verbal data (Hayes and Allinson, 1996).

Although some scholars consider the formulation of left-right brain mechanism as an oversimplification (Rao et al., 1992), others (e.g., Languis, 1998; Languis and Miller, 1992) still conduct brain mapping studies that are in line with Luria's (1980) theory of brain functioning. No matter whether the right/left brain analogy is correct or not, it remains an important metaphor for viewing cognitive differences. Leonard and Straus (1997) apply this brain metaphor to their research: emphasising that it is necessary for organisations to put their left brain and right brain to work, and leaders in organisations need to understand individuals' differences in cognitive style and effectively manage them together in order to achieve higher levels of innovation and organisational effectiveness.

Allinson and Hayes' (1996) CSI is a self-report questionnaire that assesses individuals on a unitary dimension of cognitive style whose poles are labelled 'intuitive' and 'analytic'. These characteristics have long been associated with studies in the field of cognition and judgement in decision making (Agor, 1986). Intuition refers to immediate judgement based on feeling and the adoption of a global perspective, whereas analysis refers to judgement based on mental reasoning and a focus on detail (Allinson, and Hayes, 1996). Additionally, the CSI construct has attracted a stream of research that has revealed evidence suggesting that individual differences along the CSI continuum fundamentally affect the nature of interpersonal relationships at both individual and group levels. For example, in dyadic partnerships involving supervisor-subordinate interactions, intuitive supervisors were found to be more nurturing and less domineering than analytical supervisors. Intuitive supervisors were also better liked and respected by analytical members than analytical supervisors were by intuitive members (Allinson, Armstrong and Hayes, 2001). In dyadic partnerships involving mentoring relationships, congruence between partners' cognitive styles has been found to enhance the quality of their relationships (Armstrong, Allinson, and Hayes, 2002). At the group level, cognitive style has also been found to influence both task effectiveness and social orientations of work teams. Intuitive individuals and homogenous intuitive teams outperformed their analytical counterparts when the nature of the work environment was unstructured and organic (Armstrong and Priola, 2001). Conversely, analytical individuals and homogenous analytical teams have been found to outperform their intuitive counterparts when the nature of the work environment is relatively well structured and mechanistic (Priola, Smith, and Armstrong, 2004). Armstrong and Priola (2001) demonstrate that individuals with an intuitive style may perform a higher level of task-related activities than individuals with an analytic style when the nature of the task is relatively organic rather than mechanistic.

In past studies, the CSI has been tested and analysed with a rich variety of variables, such as entrepreneurial behaviour (Allinson, Chell, and Hayes, 2000), gender differences and some individual differences on the basis of job level (Allinson and Hayes, 1996; Sadler-Smith, Spicer, and Tsang, 2000). The predictive power of the CSI has been proven. However, there are still some theoretical and methodological issues related to the development of CSI studies. These will now be discussed in more detail.

2.3.1.2.2 The dimension of the Cognitive Style index (CSI)

Before reviewing the debate about whether cognitive styles are considered as multi-dimensional or uni-dimensional, it is important to consider the many poles covered by cognitive style. The generic dimension of cognition has traditionally been dichotomous in human thinking (Allinson and Hayes, 1996).This kind of thinking regards individuals' consciousness as a simple dichotomy in that a person is considered as either intuitive or analytic. Nevertheless, this idea has largely fallen out of favour in recent years.

Individuals' attributes are not regarded as simply being one thing or another; but rather it is considered that an individual has a predisposition toward or a preference for a way of thinking or type of behaviour that falls at some point along a continuum. For instance, Hammond et al. (1987) found some poles involved in the intuition-analysis dimension. This indicates that individuals' cognitive styles may lie on any point on the scale. If one's cognitive style normally tends to be on the extreme side of the dimension, the person may prefer one type of thinking and exclude others. In other words, the more analytic an individual is, the less intuitive he or she would be. However, if someone's cognitive style normally tends to be in the middle of a dimension, the person may prefer to combine analysis and intuitive thinking when they solve problems and make decisions.

There are 38 items used to measure the single dimension of the CSI (see appendix B4), which is conventionally scored by applying a trichotomous ('true,' 'uncertain,' 'false') response. Scoring reveals a number that ranges from the minimum score of 0 (highly intuitive) to the maximum score of 76 (highly analytic). Therefore, a higher score on the CSI is related to a higher level of analytical style and lower level of intuitive style, while a lower score on the CSI is related to a higher level of intuitive style, and a lower level of analytic style. Additionally, in order to avoid potential issues involved with the trichotomous response format, the method of item parcelling (summing the score of items that are similar to chosen statistical criteria (e.g. inter-item correlation) is applied. Allinson and Hayes (1996) summarise 6 parcels of uni-dimensions according to inter-item correlation.

Regarding the dimensions of cognitive style, some scholars stress the importance of uni-dimensional cognitive style as "*alike can benefit from the relative ease of administration and interpretation that accompanies instruments based on this type of approach*" (Hodgkinson and Sadler-Smith, 2003). For instance, in organisational work, managers only need to focus on one potential source of knowledge (whereby candidates are defined as intuitive or analytic cognitive style) in a uni-dimensional construct. In comparison, to apply multidimensional constructs, managers need to spend much time to analyse and evaluate information. Therefore, it imposes additional work.

Another theoretical contribution for a uni-dimension of cognitive styles is that many empirical studies provide strong evidence for a uni-factor position (e.g. Allinson and

Hayes, 1996). Moreover, conditional probabilistic associations as the foundation of cognitive style are based on a single dimension. According to the underlying conditional probabilistic associations, if situation A and B normally do not occur together, there is weak mental association, while, if situation A and B normally occur together, there is strong mental association.

However, Hodgkinson and Sadler-Smith (2003, 2009) stress that the uni-dimensional definition of cognitive styles downplays the importance of a considerable volume of theory and significance of many studies that show a view of considerably greater complexity. Moreover, some findings show that "*cognitive style is a complex variable with multiple dimensions. Although many of the measures seem to overlap conceptually, we found no simple, strong, interrelationships among them*" (Leonard et al., 1999, p. 418). Therefore, they claim that the CSI should be developed from a multidimensional perspective, like the Learning Style Inventory (LSI) (Kolb, 1976), Myers–Briggs Type Indicator (MBTI) (Myers, 1962) or Keegan's Type Indicator (Keegan, 1982). The multidimensional construct and some complex theories play an important role in management and organisational behaviour literature. For instance, MBTI, as a multidimension measure of personality/cognitive style, plays an important role in understanding personal selection and team or group dynamics (Bayne, 1995; Hirsch and Kummerow, 1987; Kline, 1993; Myers, 1980; Myers and McCaulley, 1985).

Hodgkinson and Sadler-Smith (2003) assert that the CSI is more appropriate as a two-dimensional model in which analysis and intuition in the CSI instrument can be correlated, but also regarded as separate dimensions. This model also suggests that individuals may be not only high on one side of the CSI pole (e.g. analysis) and low on the other side of the CSI pole (e.g. intuition), but also high on both poles or low on both poles at the same time. Hodgkinson and Sparrow further suggest (2002, p. 196) that "*two modes of processing are necessary in order to perform a variety of tasks*".

However, contradicting Hodgkinson and Sadler-Smith's (2003) theoretical position, Hayes (2003) indicates that when individuals use different approaches to apprehend reality, this shows the domains of style as a single continuum of intuition-analysis, led by some common rules, rather than separate dimensions.

Another criticism is related to parcels of cognitive styles used in factor analytic development of the uni-dimensional model of the CSI, as it may lead to methodological problems. First, the parcels lead to conceptually heterogeneous item parcels, such as the mix of intuitive and analytic items that more likely to increase the likelihood that the entire item parcels would be highly inter-correlated with each other (Hodgkinson and Sadler-Smith, 2003). This intercorrelation would more naturally lead to a single factor solution. Cattell and Burdsall (1975, p.275) also criticise designing parcels as being "*too subjective and depending on possibly half conscious and almost certainly insufficiently informed stereotypes of a particular experimenter*".

The second methodological problem refers to factor extraction. Allinson and Hayes (1996) employ factor extraction to guide uni-dimensional measures. They employ an exploratory procedure to determine the appropriate number of elements to extract and the preliminary explanation for data sets. However, Epstein et al (1996) stress that empirically derived factor structures need to be subjected to more confirmatory testing.

However according to the arguments concerning these two methodological problems, later studies (Lofstrom, 2005; Backhaus and Liff, 2007) fail to provide supporting evidence for Hodgkinson and Sadler-Smith's (2003) results. By comparison, many studies (e.g. Sadler-Smith, Spicer and Tsang, 1998; Murphy et al, 2001, Van den Top, 2010) provide strong support for the original, single factor explanation of Allinson and Hayes (1996). Moreover, Hammad (2012) directly compares the uni-factor model and two-factor model to find the uni-factor model has significant advantages over the two-factor model by applying structural equation modelling measures. More interestingly, in the study of trainee teachers, when using the two-factor model, 70% of respondents are high or low on the intuitive and analytic dimensions according to median splits rather than high or low on both dimensions (Evans and Waring, 2008). Brigham and Mitchell (2010) apply the two-factor model to score individuals' cognitive styles and find that the correlation between intuitive and analytic is -.64; the strength of the correlation calls into question the extent of the distinction between the underlying information systems in the way that the two-dimensional model suggests.

Comparing conceptions of the muti-dimensional and uni-dimensional cognitive style theories, both have different theoretical implications and therefore this leads to different design of methods. This presents an interesting question of which conception is more appropriate for the present study. In this research, both multi-dimensional and uni-dimensional cognitive styles have been compared in relation to factor analysis.

2.3.1.2.3 The influence of individuals' cognitive styles on organisational citizenship behaviour

In an organisational context, a person with an analytic style would tend to favour a task-oriented and structured work environment (Allinson and Hayes, 1996) and care about self-related benefits such as promotions and rewards (Witkin and Goodenough, 1977) rather than interpersonal relationships (Pascual-Leone, 1989). Conversely, an individual with an intuitive style tends to favour a work environment that is less structured and less task-oriented (Kirton, 1976). In order to maintain effective functioning in the workplace, intuitive people tend to exhibit warm and friendly interpersonal behaviour and maintain positive interpersonal relationships (Armstrong, 2000). Comparing organisational-target versus individual-target OCB, the former (OCBO) refers to behaviours that have a direct benefit for the overall organisation through adherence to formal rules (Williams and Anderson, 1991) and focuses more on impersonal aspects of OCB such as promotion or payment. In contrast, OCBI refers to behaviours of direct benefit for individuals and indirect benefits for the organisation (e.g. helping a co-worker with a work-related problem) and is therefore more closely associated with interpersonal behaviours than with such issues as extra payment or rewards. Piliavin et al. (1982) found that if individuals have a positive interpersonal relationship with another, they would tend to like and help him/her rather than others. In other words, positive relationships will relate positively to OCBI. Behaviours of this type are consonant with intuitive people who are known to have a social orientation and encompass a strong interest in people with a preference for being with others (Armstrong et al., 2002). This is in sharp contrast with analytic people who have greater skills in cognitive analysis, but have a more impersonal nature (Pascual-Leone, 1989). However, although previous studies provide a good foundation from which to research the relationship between cognitive style and some specific social-emotional related activities, there is no empirical research to test the relationship between cognitive style and OCBI. So in this study, the empirical test will focus on this relationship. It is hypothesised that:

H1: Individuals whose cognitive styles are more intuitive than analytic will exhibit higher levels of OCBI

2.3.1.3 Group-level cognitive styles

Although the development of theory of cognitive style is at the individual level, there is a lack of systematic studies in the field of group decision making or at the organisational level. Milliken and Martins (1996) stress that there are few organisational studies concentrating on how cognitive diversity in group composition affects group members' attitudes, personality and different characteristics of behaviours.

Considering cognitive styles at the group level, some scholars (Mayer and McCaully, 1985; Staw, 1990) indicate that, as individuals have stable preferences to process information, groups may also have stable preferences for processing information in different situations. In the following sub-sections, the definition of group-level cognitive styles will firstly be introduced, and will then be discussed in relation to group composition

2.3.1.3.1 The definition of group-level cognitive styles

In order to develop the conception of group-level cognitive style, it is necessary to shift our conceptions from the individual level to the group level. Some scholars (e.g. Morgeson and Hofmann, 1999; House et al., 1995) agree that a variable at different levels can be correlated. For instance, individual-level decision making is considered as the foundation for understanding group-level decision making (Simon, 1987).

Based on this argument, Leonard et al. (2005) argue that the group-level construct of cognitive styles is defined by the greatest group members' cognitive styles score or the average score of group members' cognitive styles. For instance, if a group is composed of five members and four members have an intuitive style, this implies that the group would have an intuitive style.

Viewing the definition of cognitive style at the group level, Leonard et al. (2005) indicate that like individual-level cognitive styles, group-level cognitive style reflects groups' preferences for information processing and assessment. Over time, in the environment of decision-making or group members making contact with each other, group members may develop patterns of behaviour in terms of how they process and evaluate knowledge in order to make a decision. These traits can be called group-level cognitive styles. Additionally, the underlying nature of group level cognitive style shares some characteristics underlying individual-level cognitive styles. A group with an analytic style prefers to work in a more structured and task-oriented work environment with impersonal relationships, and focus on details. In comparison, a group with an intuitive style prefers to work in a less structured and social-emotional-oriented work environment (Kirton, 1976), shows mental functions in interpersonal relationships (such as submission and emotional expression), and focuses less on details.

Another conception to define group-level cognitive styles is according to the group structure, particularly for the group members' statuses and roles. The status reflects the social influence of group members. Individuals with high status play more important roles in the group than other group members (Ridgeway, 1981; Strodtbeck and Lipinski, 1985). They take a dominant role in communicating and interacting with group members. Individuals with high status communicate more than other group members (Hurwitz et al., 1968). In the organisational life, almost all of employees have shared beliefs that managers who have high status or important roles in the organisation may influence group members' responses and performance toward managers (Lord, 1985; Rush and Russell, 1988).

The level of status plays an important role not only in communication between group members but also in formulating group-level cognitive styles (Hurst et al., 1989). Walsh et al. (1988) indicate that social influence determines the extent to which a type of individual cognition is applied in the process of group decision-making. In other words, the application of individuals' cognitive styles in the group is determined by the level of every group member. For instance, a group leader has more power in decision making than other members. Based on these arguments, group-level cognitive styles are determined by the group leader's cognitive style.

Moreover, following the argument from Mintzberg (1978), a strong extravert individual plays a dominant role in social interaction between group members and this affects group-level cognitive style. For example, if an individual takes a dominant role in the directions of discussion, other members have less opportunity to contribute to the process. In this case, the group-level cognitive style will reflect that of the extravert individual.

However, although individuals with high status and extravert traits may have a strong influence on group processes, the contributions of other members cannot be neglected because group-level cognitive styles are developed based on the patterns of all of the group members (Leonard et al., 2005). Additionally, as mentioned previously, individual-level cognitive styles are used to construct group-level cognitive styles. Therefore, self-rated data are collected in this study as individuals may be more aware of the subtleties of their ways of carrying out their daily jobs than are others (Chan, 2009; Skinner, 1957; Conway and Lance, 2010). Moreover, because of the nature of stability in cognitive style, the level of status and extravert traits may not affect or modify one's cognitive styles. Therefore, the development of group-level cognitive styles is based on the average of group members' cognitive styles.

2.3.1.3.2 Cognitive styles (mis)fit

In order to understand how group members perform in an organisational background, it is important to consider individual characteristics, environmental situations, and the interaction between them. Many studies have been conducted in the field of person-environment (PE) fit (Ehrhart and Ziegert, 2005; Ployhart, 2006) in an attempt to answer the question of why individuals take over and what elements may improve selection and effects (Cools et al, 2009).

Kristof-Brown et al. (2005) define person-environment fit as "*the compatibility between an individual and a particular work environment that occurs when their characteristics are well matched*" (p. 281). In general, PE fit concentrates on congruence between traits of individuals and traits of groups or organisations. Specifically, one representative of individual traits is cognitive style. Group or organisational traits are closely connected to the climate and needs of the work environment (e.g., Brigham, de Castro, and Shepherd, 2007; Chilton, Hardgrave, and Armstrong, 2005; Miron, Erez, and Naveh, 2004). Therefore, it is important to consider whether individuals' preferred way to process information is compatible with the organisational work and environment requirements (e.g., Foxall and Hackett, 1994; Hirsh and Kummerow, 2000). In relation cognitive style, the identification of similarity in cognitive styles in groups is regarded as constituting the cognitive climate (Kirton, 1994).

Kirton and McCarthy (1988) introduced the theory of cognitive mismatch, as individuals' cognitive style may not fit the predominant style demands of the work environment. It may hamper individuals' development in the organisation because of "*…congruence of person and job environment leads to job satisfaction, stability of career path, and achievement. Conversely, incongruence (i.e. person and job mismatched) leads to dissatisfaction, instability of career path, and low performance*" (Holland, 1996). Chilton, Hardgrave, and Armstrong (2005) argue that the increase of stress and decrease of performance is related to the increase of the gap between perceived environment and software developers' cognitive styles (which is measured by KAI). In study of entrepreneurs, Brigham, De Castro, and Shepherd (2007) argue that dissatisfaction with the work environment and high levels of turnover are caused by cognitive misfit (measured by the CSI). Specifically, the increase of stress and turnover is positively related to the increase in the gap between cognitive styles (Chilton et al., 2005).

However, Chan (1996) demonstrated that although the level of turnover can be predicted by cognitive misfit, there is no relationship between cognitive misfit and individuals' job performance. In contrast, other different findings show that in the study of R & D professionals, there is a lack of support for the suggestion that individuals with analytic styles have a higher turnover than individuals with innovative style (Change et al., 2008). Nevertheless, as argued by Cools et al. (2009), no matter what cognitive climate individual are working in, individuals who have a creative style adopt more job-search behaviour and have more desire to leave the job than individuals who have a planning style. Moreover, it should be noted with caution that the effects of cognitive fit or misfit are not always clear-cut. A large number of studies do not support that individuals with cognitive fit are more satisfied with the job, have less intention to leave and have a lower level of turnover than individuals with cognitive misfit (Cools et al., 2009).

2.3.1.3.3 Cognitive climate

Cognitive climate is defined as "*made up of the collective preferred style of the group's majority clustered around its mode or mean*" (Kirton and McCarthy, 1988). They further argue that groups with cognitive climate tend to recruit group members who collectively have a similar mean and range. In the group context, cognitive climate determines the major model of decision making and problem solving. In other words, cognitive climate is regarded as a cognitive style that is accepted by most of the group members and as such becomes an indication of collective behaviours. For instance, an intuitive cognitive climate may encourage group members who thrive on taking a short time to process information and make decision immediately, in less structured environments.

Kirton and McCarthy (1988) provide a body of evidence for the implications of cognitive climate for career or occupation choice that individuals' differences in cognitive styles may have different occupational choices as they select specific functions according to their preferences for some tasks and job traits. Armstrong et al. (2011) also argue that some specific cognitive styles may better suit some job requirements than other styles. For instance, most personnel managers are more likely have an intuitive cognitive style than are financial and production leaders (Allinson and

Hayes, 1996). Individuals who work in a structured environment are expected to follow rules and procedures and show a bias towards adaption. Individuals with an analytic style will be more suited to these environmental requirements. Conversely, individuals who work in less structured environments, such as bank vice-presidents and strategic planners, would be given much more freedom to act and are expected to innovate. Individuals with an intuitive style are more likely to be suited to these environmental requirements (Kirton, 2003; Tullett, 1997). Additionally, when the orientation of groups is operated outside the organisation, it is more likely to have intuitive/innovative cognitive styles than those groups operating within the organisation (Cools et al., 2009).

Furthermore, Kirton and McCarthy (1988) indicate that individuals would like to make a decision about whether they stay or leave according to the match between their own cognitive style and that of groups (Hayward and Everett, 1983). Cognitive style is considered as a stable trait (Goldstein and Blackman, 1981; Messick et al., 1976), and is difficult or impossible to modify it through training (Kagan and Kogan, 1970). Therefore, if someone finds that he or she does not fit with the cognitive climate; he or she may be unhappy and remain a temporary member of the group. Individuals working with a cognitive climate misfit are more likely to leave the organisation than those whose cognitive styles fit (Thomson, 1985).

Group composition may not only influence individuals' decisions, but also affect group behaviours. An increasing number of studies indicate that encouraging commitment and motivation of group members is closely related to socialisation at the small group level in organisations (e.g. Moreland and Levine, 2001). In the next sub-section, some evidence is presented to explain the relationship between cognitive style composition and organisational citizenship behaviour.

2.3.1.3.4 Group Composition with Different Cognitive Styles and Organisational Citizenship Behaviours

In elaborating the construct of group activities, some scholars divide group activities into two parts (Cartwright and Zander, 1968): social-emotional activities (which refer to the attractions between group members) and task-related activities (referring to goal related actions) (Zaccaro, 1991; Zaccaro and Lowe, 1988). According to the demands of information-processing in the organisation, some group or teams may be inclined toward one specific cognitive style (Kirton and McCarthy, 1998). It has been previously revealed that group members whose cognitive styles are more intuitive tend to focus more on social-emotional acts in the interest of building interpersonal relationships (Armstrong and Priola, 2001), whereas members whose cognitive styles are more analytic initiate a higher proportion of task-oriented acts (Priola et al., 2004). As mentioned above, organisational citizenship behaviour is considered as a kind of non-task behaviour. This leads to the second hypothesis:

H2: Intuitive groups will exhibit a higher degree of group-level OCB than analytic groups.

Additionally, according to the similarity-attraction paradigm, individuals with similar psychological traits are more likely to work together than those with different psychological traits (Schneider, 1987; Newcomb, 1961; Byrne, 1971). In connection to this theory, individuals who have similar cognitive style are more attracted to each other (Kirton, 1989) and less likely have conflicts and negative working relationship in the working environment (Lindsay, 1985; Tullet, 1995; Lawrence, 1993). Wageman and Baker (1997) investigated 150 groups to find that individuals in a hybrid group exhibited poorer performance and were less motivated and satisfied with their jobs than members in a less hybrid group (Wageman, 1995). Similarly, Kirton and McCarthy (1985) surveyed a number of women managers and found that difference in cognitive styles led to communication problems, failure of motivation, integration issues and higher pressures than similarity of cognitive styles.

Nevertheless, a homogeneous group may fail to respond effectively to some important shifts because a single cognitive style rarely considers different perspectives with which it is not familiar. For example, individuals with an intuitive style rarely focus on detailed information so some key points may be missed by them. As a result, the group may fail to promote the development of the organisation, because inadequate information is obtained (Weick, 1979).

By comparison, in order to cope with some complex information, different cognitive styles are required in the group. Group members who consist of different cognitive styles can manage a large amount of data simultaneously and can make different choices and are more open to change. Kanter (1983) indicates that many innovative companies tend to establish heterogeneous groups to develop multiple ideas in order to avoiding the pitfall of group thinking (Janis, 1972). A second study (Hoffman and Maier, 1961) that conducted research into problem-solving tasks indicated that heterogeneous group perform better on innovative tasks and achieve greater satisfaction than homogeneous groups. Additionally, cognitive style diversity is not only required in some special situations but also needed in organisational daily work because work situations always keep changing (Hayes and Allinson, 1998). For example, successful innovation relies on interaction between individuals with different styles because individuals have different ways to collect and analyse data, and then, they may provide different sources of knowledge. Therefore, as managers have realised that it is difficult to solve conflicts between group members with different cognitive styles, and in order to achieve the goal of creative cohesion, managers have to group them together in an efficient way.

Therefore, group diversity has positive influences on innovation and complex work situations, but has negative effects on conflicts because in order to reach consensus, group members may quarrel with each other. Disagreement is one of the main sources of conflict which hampers the development of interpersonal relationships (Rahim, 2010). In other words, group diversity is negatively related to individual interdependence and cooperation because if group members disagree with each other, this may produce negative feelings which can destroy cooperation and group performance. However, similarity between group members is related to interpersonal attraction. Individuals consciously and unconsciously communicate with those individuals who are similar to them (Berscheid, 1985). Festinger (1954) stressed that when group members are similar to each other, they are more likely to choose an appropriate behaviour in interpersonal relationships.

In the organisational context, OCB is closely related to group functions (George and Bettenhausen, 1990) and interpersonal dynamics (Choi and Thomas, 2010). Nijstad (2009) indicates that how similarity between group members enhances interdependence between group members. Jehn and Mannix (2001) indicate that when group members are similar in their work values, they may agree on work norms, and so this agreement may improve interaction. Moreover, as is pointed out by George (1990), consistency or homogeneity plays an important role in facilitating group affective tone which may directly or indirectly affect group-level OCB. It is possible to assume that groups with similar group members may have a higher level of OCB than groups with dissimilar group members.

In view of the relationship between conflict and OCB, some scholars (e.g. Dreu and Van Vianen, 2001; Choi and Thomas, 2010) point out that conflict is negatively related to group-level OCB. In groups which consist of different group members, there is a high level of disagreement in individual interactions and there are many collisions between different personal preferences, which lead to relationship conflicts (Jehn et al., 1999). By comparison, in groups with high individual similarity and interdependence, individuals are more sensitive to others and tend to have more positive relationships with others (Schachter et al., 1951). Therefore, homogeneous groups are expected to be positively related to OCBI. In respect of interpersonal relationship with cognitive styles, Witkin et al. (1977) stress that cognitive similarity solves interpersonal conflicts because group members have similar ways to address problems and similar thinking styles (Witkin et al, 1977) and rarely show opposite views. Again, groups with high cognitive similarity are likely to be positively related to OCBI. Additionally, Kirton (1989, 2003) argues that individuals who have high distance on the KAI continuum may have difficulty with cooperation. This point is also supported by Harrison (1998) who asserts that high individual similarity and interdependence may promote cohesiveness because group members can easily reach consensus. In groups with a high level of cohesiveness, group members agree with other members' points, and they are likely to show positive commitment to both groups and organisational effectiveness (Kidwell et al., 1997). Again, this is closely related to OCBO. Based on these arguments, it is therefore hypothesised that:

H3: Groups with low diversity of cognitive styles will exhibit a higher degree of group-level OCB than groups with high cognitive style diversity.

In the group dynamic, the interpersonal relationship is not only influenced by cognitive style diversity, but also influenced by one's emotions and attitudes. One's ability to manage emotions is known as emotional intelligence (EI). Mayer et al. (2000) indicate that EI plays an important role in interpersonal interaction and work-related outcomes. This study will now consider the importance of emotional intelligence on OCB at various levels.

2.3.2 Emotional Intelligence

In order to develop individuals' and groups' OCB, it is also necessary to focus on individuals' feelings and attitudes because one's behaviours are directly affected by one's feelings and attitudes. EI is one's ability to manage emotions (Bar-On, 1997; Mayer et al., 2008) and may influence one's behaviours.

2.3.2.1 The Definition of Emotional Intelligence

A scientific conception of EI is closely related to associated scientific terms. Cronbach and Meehl (1955) consider this context as a homological network— a system of meanings that has been widely accepted as a result of their utility. Therefore, this study begins by introducing some concepts which are closely connected to EI and then considers how EI fits with such a network of conceptions (Mayer, Robert and Barsade, 2008).

Intelligence is defined as the mental ability to deal with or reason with information (Carroll, 1993, Sternberg and Detterman 1985), which is either specific or general. Also, this ability can be defined into hierarchies from problem solving to cognition processes (Carroll, 1993). The lowest level of the hierarchy refers to basic ability such as recognizing words in the verbal realm. The second level of the hierarchy refers to a broader or cohesive group of abilities, such as understanding verbal information (verbal-comprehension intelligence). The last hierarchy refers to general intelligence, such as abstract reasoning from all of the domains.

Another related term is emotions, which describe changes in cognition, experience, physiology (Izard, 1993; Simon, 1982) and different categories of relationships (Davitz, 1969; Roseman, 1984). For instance, if a person is happy, he or she may be glad to communicate with others and keep a good relationship with others.

EI as one kind of intelligence may be parallel with other kinds of intelligence, such as verbal-comprehension intelligence. Mayer et al. (2008) indicate that many kinds of intelligence, such as verbal-comprehension intelligence, focus on learning materials and are developed by learning. Following this sense, the initial definition of EI can be seen as "*the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought*" (Mayer et al., 2008, p.511). In other words, EI refers to both emotion and intelligence being involved in abilities in order to develop thought.

In later studies, Goleman (1998, 2001) suggests two facets to define EI. One is the ability to manage emotion versus awareness. The other is level of competence. These two facets may lead to four aspects: (a) awareness of self-emotions; (b) awareness of others' emotions; (c) managing self-emotions; (d) managing others' emotions. Nevertheless, although this definition indicates some elements for inquiry, it does not indicate a common element in different components. In addition, it does not differentiate EI from other concepts. For instance, it does not mention the differences between abilities and personality characteristics (Zeidner et al., 2004).

Furthermore, according to the different contexts, EI can be categorised into two main definitions. Bar-On (1997, p. 16) defines EI as "*an array of non-cognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures*". However, although this definition heavily stresses the adaptation of environmental requirements, many other factors (e.g. acquisition) in the emotional information are not mentioned. Additionally, cognitive skills, which benefit emotional management, have been neglected in this conception (Zeidner et al., 2004).

Compared with this definition, Mayer and Salovey (1997, p. 5) define EI as "*the ability to perceive emotions, to access and generate emotions so as to assist thoughts, to understand emotions and emotional knowledge, and reflectively to regulate emotions so as to promote emotional and intellectual growth*". Matthews et al. (2002) evaluate this as the most desirable definition, because it clearly indicates emotional information processing as an important prerequisite for emotional regulation. In this study, this definition is applied to guide the research.

2.3.2.2 Models of Emotional Intelligence

According to two different definitions, the approaches to EI can be defined as having two categories: (a) ability models which refer to the ability to manage information effectively (b) mixed models that include both the ability to manage emotion and personality (Mayer et al., 2001). The differences between these two approaches are reflected in their measurements. Based on the models of ability, some scholars consider EI as well-defined emotion-processing skills and that it can be measured by performance tests (Mayer, Caruso, and Salovey, 1999, 2000), while others assert that mixed models consist of personal functioning and can be tested by self-report protocols

(Bar-On, 1997; Boyatzis et al., 2000; Goleman, 1995). According to these arguments, it is necessary to specify at a theoretical level how and in what ways different models of EI are able to assess variables.

A mixed model of EI refers to "*non-cognitive capability, competency, or skill*" (Bar-On 1997) and/or "*emotionally and socially intelligent behaviour*" (Bar-On 2004, p. 122), and "*dispositions from the personality domain*" (Petrides and Furnham 2003, pp. 278–280). It includes motivational factors and affective dispositions (such as self-awareness, self-motivation, self-regulation, empathy, social skills, assertiveness, stress tolerance) (Bar-On, 1997; Goleman, 1995). The model is unrelated to intelligence (Matthews et al., 2002). It is not an ability scale and highly relates to personality questionnaires. For instance, EQ (Dawda and Hart, 2000; Newsome, Day, and Catano, 2000), as an instrument of the mixed model, mainly relates to low level of neuroticism. However, some studies in the field of personality suggest there are some limitations on the validity of the questionnaire instrument of EI. Matthews (1997) stresses that personality characteristics related to emotion may have both positive and negative influences according to context. For instance, the dimension of neuroticism connected to a low level of emotional intelligence may lead to stress and coping ineffectively, while, conversely, high levels of neuroticism may also lead to job success. However, emotional intelligence may offer positive influences in all situations.

In the past two decades, a rich variety of studies have demonstrated the discriminate and incremental validity of the ability version of the EI construct (Brackett and Mayer, 2003; Mayer et al., 2001; Mayer et al., 2008). For instance, it is correlated with verbal and perceptual reasoning (Mayer et al., 2008) and openness and agreeableness (Salovey and Mayer, 1993). Additionally, Clarke (2009) conducted criterion-related tests to test how the ability model predicts life outcomes or behaviours. They found that the predicting power of the ability model is reflected within a range of differing domains (Clarke, 2009), such as social functioning (Brackett et al., 2006; Lopes et al., 2004), psychological well-being (Brackett and Mayer, 2003; Brackett et al., 2006) and other important group results, such as negotiation (Day and Carroll, 2004; Mueller and Curhan, 2006).

Among measures of the ability model, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) is commonly used to test EI. MSCEIT items are summarised into four aspects (Wong and Law, 2002, p246): (a) the appraisal and expression of self-emotions (SEA), which refer to one's ability to understand her or his deep emotions and to convey these emotions; individuals who are high in this domain can precisely show and perceive their emotions (Salovey and Mayer, 1989, 1990);

(b) appraisal and recognition of others' emotions (OEA), which refers to one's ability to understand others' emotions; individuals who are high in this domain are more likely to be sensitive to others' emotions and perceive others' emotions.

(c) regulation of self-emotion (ROE), which refers to one's ability to manage one's emotions and resist psychological distress; when individuals are high in this type of ability, they may quickly get over being upset or very happy and return to a normal psychological situation. Additionally, they are less likely to lose their temper because of better control of emotions.

(d) Use of emotion to facilitate performance (UOE), which refers to "*one's ability to use his or her emotions to construct personal performance*". Individuals who are high in this ability always encourage themselves to do their best and guide their emotions to a positive and productive orientations

Because there are many differences between these two models, it is not surprising that there are low inter-correlations between these two models (e.g. O'Connor and Little, 2003; Petrides et al., 2004). The limited extent of overlap between two models indicates that different measures of EI may likely provide different levels of predictive power in assessing behavioural variables and group outcomes. Additionally, the theoretical foundation related to both models is different (Clarke, 2009). The ability model of EI is closely related to intelligence, while mixed model of EI is closely related to personality.

Nowadays, a growing number of studies focus on an ability model rather the mixed model of EI because there are many problems involved with the mixed models approach. The ability model of EI is a kind of intelligence test that can reasonably predict job criteria (Hunter and Schmidt, 1996), while mixed model is less predictive of job performance than the ability model because the mixed model is not related to intelligence (Zeidner et al., 2004). For instance, some studies (e.g. Jensen, 1980, 1998) show that there is about 10-30% criterion variance in job performance that can be predicted by general ability, while the mean validity coefficients of the 'Big Five' personality types are less than .2-.3 (Barrick and Mount, 1991, 1993; Tett et al., 1999). Some scholars (e.g. Davies et al., 1998) observed the overlap between personality inventories and mixed model of EI to conclude that "*as presently postulated, little remains of emotional intelligence that is unique and psychometrically sound. Thus, mixed model of EI questionnaire measures are too closely related to "established" personality traits (to be considered anything new)*" (p.1013).

2.3.2.3 Emotional intelligence across self- and other-rating

Since the mid-1990s, there have been a rich variety of measurement instruments developed to evaluate EI. A significant distinction concerns the method of measurement: ability test (or performance test) and self-report test.

In the performance test of EI, individuals focus on emotion-based problem-solving items and applying predeter-mined criteria to assess the quality of their answers (Beaupré, Cheung, and Hess, 2000; Freudenthaler and Neubauer, 2005; Mayer, Salovey, and Caruso, 2002). Some scholars (e.g. Mayer, Salovey, and Caruso, 2002) stress that individuals' actual intelligence can be measured by performance tests. The golden rule in the intelligence studies can be regarded as ability testing because intelligence relates to the actual capacity to perform mental tasks, rather than individuals' beliefs about those capacities (Carroll, 1993; Mayer and Salovey, 1993; Neisser et al., 1996; Scarr, 1989). For instance, if a person wants to know how well others detect emotions, he or she can show them a sad face, and observe their response if they recognise the facial expression. Or, if a person wants to know how well others reason about emotions, he or she can raise an emotional issue and evaluate the quality of their reasoning in response. Moreover, Goleman (1996) stresses that "*although there is ample research on each of its (emotional intelligence) components, some of them, such as empathy, are best tested by sampling a person's actual ability at the task…*" (p.44).

By comparison, in self-report instruments of EI, participants are asked to indicate their own level of EI. They focus on descriptive statements and report the extent to which they agree or disagree with the statement (Brackett et al, 2006; Pérez, Petrides, and Furnham, 2005; Schutte et al., 1998; Wong and Law, 2002). Although self-report instruments of EI are often applied to evaluate EI, they have many problems. One key problem is that it is only possible to reflect perceived situations rather than actual performance level. Mayer et al. (2000) stress that self-measurement characteristics depended on individuals' self-understanding. If an individual's self-perception is accurate, this measurement can accurately reflect the actual ability, while, if an individual's self-perception is inaccurate, which is often the case, it cannot reflect actual ability (Taylor and Brown, 1988). Paulhus et al. (1998) indicate that the data which is obtained from self-report measures only reflect individuals' self-concept, rather than their actual characteristics. Individuals are notoriously inaccurate reporters in some aspects of functioning, involving the self-evaluation of ability: there is only a modest correlation between actual measured intelligence and self-reported intelligence (lower than .3 or so) (Paulhus et al., 1998). As a result, individuals' self-measurement of mental abilities is independent of their actual abilities. Other cases are that there are low correlations between IQ and self-reports of intelligence (.2- .25) (Paulhus et al., 1998), and about 80% of participants believe that they are in the top 50% of individuals with high emotional intelligence (Brackett et al., 2006).

Additionally, it is not clear when self-report measurement can reflect the significance of emotional factors in the workplace. In any situation, Zeidner et al. (2004) stress that the measure of a self-report questionnaire is subject to criterion contamination. For example, the criterion measure itself is based, at least in part, on predictor measures (Cohen and Swerdlik, 1999). For instance, the EQ-I (Bar-On, 1997) which includes elements of general mood is regarded as a criterion rather than a predictor. Goleman (1996, p.44) states, " *unlike the familiar test for IQ, there is as yet no single pencil-and-paper test that yields an "emotional intelligence" score, and there may never be one*."

Moreover, the self-report measure has problems of content validity (whether a measure shows every facet in a given social context) and incremental validity (whether a test increaseS the predictive ability beyond that offered by existing assessment). Rosete and Ciarrochi (2005) stress that self-reports of EI simply replicate outcomes of personality measurements. Moreover, bias is not rejected in the measurement of self-report EI (Rosete and Ciarrochi, 2005), so it is easy to fake a good result (Day and Carroll, 2007; Grubb and McDaniel, 2007). By comparison, the ability model of EI has a higher level of reliability and criterion-related validity and it is difficult to fake a good result because the 'correct' answer is unknown beforehand (MacCann et al., 2004; Dawda and Hart, 2000). So, in contrast to measurements of mixed models of EI, the ability measurements of EI mainly focus on ability and modestly relate to intelligence.

However, by reviewing previous studies, the comparison between self-report measures and ability tests is according to different models of EI: self-report measures are used by the mixed model of EI (e.g. EQ-I), while ability tests are used by the ability-model of EI (e.g. MSCEIT). As mentioned in the literature review, there are obvious differences between these two models. The differences may influence results. Regarding the self-report measure, Wong et al. (2009) conducted research with the instrument of WLEIS to conclude that there is a high correlation between the self-report measure of ability model of EI and the ability test.

However, although WLEIS (EI construct) cannot remove method bias, it can control it through method design. First, assessment clues are avoided to guide respondents to get the right answers as it encourages respondents to make direct judgements (Law et al., 2007). Second, there are some items that are designed to evaluate others so it is possible to avoid self-bias (Law et al., 2004). Third, its construct has been developed for a long time and there is empirical evidence to show its high reliability and validity (Law et al., 2004; Wong and Law, 2002). Fourth, whether people deploy their EI source is determined by their own perceptions of emotional abilities and their usual actions (Antonakis et al., 2009). Finally, feedback about one’s ability to handle emotions may be very frequent in social interactions and thus one’s evaluation of this type of ability may be more accurate than evaluations of other types of abilities, such as reasoning and logical deduction. (Law et al., 2007).

Moreover, the WLEIS construct may more accurately reflect emotional intelligence in the Chinese background than other types of instrument, such as the MSCEIT, because it considers Chinese norm-referenced criteria. For example, when Chinese followers give a non-reactive quiet response to their leaders who made unreasonable demands, it is regarded as a ‘smart’ decision, but American employees may give a stronger response (Law et al., 2004; Wong, Law and Wong, 2004; Wong et al., 2007). Wong et al. (2009) empirically test the predicting power of MSCEIT and WLEIS in both China and U.S.A background and find that the task-based of MSCEIT is more appropriate to conduct research in the U.S. context, while WLEIS is more appropriate to guide research in

China and it is better to predict performance and organisational behaviours for Chinese workers. Therefore, it is appropriate to use WLEIS to predict OCB in this study.

As discussed above, the attributes of EI play a significant role in keeping good interpersonal relationships. Based on this point, it seems to have the same role as an intuitive cognitive style. Few studies, however, focus on the relationship between the two terms. The relationship between these two terms will be discussed in more detail.

2.3.2.4 Emotional intelligence and individual-level variables

2.3.2.4.1 Emotional Intelligence and Cognitive Style

Comparing the characteristics of cognitive styles and the mixed model of EI, there are many similar features between them. Dulewicz and Higgs (1999) developed a mixed model of EI to test the relationship between EI and cognitive styles (Figure 2.3.2.4.1.1). They found that some elements of EI and MBTI scales overlapped considerably. For instance, the factor of self-awareness to evaluate one's weaknesses and strengths is based on the external environment. It is similar to the factor of extraversion in the MBTI scales and differs from the domain of introversion.

In their model, Dainty and Anderson (2000) further indicate the relationship between EI and MBTI (Figure 2.3.2.4.1.1). The extraversion style is more positivly related to EI than the introversion style; the intuiting style is more positively related to EI than the sensing style and the feeling style is more positively related to EI than the thinking style.

Figure 2.3.2.4.1.1: The relationship between E1 and MBT1

				E1 elements			
MBT1	**Self-awareness**	**Emotional resilience**	**Motivation**	**Interpersonal sensitivity**	**Influence**	**Intuitive decision making**	**Conscientiousness and Integrity**
E	+			+	+	+	
I	-			-	-	-	
N						+	
S				-		-	
T	-	+		-	-	-	
F	+	-		+	+	+	
J						.	+
P						+	-

Source: Dulewicz and Higgs, 1999; Dainty and Anderson, 2000

Note: (a) self-awareness refers to making a realistic evaluation of one's weaknesses and strengths (b) emotional resilience refers to the ability to perform consistently in all situations and adjust one's actions appropriately (c) motivation is the drive to achieve clear outcomes and to balance any goals (d) interpersonal sensitivity refers to the ability to notice the willingness of others when making decisions (e) influence refers to the ability of persuade or modify others' ideas according to understanding their perspectives (f) intuitiveness refers to the ability to make decisions and drive their implementation when information is ambiguous (g) conscientiousness refers to the ability to make a commitment to the actions when facing challenges.

Nevertheless, although some studies have tested the relationship between EI and cognitive styles (e.g. Mcclure and Werther, 1993; Dainty and Anderson), its full implications are still unclear. Additionally, previous studies focus mainly on the relationship between cognitive style and the mixed model of EI rather than the ability-model of EI. In empirical tests, the ability-model of EI has more advantages than the mixed model of EI. Therefore, it is necessary to apply the ability-model and CSI to explore the relationship between EI and cognitive style.

However, some studies suggest that the distinction between cognitive style and the ability-model of EI involves cognitive ability. The meaning of ability refers to measurement of capacity in the field of maximal performance, which focuses on level of accomplishment. The ability-model of EI can be considered as involving cognitive abilities to process emotional information and regulate emotion adaptively. By comparison, the meaning of style refers to modes of operation in the field of typical performance in which individuals may use their familiar way to exhibit performance. Style is different from abilities in that even if an individual has abilities to do some work, they may not show their abilities in daily work as they are not familiar ways to perform. They may use their familiar style to do work. A study supports the theory that although individuals have the ability to think of every object differently when told to do so, they may use less differentiated or more familiar methods to process information in daily work (Hayes and Allinson, 1994).

Furthermore, individuals with high emotional intelligence may have advantages of both intuitive style and analytic style at the same time. On the one hand, according to George's (2000) assumption, in the daily work, individuals need to cope with a great deal of information which is characterized as ambiguity and uncertainty. A high level of emotional intelligence enables them to substantively process complex information and to find directions among complex information. Additionally, when individuals have emotional intelligence, they may tend to be creative and have a compelling vision (Isen et al., 1987, George, 2000). For example, individuals with positive emotion may be more likely to be integrative, use broader categories and solve issues flexibly (Isen and Baron, 1991; Isen and Si Daubman, 1984; Isen et al., 1985; Murray et al., 1990). These characteristics are consistent with an intuitive style. On the other hand, emotional intelligence may help people to control negative emotions to carefully consider all aspects of the issues involved in the work (George, 2000). These characteristics are consistent with those of an analytic style.

However, although there are some differences between the mixed model of EI and the ability-model of EI, both of the models consider ability factors in the measurement of EI and are moderately correlated (Bastian, Burns and Nettelbeck, 2005). Therefore, whilst it is reasonable to study the relationship between cognitive style and the mixed model of EI, it is also possible to focus on the cognitive style and ability model of EI. Additionally, some scholars (Mayer and Salvey, 2002; Bastian, Burns and Nettelbeck, 2005) indicate that although the mixed model of EI and cognitive style may be more closely related to personality than the ability model of EI, it does not mean there is no relationship between some aspects of personality and ability models of EI. Some results indicate that a higher level of EI is related to higher levels of extraversion, openness, agreeableness and conscientiousness. Additionally, the study posits that the distinction between the mixed model of EI and the ability-model of EI may not be obvious when they are related to cognitive abilities. Therefore, the relationship between the ability model of EI and cognitive style is far clearer. Similarly, it is also worth testing the relationship between the ability model of EI and cognitive style. In this study, the hypothesis is developed based on the partial correlation between the mixed model of EI and the ability-model of EI in some aspects of personality and the correlation between the mixed model of EI and cognitive style. Based on these points, it is hypothesised that:

H4: Intuitive style is more likely to tend toward a higher level of EI than analytic style.

2.3.2.4.2 Individual Emotional Intelligence and Organisational Citizenship Behaviours

According to the definition and constructs of EI, individuals with high EI are expected to make appropriate responses to others. For instance, they may encourage or take actions to help others when others have troubles. Furthermore, EI is positively related to empathy (e.g., Ciarocchi et al., 2000), so individuals with high EI may take actions to commit to organisational development (Abraham, 1999). In the literature, there are some studies that focus on the relationship between some specific elements of OCB and EI (Ilies et al., 2007), such as the relationship between altruism/compliance and EI.

On the one hand, altruistic behaviours can be improved by EI because EI plays an influential role in understanding others' feelings and then making an appropriate response (Abraham, 1999), such as helping others. Similarly, altruistic behaviours may help individuals to understand and manage their partners' feelings. If someone has altruistic ability, he or she more easily keeps a positive mind and is more likely to be more enthusiastic with others than someone who has a low level of altruistic ability (Fiske and Taylor, 1991; Staw et al., 1994). Therefore, both altruistic behaviours and EI overlap in their nature. In the empirical test of Charbonneau and Nicol (2002), there is a positive relationship between altruism and EI.

On the other hand, individuals with high EI can effectively understand organisational rules and meet organisational requirements because they are sensitive to the environment. Thus, they may be compliant with organisational rules (Carmeli and Josman, 2006). In the empirical test of Charbonneau and Nicol (2002), there is a positive relationship between compliance and EI.

2.3.2.5 Group-level emotional intelligence

As has been noted, emotional intelligence has been demonstrated to have significant implications for individuals' consequences in organisational work, but a rich variety of studies have considered how EI is reflected at the group level (e.g. Kelly and Barsade, 2001; Druskat and Wolff). Kelly and Barsade (2001) indicate that Emotional intelligence was originally associated with individual characteristics, but it is possible to create or combine these individual traits into emotional composition of a group. Specifically, Druskat and Wolff (2001) stress that emotional intelligence plays an important role in both individual-level research and in group-level research. I will now discuss some important characteristics of group-level emotional intelligence and then focuses on its relationship with group-level organisational citizenship behaviour.

2.3.2.5.1 The main features of group-level emotional intelligence

There are two valuable, but different, methods to define emotional intelligence in groups. The most common method to measure team or group level of psychological environment is through an average value, which refers to the aggregation of individual-level data to group level. The basic assumption applied in this conception is that group-level emotional intelligence is considered as a kind of resource which group members focus on and that group members can share and compensate for their ability with other members (Elfenbein, 2006).

In the literature, a large body of evidence has been provided for the connection between the average of emotional characteristics in groups, and group behaviour. For instance, George (1990) states that group members' emotional orientations are significantly related to group members' emotional reactions. For instance, the positive affective tone may lead to low level absenteeism and helping behaviours among group members. Bouchard (1969) also found that group members with higher level of emotional ability may cause higher levels of group problem-solving behaviour. Cooperation and communication between group members can be reached and conflicts can be solved by group members with positive and good emotions (Neuman and Wright, 1999). Elfenbein (2006) indicates that the effectiveness of group behaviour or performance results from the group members with high average levels of EI because group members with a high average level of EI are good at managing the affective environment, and so the group's activities are organised in an effective way (Druskat and Wolff, 2001) and it is possible to obtain good cognitive and decision-making processes (Mayer et al., 2000)

Although overall group-level emotional intelligence can be measured by a group average, the average value is not the only way to measure it. According to the type of group tasks, maximum and minimum value can also be used to describe the important characteristics of groups (Barsade and Gibson, 1998). Specifically, it is appropriate to use the maximum level of individuals' EI to reflect group value in some 'conjunctive' tasks in which the group outcomes are represented by the performance of the best group members, while the minimum level of individuals' EI is also appropriate to reflect group values in some 'conjunctive' tasks in which the group outcomes are as strong as its weakest link (Elfenbein, 2006). For instance, some groups are representative of their company to treat with external stakeholders; in these groups, a group member's behaviour which is emotionally inappropriate can reflect poorly on the whole group. In addition, in some kinds of work, a single group member's value can appropriately reflect the whole group's value. Another example is that, in the situation of negotiation, an individual who takes a dominant role in the group and is good at perceiving the other party's position is likely to share information with other group members. Therefore, the group can act appropriately according to his or her good performance.

However, some studies (Atwater and Yammarino, 1992; Jordan et al., 2002) stress that this kind of measurement is problematic. Pate et al. (1998) indicate that group performance is more appropriately predicted by decision-making ability of a group rather than by the best decision-maker in the group. In some groups, the leadership role is rotated, and thus it is not feasible to clearly specify a group leader. Additionally, this study focuses on non-task related behaviours (OCB) rather than task-related behaviours; therefore, emotional intelligence is not appropriately measured by the maximum and minimum values of a person.

Druskat and Wolff (2001) indicate that the definition of EI can be considered not only as an individual competency but also as a group property. Therefore, one perspective to define group-level emotional intelligence is according to group climate. Brown and Brooks (2002) argue that emotional climate plays a significant role in determining organisational processes and the group climate in which tasks are accomplished. It explains significant differences in individuals' attitudes and behaviours. In addition, they argue that emotional climate is composed mainly of shared affective experiences and emotions. Drawing from emotional intelligence literature (Druskat and Wolff, 2001; Goleman, 1998; Jordan et al., 2002; Mayer and Salovey, 1997; Salovey and Mayer, 1990), group emotional intelligence is defined as the characteristics of a work group environment (such as team empathic concern, emotion management, and norms) and affects group members' habits in some organisational events. Specifically, empathic concern and emotion management are considered to be two important elements of group emotional intelligence climate because first, both emotional management and empathic are closely related to group members' propensity. Second, group members control and manage emotions only after they realise their own and others' emotions (Ayoko et al., 2008)

Empathy is defined as "*the ability to comprehend another's feelings and to re-experience them oneself*" (Salovey and Mayer, 1990, pp.194-195) and "*sensing other's feelings, perspectives and taking an active interest in their concerns*"(Goleman, 1998, p.318). The bond between group members uses empathic behaviours to generate a climate in which their highs and lows can be shared, discussed, and worked through (Rapisarda, 2002). Additionally, empathy is important for improving the emotional environment which increases group cohesion and performance (Rapisarda, 2002). For instance, a group climate with a high level of empathy is important for conflict solving (Ayoko et al., 2008).

Moreover, Salovey and Mayer (1990) provide evidence that information-processing capability can be improved by emotional management in a way that enables a good ability to plan and motivate. Particularly, successful emotional management improves not only one's own and other members' ability in solving significant issues (Salovey and Mayer, 1990), but also for team performance (Jordan and Troth, 2004). For instance, successful team emotional management plays an important role in group members' task completion (Druskat and Wolff, 2001) and conflict solving (Ayoko et al., 2008)

However, Chang et al. (2011) argue that measures of group-level emotional intelligence need to consider different research contexts. The EI climate is regarded as an emergent state of the group which improves the effectiveness of intergroup processes, while the average level of group members' EI defines group-level EI as an input element which is closely related to group processes and results. Two measurements of group-level EI are conceptualised by different composition models. The average level of group members' EI is appropriately represented by the additive model because it concentrates on the compositional influence of group members' traits (EI) on the group process and outcomes (Chan, 1998; Elfenbein, 2006). In comparison, the EI climate is appropriately represented by the referent-shift consensus model, which defines group-level EI as a kind of norm or climate oriented in groups (Chang et al., 2011). This study will use the average level of group members' EI as an instrument because it concerns the influence of group members' EI as an input factor to determining group-level OCB.

2.3.2.5.2 Group Emotional Intelligence and Group-level Organisational Citizenship Behaviours

In recent years, increasing attention has been paid to the effect of group EI which plays an essential role in organisational processes (Brown and Brooks, 2002). Mooney, Holahan and Amason (2007) assert that the most significant role of EI at the group level is to improve interpersonal relationships and individuals' feelings, and perceptions (Salancik and Pfeffer, 1978) because group members often seek guidance from other group members to cope with events and to develop appropriate emotions and behaviours (Salancik and Pfeffer, 1978). When group members receive emotional support from others, they may take effective ways to manage conflicts.

Group-level EI not only plays an important role in ones' own behaviours, but also is important for others' interpersonal related behaviours because EI takes other members' situations into account and incentivises other members (Feyerherm and Rice, 2002). Some studies (e.g. Vakola et al., 2004) further indicate that group members who join in affective management are also able to motivate and energise others. An increase in the sense of control of individuals' own emotional state and adaptive coping behaviours, together with the ability to affect the emotional states of others, may give individuals greater confidence and willingness to talk about their feelings more openly (Baumeister et al., 1994; Jordan et al., 2002). In other words, when most of the group members have a high level of EI, they may enhance others' emotional states and organisational citizenship behaviours.

According to George (1990), group-level EI plays an important role in defining group affective tone which may directly or indirectly affect group-level OCB. Chan et al. (2005) stress that when group members fall into negative emotions, they tend to keep a negative view of themselves, others and the environment around them, and have ambiguous or negative responses, while groups members who have positive emotions tend to have a general sense of well-being and tend to regard themselves as satisfactorily and effectively engaged. Additionally, there is an overlap between groups with negative/positive emotions and cooperative behaviours. George (1990) state that there is a close relationship between less social behaviours and negative affective tone in a sales group, while individuals' low level of absenteeism is closely related to group positive affective tone.

Moreover, group-level EI can predict group-level OCB through its implication in interpersonal conflicts. As has been mentioned, interpersonal conflicts are negative related to group-level OCBI (GOCBI) and group-level OCBO (GOCBO). Some previous studies (e.g. Ayoko et al., 2008) demonstrate that group EI plays an influential role in solving relationship conflicts. Plutchik (1987) stresses that group-level EI can produce a bond among individuals through sharing positive emotions. The bond between members will promote cohesion and performance and reduce interpersonal conflicts (Rapisarda, 2002) because group members can understand their own and others' feelings and promote the development of organisation. In an empirical test, Ayoko et al. (2008) found that group EI is negatively related to relationship conflicts.

Therefore, interpersonal conflicts can be controlled by group level EI. In conclusion, group level EI directly or indirectly positively relates to the development of group-level OCB. It is therefore hypothesised that:

H5: Group-level emotional intelligence is positively linked to group-level organisational citizenship behaviour.

The interpersonal relationship can be considered not only in terms of inter-member or co-worker relationship within the work group, but also from the perspective of leader-subordinate relationships, commonly referred to as the leader-member exchange (LMX) relationship. It has been found that leaders often treat their members differently. Similarly, different followers have different expectations and evaluations for their leaders. These different leader-member relationships may be caused by differences in cognitive styles (Allinson et al., 2001) and, theoretically, levels of EI. For instance, according to the definition of EI, when leaders have a higher level of EI, they can better manage their relationships with followers than those leaders with a lower level of EI. It is therefore necessary to now focus on the influence of individual difference (in terms of cognitive styles and EI) on LMX and OCB.

2.3.3 Leader-member Exchange

Graen and Uhl-Bien (1995) indicate that the relationship-based approach to leadership theory concentrates on the reciprocal relationship between leaders and followers. This reciprocal relationship approach to understanding leadership is referred to as leader-member exchange (LMX). Before reviewing the effects of leaders' cognitive styles and EI on LMX, it is first necessary to focus on some main features of LMX.

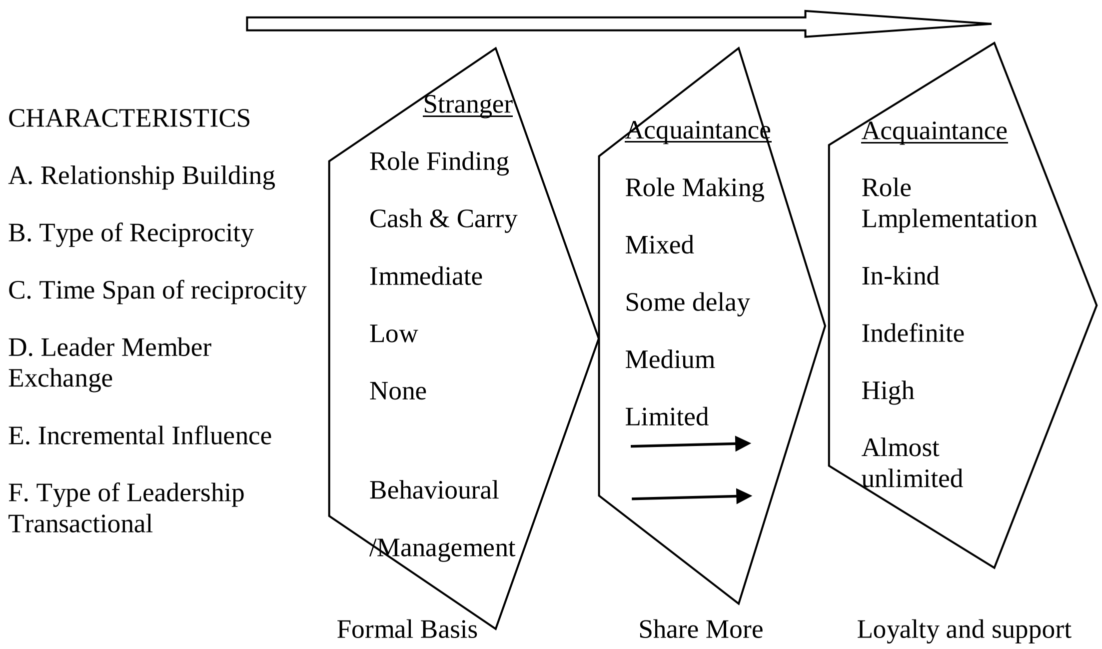
2.3.3.1 The Definition and Development of Leader-member Exchange

Since it was first introduced over four decades ago, the theory of LMX (e.g. Graen and Cashman, 1975; Graen and Uhl-Bien, 1995) has continued to evolve through four stages. The first stage focuses on vertical dyad linkage (VDL) (e.g. Dansereau et al., 1975; Vecchio, 1982), which indicates that leaders treat subordinates differently in their units. In order to manage units effectively, leaders need to develop a few trusted followers because of time and resource limited (Graen and Uhl-Bien, 1995). These followers can be considered as 'in-group' members who get extra support from their leaders

(Dienesch and Liden, 1986). However, most followers are separated into an 'out-group', which indicates that they only make superficial contact with their leaders (Dansereau et al., 1975; Graen, 1976). Therefore, 'in-group' members are more committed to organisational work than 'out-group' members, while 'out-group' members do no more than what the job requires, and are less inclined to contribute to the organisation than 'in-group' members.

The second and third stages explicate the homological network surrounding the LMX construct (e.g. Mansour-Cole, 1994) and focuses mainly on the Leadership Making Model. The model stresses the movement from differentiation of followers by leaders to a partnership between leaders and followers (e.g. Graen and Uhl-Bien, 1995) (Figure 2.3.3.1.1). The model indicates three phases of relationship building: 'stranger' phase, 'acquaintance' phase and 'mature' phase. The transformation from the 'stranger' phase to the 'mature' phase represents individuals that move beyond their own self interests toward mutual interests. In the 'stranger' phase, the interaction between leaders and followers is based on formal contracts and job requirements. In contrast, in the mature stage, the relationship between leaders and followers is not like the traditional hierarchical leader-follower relationship (leaders give orders to followers, and followers' activities are based on job requirements), but more like that of peers. High quality exchanges may occur in the mature stage because both leaders and followers maintain high levels of trust with each other in this phase. Within high quality relationship during the mature phase, leaders provide followers assistance when they need it, and followers are more likely to exhibit extra-activities over and beyond what is required by the job. Compared with vertical dyad linkage theory, the 'leadership making model' provides more information and a good understanding about the process of transformation from 'out-group' to 'in-group', rather than distinguish between 'in-group' members and 'out-group' members. The final stage considers LMX as interdependent dyadic relationship or network assemblies (Scandura, 1995). Different dyadic relationships can be combined to generate a wider system of network assemblies (e.g. Uhl-Bien and Graen, 1992, 1993).

Figure 2.3.3.1.1 Life cycle of leadership making



Source: Graen and Uhl-Bien (1995)

Recently, most LMX researchers have focused on the latter two stages and stress that the nature of LMX is decided by the quality of LMX relationships. With regard to the LMX construct, a numbers of scholars use different scales to measure LMX, such as 2-item scales (Dansereau, et al., 1975), 4-item scales (Graen and Schiemann, 1978), 5-items scales (Graen et al., 1982) and 7-item scales (Graen et al., 1982; Seers and Graen, 1984; Graen and Uhl-Bien, 1995). Considering different measurements, the 7-item LMX will be adopted in this study because of its high reliability (0.78- 0.93). Full justification for this decision will be provided in the next section. It focuses on the development of the quality of LMX rather than concentrating on the amount of negotiating latitude a leader allows a member. Graen and Uhl-Bien (1995, P.237) point out the development of quality of LMX according to (1) mutual respect for capabilities of the other, (2) the levels of reciprocal trust *(3)* **“***the expectation that interacting obligation will grow over time as career-oriented social exchanges blossom into a partnership*”. High quality will be formed by mutual respect and trust and reciprocal obligations, while if one member in the dyadic relationship perceives another as untrustworthy, they may be unwilling to reciprocate obligations, and LMX quality will remain at a low level.

2.3.3.2 The dimension of leader-member exchange (LMX)

Traditionally, LMX has been considered as a global construct which shows a measure of the general quality in the exchange relationship between a leader and a follower

(Graen and Cashman, 1975; Graen et al., 1982; Graen and Scandura, 1987). It was originally defined as a uni-dimensional variable according to work-related exchange and work behaviours from both a leader and a follower (Graen, 1976; Graen and Scandura, 1987; Graen and Uhl-Bien, 1995). In such, both a leader and a follower according to their needs define each other as respected or un-respected, trustful or untrustful.

Nevertheless, Dienesch and Liden (1986) argue that there is a lack of theoretical and empirical evidence to suggest that LMX is a uni-dimensional construct. Additionally, they stress that there are some theories implied in the conception of LMX to provide evidence for a multidimensional perspective. For instance, the multidimensional construct of LMX results from the concept of role, which is defined as ". . . *standardized patterns of behaviour required of all persons playing a part in a given functional relationship* ..." (Katz and Kahn, 1978, p.43). Graen and Scandura (1987) also stress that the development of LMX results from different role making episodes. Normally, leaders' roles are expected to take multiple factors or activities, such as supervising activities, distributing resources activities (Kim and Yukl, 1995; Tsui, 1984). Mintzberg (1973) proposed that the roles leaders played in organisations were those of figurehead, leader, liaison, monitor, disseminator, spokesman, entrepreneur, disturbance handler, resource allocator and negotiator. Similarly, the position of some followers in the organisation is expected to focus on task-related aspects, but others are expected to focus on non-job specific behaviours (Borman and Motowidlo, 1993; Organ, 1997). Therefore, according to different roles taken by both leaders and followers, the LMX construct may be developed into a multi-dimensional construct. Additionally, some theoretical and empirical studies support the contention that multiple dimensions of LMX play an important role not only in understanding the construct of LMX, but also in predicting its relationship with some organisational variables (such as justice and organisational behaviours) (Dienesch and Liden, 1986; Liden and Maslyn, 1998; Liden et al., 1997).

The multidimensional LMX can be understood according to the theory of social exchange (Dienesch and Liden, 1986; Liden and Maslyn, 1998; Liden et al., 1997). In organisational practice, a great amount of different material and non-material products are exchanged in social interactions (Liden and Maslyn, 1998). For instance, efforts and friendships are considered as potential social currencies (Krackhardt, 1990; Liden et al., 1997; Sparrowe and Liden, 1997). These social currencies are exchanged differently according to different social interactions. Consistent with this view, the dyadic relationship is actually predicted according to different kinds of exchanges that are dissimilar in nature (Liden and Maslyn, 1998; Liden et al., 1997). For instance, one kind of LMX relationship may depend on both partners wanting to spend more time to complete tasks, while another kind of LMX relationship may depend on positive interpersonal relationships in the organisation. Here, two kinds of relationship may lead to high level of LMX, but their interactions (such as antecedents and consequences) are different (Greguras and Ford, 2006). In comparison, when the scale of LMX is measured as uni-dimensional, the dyadic relationships tend to be similar, either high or low. Thus, the uni-dimensional perspective of LMX may fail to consider the nature of LMX relationships (Greguras and Ford, 2006).

According to different exchange 'currencies', the multidimensional LMX relationship is originally defined as having three perspectives - contribution ("*perception of the amount, direction, and quality of work-oriented activity each member puts forth toward the mutual goals (explicit or implicit) of the dyad*") (Dienesch and Liden, 1986, p.624), loyalty ("*the extent to which both leader and member publicly support each other's actions and character*") (Liden and Maslyn, 1998, p.46) and affect ("*the mutual affection members of the dyad have for each other based primarily on interpersonal attraction rather than work or professional values*") (Dienesch and Liden, 1986, p.625). The latter study also provides a fourth dimension- professional respect (respect for professional capabilities) to depict the LMX relationship (Liden and Maslyn, 1998). The four dimensions are tested by the Leader Member Exchange-Multi-Dimensional Measure (LMX-MDM) with 12 items. It evaluates the LMX relationships based on the ideas of followers. Further empirical LMX tests have shown that the four dimensions demonstrate high reliability and validity (Schriesheim et al., 1992).

Gerstner and Day (1997) argue that if the number of items is small (e.g. n< 10), a large coefficient alpha estimate (>.8) can be constructed as the average item inter-correlation is normally large (Cortina, 1993). It is possible that a scale with a high alpha indicates a multidimensional construct, but it is not highly inter-correlated for all dimensions. Graen and Uhl-Bien (1995) found that the alpha of multidimensional LMX constructs ranges from .8 to .9, so it is possible to conclude that the LMX construct includes several dimensions. However, Gerstner and Day (1997) argue that all dimensions of multiple LMX are highly correlated, and three dimensions of LMX- "*respect for* *competence, trust in motivation and commitment to common values*" are quite similar (Graen, 2008, p. 5), and it is appropriately measured by a unidimensional measure of LMX. Graen and Uhl-Bien (1995, p.236) indicate that the most consistent findings of the testing across multidimensional studies is "*homogeneity on the single dimension (α ranges from .8- .9) and most of these studies fail to find multiple elements in exploratory factor analysis (EFA)*".

Compared with past studies, the research about multidimensional LMX construct is mainly developed based on the LMX-MDM instrument (Liden and Maslyn, 1998), while research using the unidimensional LMX construct is mainly developed based on the LMX7 instrument. Although both instruments are highly related, they are not only different in the assumption of dimensions (the LMX7 is based on responses from a follower, a leader, and both of them, while the LMX-MDM instrument is based on responses from a follower), but also report different relationships with other variables.

In this study, LMX is considered as a uni-dimensional construct because the single dimension is tested repeatedly in a rich variety of empirical LMX studies (94% of studies consider LMX to be a single, broad construct rather than a multidimensional set of constructs) (Joseph et al., 2011). Specifically, LMX7 will be adopted to test relationships with other variables because of the extensive review of LMX theory development. Gerstner and Day (1997) give an understanding and influential review of LMX literature, in which they suggest that if researchers and scholars are interested in unidumensional LMX studies, it is appropriate to use LMX7 as a measurement instrument. This suggestion is based on two grounds. First, internal consistency reliability of LMX7 is much higher than other LMX instruments, because of the smaller estimated measurement error involved in LMX7 (Gerstner and Day, 1997). Second, it has stronger criterion validity in considering relationships with other variables (such as organisational behaviours, team conflict and attitudes) than other LMX instruments (Joseph et al., 2011). Therefore, the implication of these two debates is that the LMX7 instrument offers the most robust psychometric properties of all available LMX measures. The instrument of LMX7 is suggested by scholars to evaluate the overall exchange quality (e.g. Gerstner and Day, 1997).

2.3.3.3 Leader-member Exchange and Organisational Citizenship Behaviours

LMX theory is closely related to social exchange theory (Blau, 1964, P.91). According to social exchange theory, individuals will adopt extra behaviours to repay those who have benefited them. Considering the quality of LMX and its relation to OCB, 'in-group' LMX (or high quality LMX relationships) is associated with high level of trust and support (Dienesch and Liden, 1986). In high quality LMX, leaders may provide material and non-material benefits to their 'in-group' members (Liden et al., 1997; Liden and Graen, 1980). As a result, in order to reciprocate leaders' support, subordinates may go beyond job-requirements and participate in OCB in order to maintain a balance of social exchange. In other words, managers' care and support may affect employees' OCB (Hackett et al., 2003).

Additionally, the leaders' support may likely encourage individuals to perform OCB because most of the leaders' supportive behaviours are, in themselves, a type of citizenship behaviour. Supportive leaders are more likely to be considered as role models for their followers. Additionally, supportive leaders are more likely to provide positive feedback to individuals or groups and these are considered to be the 'causes' of individuals' helping behaviours (Bachrach et al., 2001)

As mentioned above, OCBI is closely related to interpersonal relationships. Therefore, LMX may strongly predict OCBI because "*OCBI is aligned with the inherently nature of LMX*" (Remus et al., 2007, P272). Wayne and Green (1993) also claim that individual-level citizenship behaviour, which may directly relate to either managers or co-workers, provides a way for employees to deliver positive outcomes which benefit themselves or managers. Although OCBO mainly focuses on the commitment to organisations, it is also likely to be positively related to LMX. Lee and Allen (2002) conclude that when followers have positive emotions about their leaders, they may positively commit to the effectiveness of the organisation.

Although some scholars insist there is a strong relationship between LMX and OCB, others do not think so. Wayne et al. (2002) indicate that OCB is weakly related to the LMX ($r = .20$). Hackett et al. (2003) further confirm this idea. However, in Tekleab and Taylor's (2003) study, OCB is strongly related to the LMX ($r = .52$). These different results may be caused by sampling error and differential reliability control. Additionally, only small samples (sample size is less than 300) are taken into account in Wayne et al.

(2002) and Hackett et al. (2003) analyses (Ilies et al. 2007). Based on these studies, Ilies et al. (2007) uses a larger set of studies (sample size is 9,324) to indicate that LMX is strongly related to OCB. Therefore, there appears to be a significant relationship between the quality of LMX and OCB. In order to further test whether there is a relationship between LMX and OCB, this study designs appropriate methods to test the relationship.

2.3.3.4 Cognitive Styles, Leader-member Exchange and Organisational citizenship behaviour

In organisational life, almost all employees have shared beliefs that managers who have high status or important roles in the organisation may influence how a group member responds and behaves (Lord, 1985; Rush and Russell, 1988). Based on these arguments, first, this sub-section discusses the relationship between cognitive styles and leader-member exchange.

Handley (1982) examines the relationship between cognitive style and supervision to point out that similarity between leaders and followers results in high quality interpersonal relationships. Turban and Jones (1988) also found that subordinates who regard themselves as being similar to their supervisors communicate more with them, and consequently have higher assessments of them. Similarity between leader and member both in a general sense (Wexley and Pulakos, 1983) and with regard to attributes such as values (Ashkanasy and O'Connor, 1997), and attitudes (Phillips and Bedeian, 1994) has also been associated with LMX quality. Continuing this line of inquiry associated with the similarity-attraction paradigm (Byrne, 1971), Armstrong, Allinson, and Hayes (1997) further confirmed that individuals' cognitive style has a significant influence on interpersonal relationships. According to the similarity-attraction paradigm, if leaders' cognitive style is different from that of their followers, this may lead to a low quality of leader-member-exchange relationships (Suazo et al, 2008).

However, Winch et al. (1954) assert that mutual demands can be considered as the foundation of good interaction because individuals may develop when interacting with others who have different talents (Winch et al, 1954). According to this theory, individuals who have different cognitive styles linked together may result in some positive outcomes. Similar research was conducted by Allinson et al (2001). They claim that if leaders' cognitive styles are different from those of their followers, this may develop higher quality LMX relationships with followers than those with a similar cognitive style. For instance, intuitive managers are more respected by analytic members than analytic managers, because intuitive managers may have some talents which are not possessed by followers with an analytic style.

However, Armstrong (2004) tested the relationship between leaders and students in an educational context to point out that, based on work quality in a classroom, high quality of supervision is significantly related to leaders' analytic cognitive style, no matter whether students' cognitive style is similar to their leaders' or not. The reason is that analytic cognitive style is considered as task oriented and tends to stress ideas and principles, but intuitive style is less likely to focus on details and making decisions immediately (Kozhevnikov, 2007). In the education context, students' tasks are relatively complex; students require step-by-step logical guidance and extensive studies to find a solution; it is not surprising that students prefer a logical and serial approach guided by analytic supervisors. Nevertheless, his research focuses only on education settings rather than industry settings. Thus, more evidence is required to support the finding in the industry context.

Previous studies mainly concentrate on task-related activities. It is necessary to apply the theory of social exchange to non-task activities. Leonard et al. (2005) classify two types of leaders in their research. One is task leaders and the other, social-emotional leaders. Task-related leaders mainly focus on task completion, while social-emotional leaders mainly focus on supporting and caring for followers. The support and care are considered as an important standard to judge the level of leader-member exchange. Following this argument, leaders' cognitive style probably plays an important role in determining the levels of LMX in social-emotional activities because different types of cognitive style have different implications for task or non-task related activities (Armstrong and Priola, 2001).

Some scholars (e.g., Hollander, 1979; Jacobs, 1970) indicate that employees may feel strong commitment to, and respect for their leaders when leaders give them psychological benefits, such as trust and encouragement. Moreover, Dansereau et al. (1995) assert that subordinates' activities can be positively affected by leaders' support of their feelings of self-worth. Considering cognitive style in leadership, leaders' cognitive styles play an important role in the leader/follower relationship. When leaders' cognitive styles are positively related to psychological support, followers can obtain psychological benefits (such as submissive and emotional expression) in the interpersonal relationship. They may strongly commit to and respect their leaders. Some studies (e.g. Atwater and Yammarino, 1992) reveal that according to the MBTI category of cognitive styles, leaders with a feeling style are found to be rated higher by both leaders and followers than those with a thinking style. Additionally, information processing with an intuitive style may lead to more effective leadership than information processing with an analytic style (Allinson et al., 2001). Additionally, based on the close relationship between LMX and OCBI, a high level of LMX is deemed to be positively related to OCBI. Thus, when followers receive psychological support from their leaders, they may feel that the leaders trust and respect them. In order to repay leaders' support, they are likely to become more highly motivated to adopt helping behaviours and commitment to organisational rules.

With regard to OCBO, some scholars (e.g. McNeese-Smith, 1997; Brewer and Lok, 1995) stress that followers' organisational commitment is affected by leaders' supportive behaviours, such as to trust followers and creating open communications. In China, group leaders can be considered as representatives of the organisation. They monitor group members' daily work and give orders to them. When group members meet group leaders' requests, it also means that they finish the organisational job. In other words, leaders' psychological support is also considered as organisational support. Therefore, when group members receive help from group leaders, they may not only devote themselves to positive interpersonal behaviours, but also commit to organisational development.

Although this may make sense in a theoretical sense, further empirical investigations are needed. It is therefore hypothesised that:

H6: Leaders' cognitive style is negatively related to followers' OCB.
H7a: Leaders' perceived quality of LMX mediates the effects of leaders' cognitive style on followers OCBI.
H7b: Leaders' perceived quality of LMX mediates the effects of leaders' cognitive style on followers OCBO.

H7c: Followers' perceived quality of LMX mediates the effects of leaders' cognitive style on followers OCBI.
H7d: Followers' perceived quality of LMX mediates the effects of leaders' cognitive style on followers OCBO.

2.3.3.5 Emotional Intelligence, Leader-member Exchange and Organisational Citizenship Behaviours

A wide variety of studies posit that the link between individuals' EI and performance is likely to be influenced by different intervening processes (Druskat and Wolff, 2001; Chang et al., 2011). Leader-member exchanges can be considered as a potential key intervening mechanism. As mentioned previously, a rich variety of studies with theoretical and empirical tests demonstrate that there is a positive relationship between LMX and OCB. This study further expects that LMX mediates the relationship between leaders' EI and followers' OCB.

According to leadership theories, Palmer et al. (2001) point out that the effectiveness of leadership is closely linked to EI, as EI plays a significant role in understanding interpersonal relationships (Jordan and Troth, 2010). Recently, certain authors (Rosete and Ciarrochi, 2005; George, 2000) have used MSCEIT measurements to indicate that the score of EI relates to members' assessment of leadership effectiveness in terms of five aspects. First, organisational objectives and goals can be developed by EI; second, confidence and enthusiasm about cooperation can be generated by EI; third, flexibility in decision making can be encouraged through EI; fourth, EI can help create meaningful organisational identity; and fifth, EI can strengthen the significance of work in one's mind.

Additionally, Fedor (1991) empirically tested the influence of intentions and emotions of managers and found that perceived leaders' intentions plays a significant role in the feedbacks of followers, as individuals' feelings and behaviours can be influenced by perceptions of others' intention and actions (Ferris et al., 1995). In the area of EI, EI plays an important role in constructs of member attributions to reflect managers' emotion-evoking behaviours (Ashforth and Humphrey, 1995; Ashkanasy and Tse, 2000). Some studies indicate that leaders with a high level of EI may guide individuals to achieve desirable work results (Sy, Tram, and O'Hara, 2006; Wong and Law, 2002; Zhou and George, 2003). These leaders improve group members' activities by channelling the emotions of individuals in such a way as to generate greater resilience and confidence about behaviours and collaboration between these individuals (Sy et al., 2005; Zhou and George, 2003).

Mayer et al. (2008) argue that individuals who have a high level of EI can effectively communicate their thoughts with followers and are sensitive to others' emotions. This may lead to effective interpersonal relationships between themselves and group members because of mutual understanding and benefit (Chang et al., 2011). In other words, leaders with a high EI may further develop interpersonal relationships through self- and other-reinforcing natures (Kramer et al., 1996). As a result, the mutual understanding of needs leads individuals to take appropriate actions. Even if individuals disagree with each other, those with a high level of EI can better understand each other's ideas and feelings and take effective actions. Some scholars (Shamir et al., 1993; Wayne et al., 1997) assert that leaders who have a high level of EI are more likely to take emotionally supportive actions towards subordinates, and then the subordinates may reciprocate with more helping behaviours and contributions to the achievement of collective missions within the positive relationships.

Once a positive relationship is formed, it tends to act as an additional basis for the further reinforcement of extant trust relationships unless destructive trust-breaking events occur (McAllister, 1995). Considering that trust and positive relationships may be broken by poor communication and misunderstanding, leaders with high EI may have the ability to prevent destructive events occurring.

Thus, when followers receive psychological support from their leaders, they may feel that the leaders trust and respect them. In order to repay leaders' support, they are motivated to assume helping behaviours and commit to organisational rules. In light of these arguments, it is hypothesised that:

H8a: Leaders' perceived quality of LMX will mediate the relationship between leaders' EI and followers' OCBI.
H8b: leaders' perceived quality of LMX will mediate the relationship between leaders' EI and followers' OCBO.
H8c: followers' perceived quality of LMX will mediate the relationship between leaders' EI and followers' OCBI.
H8d: leaders' perceived quality of LMX will mediate the relationship between leaders' EI and followers' OCBO.

It should be noted that some scholars support this idea that leadership affects individuals both independently and as members in groups (Katerberg and Hom, 1981; Veechio, 1982). In an investigation of unit-level OCB in 249 grocery store departments, Ehrhart (2002) indicates that servant-leadership (as a type of supportive leadership) plays an important role in group-level OCB. With this in mind, LMX plays an important role not only in individual level but also in group level OCB. LMX will now be discussed in the context of group-level diversity.

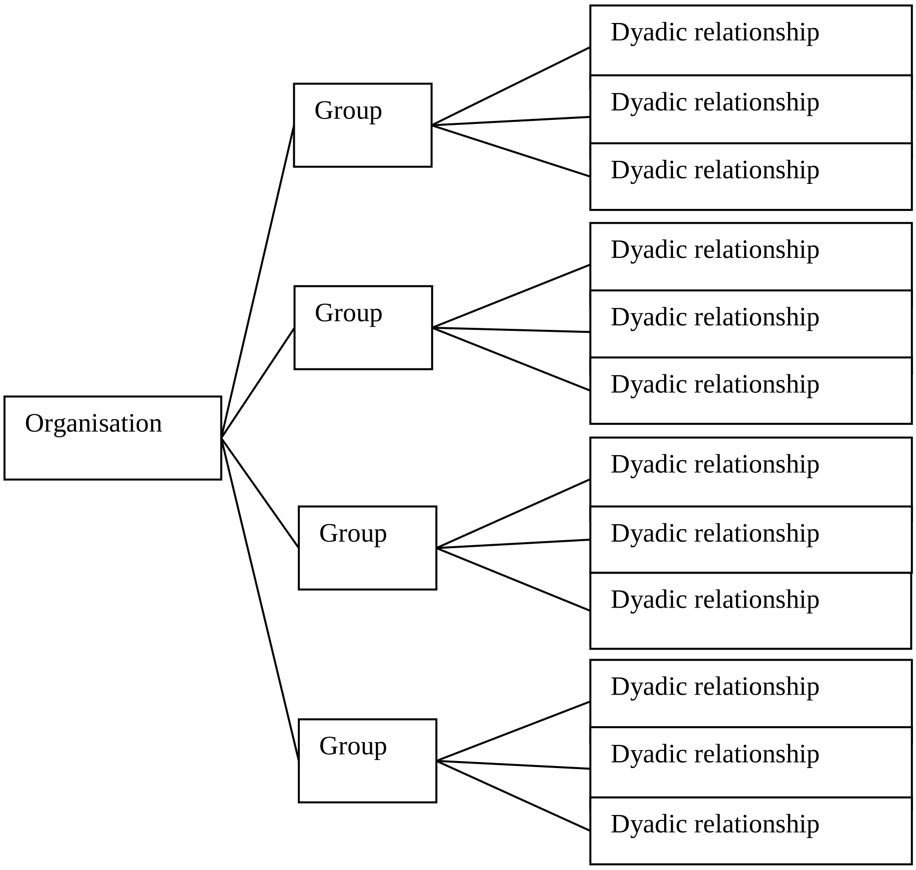
2.3.3.6 Leader-member exchange differentiation (LMX differentiation)

Although some studies propose that it is better to consider the model of LMX in dyadic situations (Graen and Uhi-Bien, 1995; Schriesheim et al., 2001), others posit the multilevel model of LMX (Cogliser and Schriesheim, 2000; Erdogan and Liden, 2002; Henderson et al., 2008). The multilevel model of LMX was originally developed in relation to how leaders provide different treatments to multiple followers in the work group, and how this affects performance within groups (Henderson et al., 2009). The dyadic-level model of LMX only represents the interpersonal behaviours and motivations at the dyadic level; it cannot represent how within-group characteristics in LMX quality provide a social context which affects group members' attitudes and actions (Henderson et al., 2009; Mayer and Piccolo, 2006).

LMX differentiation is defined as "*a process by which a leader, through engaging in differing types of exchange patterns with subordinates, forms different quality exchange relationships (ranging from low to high) with them. As such, LMX differentiation refers to a set and outcome of dynamic and interactive exchanges that occur between leaders and members, the nature of which (transactional versus social exchange) may differ across dyads within a work group*" (Henderson et al., 2009, p.519).

When transforming LMX from the dyadic level to group level, the nature of LMX differentiation is concentrated on differentiated exchanges and relationships within group level (Henderson et al., 2009). Unless there is only one leader and a sole subordinate in a work group, a group-level context will involve within-group variability among the various leader-member relationships (Figure 2.3.3.6.1). In some groups, members are largely different in evaluating their relationship with a leader, while in other groups, members are slightly different in evaluating their relationship with a leader. In some teams or groups with a high level of LMX differentiation, leaders may keep a high level of exchange with some members, but not with others (Liden et al., 2006).

Figure 2.3.3.6.1 Different levels in the organisation



The multilevel construct of LMX provides different implications for different theoretical backgrounds (House et al., 1995; Klein et al., 1994). For instance, some empirical evidence shows that the LMX model can operate at the: (1) individual-level social exchange motivations related to individual-level LMX; (2) individual–within group level resulting from comparative processes among group members regarding the quality and nature of their LMX relationships; and (3) at group-level, as the within-group LMX differentiation may affect the prominence of individual–within-group comparison processes on subsidiary outcomes (Henderson et al., 2008). Please refer to Figure 2.3.3.6.1 for clarification.

As LMX differentiation plays an important role in determining group or team outcomes, it is important to confirm the antecedents of LMX differentiation (Henderson et al., 2009). Blanc and Gonzales-Roma (2012) stress that the differences between group members related to work values can be considered as one of the important antecedents of LMX differentiation because different work values mean different group members' requirements, which affect leaders' differing behaviours (Blanc and Gonzales-Roma, 2012). In groups where there is an increase in dissimilarity of group members related to work values, "*it may be become difficult for a leader to expend the time and effort necessary to meet the unique needs and desires of all group members*" (Henderson et al., 2009, p. 522). For example, in order to meet group members' different needs (such as someone needed for high intrinsic work values whereas others are needed for job autonomy and self-development chances), leaders need to balance these different needs and have different actions to cope with them. Thus, with the increase in differences, it is difficult to develop high levels of LMX with every group member because of resource and time limitations. They will give more benefits to individuals whose values show advantages in groups than to others whose values show fewer advantages in groups. This implies a high level of LMX differentiation. According to the conception of cognitive styles, this can be considered as individuals' differences in work values. Therefore, it can be assumed that LMX differentiation may possibly relate to groups with cognitive style diversity.

Normally, group or team missions have to run different activities (from some activities that necessitate making decisions in the short term, to other activities that focus on details). According to the nature of the intuitive/analytic cognitive styles, leaders may trust and rely on individuals with an analytic style in some situations in which individuals need to consider all of the details and then make decisions. Similarly, leaders may trust and rely on individuals with an intuitive style in some situations in which it is not necessary to consider many details and draw a conclusion immediately. Similarly, individual differences in cognitive styles may lead to different evalutions for leaders' treatments because of cognitive styles resulting in individual differences in perceiving and assessing information. Thus, in groups with a wide diversity of cognitive styles diversity, leaders' and followers' behaviour may differ from each other in their evaluations. Based on these arguments, it is hypothesised that:

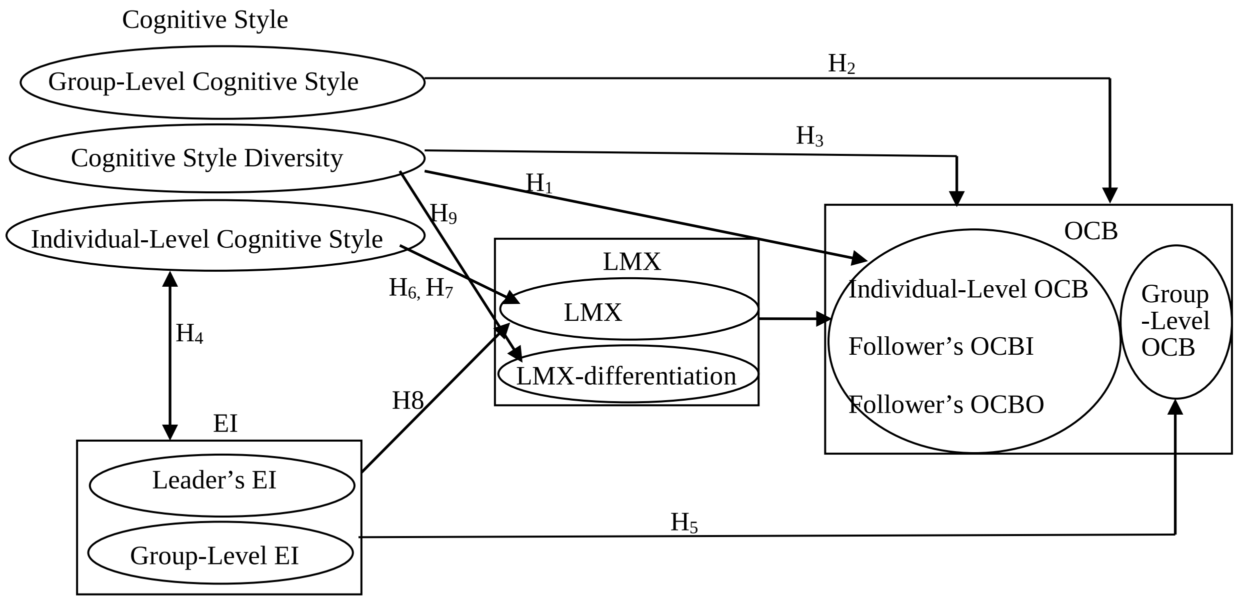
H8: Groups with higher cognitive style diversity will exhibit greater LMX differentiation than groups with lower cognitive style diversity.

2.4 Research framework and hypotheses

As a continuation of the literature review, this section integrates all of the hypotheses in order to map the framework with selected variables. The framework is designed to give a better understanding of the mediating effects of LMX on cognitive style/EI and OCB, followed by a test of the relationship between cognitive styles and EI. OCB is then presented in relation to EI and cognitive styles from the perspectives of individual and group levels of analysis. In addition, group-level OCB is further tested in relation to cognitive style diversity, which is considered as an antecedent to be tested according to LMX differentiation.

Theoretical relationships among these given variables are organised structurally in the model, as indicated in Figure 2.4.1. In the model, the arrow shows the direction of influence between the variables.

Figure 2.4.1: Hypothesized model



H1: Individuals whose cognitive styles are more intuitive than analytic will exhibit higher levels of OCBI.

H2: Intuitive groups will exhibit a higher degree of group-level OCB than analytic groups

H3: Groups with low diversity of cognitive styles will exhibit a higher degree of group-level OCB than groups with high cognitive style diversity.

H4: Intuitive style is more likely to tend toward a higher level of EI than analytic style.

H5: Group-level emotional intelligence is positively linked to group-level organisational citizenship behaviour.

H6: Leaders’ cognitive style is negatively related to followers’ OCB.

H7a: Leaders’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBI.

H7b: Leaders’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBO.

H7c: Followers’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBI.

H7d: Followers’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBO.

H8a: Leaders’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBI.

H8b: Leaders’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBO.

H8c: Followers’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBI.

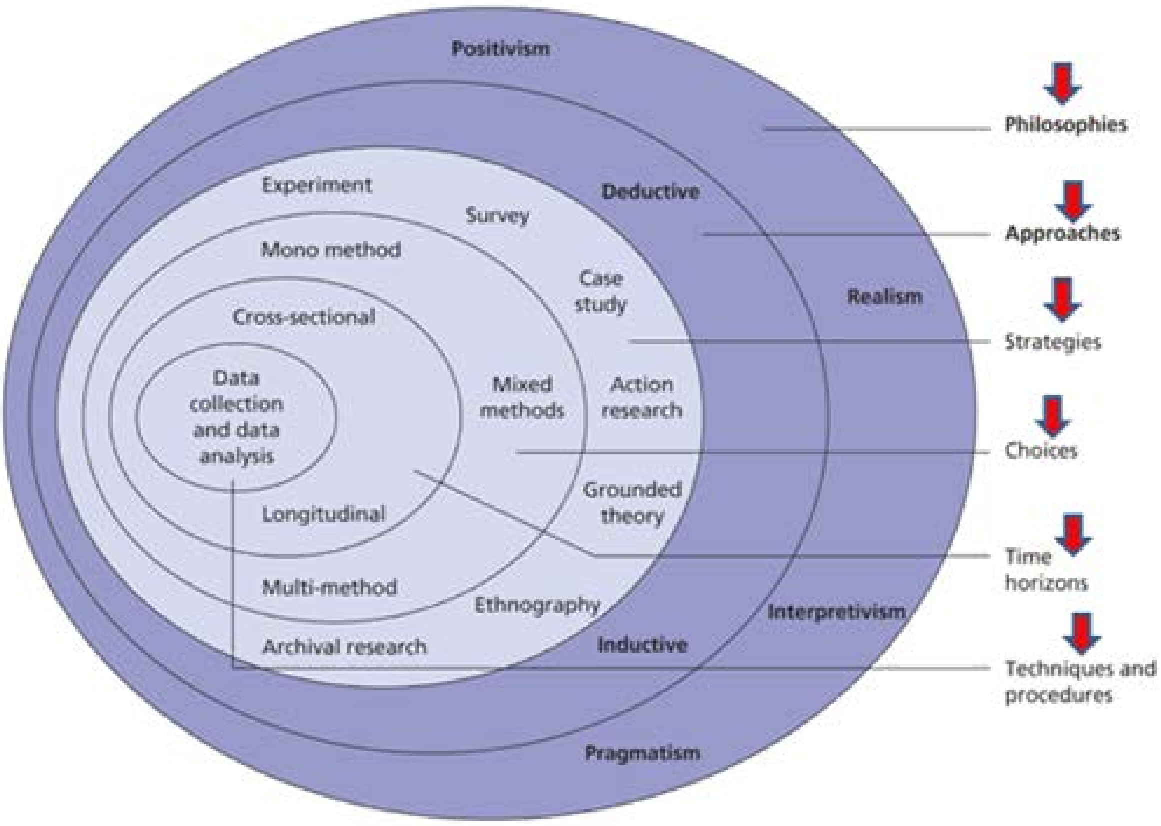
H8d: Leaders’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBO.

H9: Groups with higher cognitive style diversity will exhibit greater LMX differentiation than groups with lower cognitive style diversity.

3. Methodology

In the literature review, the developed hypotheses provided directions for answering the research questions. This chapter outlines the process for selecting the most appropriate research methods are in order for the research design to fill the gaps revealed in the literature review. In accordance with the '*research onion*' (Figure 3.1), the research processes were conducted from the surface to the centre. The research philosophy is first explored in order to guide the research approach and research strategies. The sample and group composition are then described in detail. Linked to the literature review, the appropriate instruments were designed to support the validity and reliability of the constructs and avoid common method biase. Finally, several types of analysis and ethical issues are discussed in this chapter.

Figure 3.1: Research onion



Source: Saunders et al. (2009; p108)

3.1 Research philosophy

The development of organisational theory is closely related to the selected research philosophies. Saunders et al. (2009) indicate that research philosophy, as an all-encompassing term, connects with the nature and development of knowledge. According to the different philosophical assumptions, scholars may develop different ideas about the nature of reality that may connect to the phenomenon under study (ontology). Consequently, scholars are guided by different philosophical assumptions to think about what they know from reality (epistemology) and to use the most appropriate method to derive knowledge from phenomena (methodology). Therefore, it is important for researchers to understand different philosophical assumptions (Burrell and Morgan, 1979).

Saunders et al. (2009) indicate that the most important element of research philosophy is to ensure that a paradigm is suitable for theresearch perspective. In particular, pragmatism holds that research questions play an important role in determining ontology, epistemology and axiology. The purpose of the current research is to answer research questions based on a fundamental knowledge of LMX, OCB, EI and cognitive styles.

3.1.1 Epistemology

Burrell and Morgan (1979) state that epistemology concerns the accepted knowledge in a field of study from three paradigms: positivism, interpretivism and realism. Positivism emphasises that the social world exists externally and objectively and is closely associated with quantitative research (Easterby-Smith, 2008). In comparison, interpretivism holds that one's experience and memories play an important role in making sense of the social world and is closely associated with qualitative research. Finally, in the realist paradigm, scientists argue that "*what the senses show us as the reality is the truth: that objects have an existence independent of the human mind*" (Saunders et al., 2009; p.114). They also insist that realism and positivism are similar in that both philosophies focus on the development of knowledge.

This PhD thesis mainly focuses on different organisational settings. The subjective nature of interpretivism is not appropriate to apply in this study because even if a person's understanding can reflect the '*real*' situation in an organisational setting, this may not be replicated to others. Kim (2003) further asserts that results are un-replicated to different backgrounds as a result of the unique characteristics of influential elements in each organisation. Another reason for the inappropriateness of the interpretive paradigm in this research is that it stresses dialogue rather than the causes and effects of the relationships between variables. In other words, according to the interpretivist paradigm, individuals' views are only reflected through discussion and conversation. Even if sometimes individuals generate deep and innovative views through discussion, an individual's bias may hamper the process of data analysis.

In relation to the applied theories, organisational citizenship behaviour, leader-member exchange and cognitive styles are consistent with an objective nature. First, the term 'cognitive styles' implies that individuals' detecting behaviours for the social phenomenon under study is objective and is not modified by their own and others' minds (Franco et al., 2013). Moreover, the theory of leader-memberexchange reflects the relationship between leaders and subordinates. This kind of relationship is consistent with the purposes of positivist epistemology, in which correlated elements are stressed. In addition, the purpose of the study was to discover how to motivate employees to perform organisational citizenship behaviours and how to organise members successfully in their work units, which is consistent with the positivist philosophy, in which practical elements of organisation and enhancing individuals' input to gain output are the main focus (Swanson, 1995).

Swanson (1995) indicates that the main aim of the positivist paradigm is to identify whether a change in one variable influences a change in other variables. In the theoretical background of this study, it is possible to assume that an individual's cognitive style and leader-member relationship have predictive power for organisational citizenship behaviours (Armstrong and Priola, 2001; Graen and Uhl-Bien, 1995; Kirton, 2003). Intuitive style is more positively related to OCB than analytic style; a higher quality of LMX is more closely related to OCB than is a lower quality of LMX. Testing these relationships is in line with the main aim of the positivist paradigm. Although the relationship between these variables makes sense against a theoretical background, it also needs further confirmation in an empirical test. Therefore, this study employed appropriate methods to test this relationship.

Applying a correlational design to this research not only measured whether there is a relationship between the independent variables (cognitive style, emotional intelligence and leader-member exchange) and the dependent variable (organisational citizenship behaviours), but also further determined the positive/negative or strong/weak relationships between these variables. Some scholars (e.g., Borg and Gall, 1996; Pirsig, 1997) indicate that, according to positivist assumptions, researchers may analyse these relationships, in combination or individually, by finding degrees and directions of relationships between variables.

Moreover, many of the previous studies reviewed employed an objective and positivist research philosophy to guide analysis of cognitive styles, organisational citizenship behaviours and leader-member exchange (e.g., Armstrong and Priola, 2001; Kirton, 2003; Liden et al., 1997; Podsakoff et al., 1996). Another important feature of the positivist paradigm is that it obtains highly reliable and valid findings and generalisable results.

As a researcher seeks to objectively detect the phenomena of the social world, it is possible to minimise bias in research. As Smith (1993) points out, positivism enables researchers to observe "*real reality*" by removing bias that could have a negative influence on the research process. Smith and Heshusius (1986) further point out that in order to avoid the influence of one's feelings and ideas, certain research procedures and empirical methods need to be designed prior to undertaking a piece of research. In comparison, according to the interpretivist perspective, how individuals obtain knowledge of daily phenomena is strongly influenced by their experiences, feelings and social background. At the level of experience of the social world, it is difficult for them to eradicate their personal views in a study and to consider every perspective of the social world in order to generate their own ideas (Kim, 2002).

3.1.2 Ontology

Ontology focuses on the nature of reality and concerns whether social phenomena can be detected by individuals' perceptions. With reference to ontological points, positivism stresses that '*reality*' is independent of people, which is similar to the theory of direct realism. Subjectivity indicates that individuals' views play an important role in constructing and formulating '*reality*', which is similar to the theory of critical realism. In practical terms this study focused on Chinese organisations which are considered as objective entities (Saunders et al., 2009). In the organisational setting, individuals' duties are prescribed by job descriptions. Individuals carry out procedures according to organisational requirements, and they are part of formal structures that locate them within a hierarchy. This suggests that "*individual members are just so much functionally arranged material, analogous to the functionally arranged cells of a living body, and they need not be aware of their functional role at all*" (McMahon, 1995, p.545).

In summary, a positivist and objective paradigm was used to guide the present research.

3.2 Research approach

Two approaches can be used to design a research project. First, a deductive approach is a highly structured way of testing hypotheses by collecting quantitative data. Second, an inductive approach is used to develop a theory using qualitative data (Saunders et al., 2009). In this research, hypotheses were designed to test the relationship between the independent variables and the dependent variable. Thus, a deductive approach was used in this study.

In this study, the research processes were designed to take a deductive approach involving several aspects (see Table 3.2.1). First, it was necessary to discover the causal relationships between variables. After reviewing the literature on OCB, there appeared to be potential relationships between OCB, LMX, EI and cognitive style. Therefore, a series of hypotheses were developed concerning the relationship between the dependent variable (OCB) and the independent variables (LMX, cognitive styles and EI) (deductive process 1). In order to test the relationship between the variables, quantitative research strategies were chosen to collect credible data (deductive process 2 and deductive process 3). However, in the data collection and analysis processes, other variables such as group size may potentially influence OCB. It was, therefore, necessary to consider some controls in selecting samples (see section 3.5). Finally, according to analyses of the collected data, the original theory was confirmed or modified (deductive process 4 and deductive process 5).

Table 3.2.1: The process of the deductive approach

<table>
<tr><th>Deductive processes</th><th>This research</th></tr>
<tr><td>1 Deducing a hypothesis from the theory</td><td>All of the hypotheses (H1-H9)</td></tr>
<tr><td>2 Expressing the hypothesis in operational terms</td><td rowspan="2">Quantitative data collected by self-completion questionnaires (shown in section 3.8)</td></tr>
<tr><td>3 Testing this operational hypothesis</td></tr>
<tr><td>4 Examining the specific outcomes of the inquiry</td><td>………………………..</td></tr>
<tr><td>5 Modifying the theory or not</td><td>………………………..</td></tr>
</table>

Source: Robson, 2002

3.3 Research strategies

Quantitative research strategies are chosen to collect credible data. As shown in Table 3.3.1, three research strategies can be used to collect quantitative data: scientific experiment, survey and secondary data analysis (either qualitative or quantitative data). The purpose of a scientific experiment is to study causal links and determine whether a dependent variable can be changed by one independent variable (Hakim, 2000).

In business and management research, a survey is a widely-used strategy for collecting and analysing quantitative data and answering questions addressing who, what, where, how much and how many (Collis and Hussey, 2009; Rosendaal, 2009; Sekaran, 2003). Surveys permit the collection of a large amount of data using questionnaires. The data are standardised, which makes them easier to compare. In this research, a strategy survey was applied because it is possible to reach a large sample at low cost and ensure samples are representative. Compared with a survey, experiments are costly and may not be representative because potential participants may be unwilling to participate in them at all. Further, most of the hypotheses in this study cannot be answered by secondary data analysis, which refers to the re-analysis of data that were collected for other purposes, because of the lack of data collected in the fields of OCB, cognitive styles, EI and LMX. For example, there is no previous research focusing on the cognitive styles of Chinese workers in the manufacturing industry. Therefore, compared with the other two methods, the collection of primary data through a survey was considered to be the most appropriate method for this research.

Previous studies have provide other strategies (except strategies listed in Table 3.3.1) to measure OCB, such as behavioural observation and hypothetical scenarios. Behavioural observation means that a researcher actually observes and records the nature of group members' OCB. Robson (1993) stresses that this method has advantage of directness because participants directly record their own or others' actions. However, it is costly in terms of time and money and the influence of the observer on the observed behaviour is unknown. More importantly, although it can obtain information about individuals' perceptions of the overall group's performance of OCB, it is difficult to obtain information about individuals' perceptions of what behaviours other group members think should be performed (Podsakoff et al., 1990).

Another approach is to use hypothetical scenarios which ask individuals to indicate their approval or disapproval of hypothetical situations that indicate different levels of a co-worker’s behaviour (George and Bettenhausen, 1990). The information obtained is then aggregated to group level to indicate the group’s situation. Therefore, the approach not only captures individual norms, but also group norms. However, although this approach allows participants to consider hypothetical situations in order to measure norms at the grouplevel of analysisdirectly, it does not directly ask about either individuals’ own or their co-workers’ behaviours (George and Bettenhausen, 1990). In addition, Ehrhart and Naumann (2004) stress that the measurement chosen needs to be in line with the applied theory. Therefore, consistent with mainstream OCB research, a survey was applied in this study.

Table 3.3.1: Quantitative research vs. qualitative research

Quantitative		Qualitative
Positivist	Research philosophy	Interpretivist
Deductive	Research approach	Inductive
Scientific experiment Survey Secondary-data analysis	Research strategies	Action research Case study Ethnographic research Ground theory research

Source: Saunders et al., 2009

3.4 Time horizons

In order to test interrelationships between variables, there are two main kinds of survey designed for different types of study: cross-sectional and longitudinal. Cross-sectional studies focus on a particular phenomenon within a particular timeframe, whereas longitudinal studies tend to measure certain variables at two or more different times. In other words, it aims to analyse changes in the variables over time (Adams and Schvaneveldt, 1991). In comparing the two designs, the longitudinal study has limitations of high cost and small sample size. Weiss and Heide (1993) stress that in a longitudinal study it is difficult to obtain a large sample size. In this study, it was planned to collect a large amount of data (from more than 800 individuals). Hence, it would have been too costly to conduct a longitudinal study.

However, it is assumed by some scholars that cross-sectional research may lack sufficient temporal insight to afford causal pronouncements between variables (Bollen, 1989; Bowen and Wiersema, 1999; Edwards and Bagozzi, 2000) because "*the data on them are collected more or less simultaneously, and the research does not (invariably because he or she cannot) manipulate any of the variables*" (Bryman and Bell, 2007, p.126). Accordingly, in order to consider causality, it is important to manage the time and sequence between constructs (Edwards and Bagozzi, 2000). Time and sequence are important for any study because, in this study, for examply, the influence of leaders' styles and abilities on followers' attitudes and behaviours may be time dependent, and therefore, the application of a cross-sectional research design might not have discovered changes because a practical window may have been too narrow.

However, Rindfleisch et al. (2008) compare the cross-sectional and longitudinal approaches and indicate that a cross-sectional approach is the more appropriate for studies that test concrete and externally oriented constructs, apply different measurement scales and are developed based on theory. In comparison, a longitudinal approach is more appropriate when a study focuses on the temporal nature of a situation, when a follow-up study cannot confound some intervening events and when alternative explanations cannot be managed by a cross-sectional measure. In this study, the average length of work experience of the respondents in their respective organisations was 9.14 years. In other words, the relationship between leaders and followers and leaders' influence is not of a temporal nature in terms of the phenomenon under study. In addition, all of the hypotheses were developed based on strong conceptual and theoretical reasoning from the literature. This means that problems related to causality could be lessened, if not overcome. Furthermore, in this study, it was unknown when the effect of a predictor begin and ended. Thus, it would have been challenging to conduct a longitudinal study because it would have been difficult to determine the data at which a follow-up survey needs to be conducted (Shadish et al., 2002). Finally, it is possible that there can be some intervening events in a follow-up survey, such as target organisations not permitting such a survey to be conducted. Therefore, a cross-sectional approach was deemed an appropriate choice in this study.

According to the normal sequence of the cross-sectional approach, the data were collected through the following steps (more details are given in section 3.8.2).

Table 3.4.1 The process of data collection

Step	Description	Reason
1	Conducting a pre-test when translating English into Chinese and then a pilot study	To avoid misunderstanding the questionnaires.
2	Informing low-level managers to motivate their direct followers to focus on the questionnaires.	To solve the problem of completeness in the questionnaires.
3	Distributing LMX7 to low-level managers and their direct followers separately.	To measure the relationship between leaders and members.
4	Questionnaires were employed to measure cognitive styles, EI and OCB.	

3.5 Population and sampling

The context of this study was Chinese organisations, so all of the samples had to be taken from Chinese organisations. In this study, it was impossible to consider all possible cases or elements in the population because of limitations of time and money, so it was necessary to use a sampling method that would enable data to be collected from a representative section of the population.

3.5.1 Target population

The purpose of this study was to study individuals and groups involved in OCB in Chinese manufacturing organisations.Therefore, the data collection needed to focus on two categories within this population; groups and individuals (both group members and leaders) in Chinese organisations. The followsing sections review the background to the Chinese manufacturing industry, the influence of group-based working on this industry, and informal *vs.* formal work groups and group size.

3.5.1.1 Background of the Chinese manufacturing industry

The Chinese manufacturing industry has enjoyed very rapid development and its general scale has ranked it at the top in the world. Currently, the manufacturing industry is the pillar of the national economy of China, have improved the comprehensive national power of China over the past 20 years. The comprehensive development and optimised upgrading of the Chinese manufacturing industry has turned China into the "*big country of manufacturing*" (GMID, 2012). From 2005 to 2010, China's total manufacturing production expanded by 107.9%, amounting to US$10.2 trillion, which is more than double that of the US secondplace. The country's large manufacturing base plays an important role in attracting foreign businesses and boosting the domestic labour market (GMID, 2012).

In recent years, the Chinese manufacturing industry has been in the process of economic transformation. The industry faces a growing number of challenges and opportunities (GMID, 2012). It is important for Chinese manufacturing to consider how to cope with these challenges and opportunities. Organisational citizenship behaviour plays an important role in managing challenges and uncertainties in the process of economic transformation (Chen et al., 2005). Therefore, it is valuable to study OCB against the background of Chinese manufacturing.

In this study, data is collected from seven different manufacturing organisations with different characteristics : two gear manufacturing companies, an electrical equipment company, an instrument panel manufacturing company, a combustion motor manufacturing company, a piston manufacturing company and a control panel manufacturing company.

3.5.1.2 The influence of group-based working on the manufacturing industry

The work team or work group is considered by most human resource practice as playing an important role in the manufacturing background (e.g., Ichniowski and Shaw, 1995). The development of the work group is a result of identifying and solving work-related issues in order to contribute to enhanced performance. In considering high-quality, fast product innovation and improved customer satisfaction, a growing number of organisations have established groups to design goals in a setting characterised by functional and process interdependencies (Boyett and Conn, 1991). The work team or group is also considered to be "*an integral tool aiding continuous improvement in work operations*" (Cutcher-Gershenfeld and Associates, 1994, p.42).

Assessing group effectiveness is considered to be the most common way to measure the influence of groups. Some scholars stress that setting up working groups is an important way to improve quality. For instance, Deming (1986) states that work groups encourage workers' input and cooperation to enhance quality. However, Keefe (1987) surveyed plants belonging to a major US automobile manufacturer in 1979 and 1986 and found that work groups negatively influenced plant productivity. Katz et al.(1987, p. 709) note, howerer, that "*the negative impact of work teams on plant productivity in the company . . . resulted from problems associated with introducing the system . . . teams may yet help to improve productivity*" In addition, MacDuffie (1995) found that work groups played an important role in manufacturing innovative performance.

However, most previous studies have been conducted in Western manufacturing firms rather than Chinese companies. Some scholars insist that the role of working groups in organisational effectiveness is more obvious in Chinese organisations than in those in the West. For instance, Chen et al. (2005) indicate that Chinese participants were found to be more likely to develop interpersonal relationships when working in groups in China than workers in North America because Chinese culture is relationship- oriented.

3.5.1.3 Work groups in manufacturing organisations

There are five main types of work group found in the manufacturing environment (Hackman, 1987; Ledford, Lawler, and Mohrman, 1998) (see Figure 3.5.1.3.1)

First, traditional work groups are considered to comprise individuals who perform core production activities in organisations but do not have any power in terms of control or responsibility. Second, quality circles refer to group members who contribute to making suggestions but do not participate in decision making. Third, high-performance groups are defined as containing members who have specific roles and complementary skills and are committed to a common goal. They have a high degree of collaboration and innovation. Fourth, semi-autonomous work groups are defined as those with members who can self-regulate work on their interdependent production and support activities. Last, autonomous work groups are regarded as groups of individuals who can self-regulate work on interdependent tasks. The difference between semi-autonomous and autonomous work groups is that the scope of autonomous groups is narrower than that of semi-autonomous groups in the area of production tasks managed and executed.

According to West (1999), all departments in organisations can be regarded as formal work groups. Thus, all individuals in the same department are considered to be group members.

Figure 3.5.1.3.1 Types of work groups in the manufacturing environments

Traditional work groups	Quality circles	High-performance work Groups	Semi-autonomous-work groups	Autonomous work groups

Low group autonomy ——————————————▶ High Group Autonomy

Source: Banker et al. (1996)

3.5.1.4 Group size

In past decades, scholars have offered many suggestions for the appropriate size of different types of groups. Katzenbach and Smith (1993) indicate that a dozen or so members need to be contained in a work group, but Scharf (1989) asserts that seven is an appropriate group size. Various other suggestions can be discovered in the literature. However, it is difficult to assess which is the best as most of the studies have been developed according to personal experience rather than empirical testing. Nevertheless, it is also difficult to assess the best group size in empirical studies. Nieva, Fleishman and Reick (1985) found that the effectiveness of group performance is reduced in groups with too few or too many members. Other scholars (Hamburger et al., 1975; Komorita and Lapworth, 1982) studied groups in which the size ranged from three to seven, suggesting that, with an increase in group size, the level ofcooperation declines. Olson (1965, p.65) argues that "*the larger a group is, the farther it will fall short of providing an optimal supply of any collective good…..in short, the larger the group, the less it will further common interests*". However, some other studies indicate that there is no relationship between group performance and group size (Hackman and Vidmar, 1970; Martz, Vogel, and Nunamaker, 1992; Messick and McClelland, 1983) or that there is a positive relationship between group performance and group size (Campion, Medsker, and Higgs, 1993).

The different results and suggestions above are possibly influenced by the consideration that the best group size is consistent with the task and the environment in which the group performs. For instance, a larger group may possibly obtain more resources, such as money, time and energy, which may enhance group performance in difficult missions (Hill, 1982), but they may have a problem with a lack of motivation (Sheppard, 1993). Therefore, the appropriate group size is determined according to different research backgrounds. In accordance with West's (1996) suggestion about the appropriate size to facilitate work groups in organisations, the target work groups in the current study have fewer than 20 members; specifically, the average group size is eight. Liebrand (1984) indicates that there is no difference in levels of cooperation between groups of seven or 20 in a common dilemma-type task.

3.5.2 Sampling

In this research, it was impractical to collect data from the entire population because of the limitation on time and money. Thus, the sampling method was designed in order to test the theoretical framework (Bernard, 2002). Saunders et al. (2009) define two types sampling techniques: probability and non-probability sampling. Probability sampling refers to selecting individuals from a sampling frame listing all the cases of the population. Everyone has an equal chance of being selected (Bernard, 2000). In non-probability sampling, the probability of someone being selected is unknown because of the limited knowledge of a large population (Saunders et al., 2009).

As mentioned above, some strict criteria were established to select the sample (such as group size). It was unknown how many work groups would meet these standards.so. Therefore, non-probability sampling was used in this study.

There are five techniques used in non-probability sampling: quota, purposive, snowball, self-selection and convenience sampling. All these techniques, except quota sampling, consider sample size as ambiguous. Purposive sampling was adopted. In this study. Tongco (2007) defines purposive sampling as selecting informants according to the qualities of the informant processes. Compared with other non-probability sampling strategies, this study used strict rules to select samples (for self-selection sampling, informants join in the research depending only on their desire to do so) and some individual cases (e.g., how many followers are supervised by one leader) could be found with managers' help (for snowball sampling, researchers need to contact previous cases in order to find new ones) (see Table 3.5.2.1).

There are several steps to guide data selection (Tongco, 2007). First, purposive sampling is influenced by the research questions and the type(s) of information needed. In order to answer research questions about relations between groups in terms of cognitive style diversity and group-level OCB, purposive sampling was applied to determine whether a group was heterogeneous or homogeneous. Patton (2002) stresses that purposive sampling helps researchers to identify diverse characteristics (such as different abilities to process emotions and different ways to process information) in groups. Second, there were strict rules to in selecting group size, so only a limited number of groups in an organisation could be selected.

Table 3.5.2.1: Impact of various factors of non-probability sampling techniques

Sample type	Likelihood of sample being representative	Types of research in which useful	Relative costs	Control over sample contents
Quota	Reasonable to high; although dependent on selection of quota variables	Where costs constrained or data needed very quickly so an alternative to probability sampling needed	Moderately high to reasonable	Relatively high
Purposive	Low, although dependent on researcher's choices: extreme case Heterogeneous Homogeneous Critical case Typical case	Where working with very small samples Focus: unusual or special Focus: key themes Focus: in-depth Focus: importance of case Focus: illustrative	Reasonable	Reasonable
Snowball	Low, but cases will have characteristics desired	Where difficulties in identifying cases	Reasonable	Quite low
Self-selection	Low, but cases self-selected	Where exploratory research needed	Low	Low
Convenience	Very low	Where very little variation in population	Low	Low

Sources: Kervin, 1999; Patton, 2002

3.6 Level of analysis

Podsakoff et al. (2000) propose that OCB relates to four main aspects of antecedents: task, individual, organisational and leadership features. All of these features involve individual-level and group-level OCB. For example, OCB is due to individual characteristics, nested in specific dyadic combinations, and further relates to groups. Choi (2010) indicates that different variables influence OCB at different levels. It is difficult to capture the OCB phenomenon if the view is taken from a single vantage point (e.g., Choi, in press; Somech and Drach-Zahavy, 2004;). Thus, it was necessary to consider different variables at different levels.

First, at the individual level, types of cognitive style and levels of EI may influence attitudes and behaviours towards other group members and organisational commitment. Some members may be more likely to help other group members and commit to the organisation than others. However, an individual is not independent within an organisation. He or she may interact with others to perform his or her daily work. How the interaction takes place will influence his or her feelings and OCB. In a group, if a member can keep a good relationship with others, he or she may help others and commit to the organisation. Moreover, when individual factors are aggregated to the group level, it may the shape shared perceptions of the group. The shared perceptions at the group level will influence group-level behaviours. In addition, in some groups, group members are directly supervised under at least one leader; thus leaders have more power than group members. If leaders give psychological benefits to followers, followers may reciprocate leaders' support. In the leader-member relationship, the relationship between a leader and a follower will influence the follower's feelings and extra-role behaviours (e.g. OCB).

In view of the level of measurement, individual-level constructs needed to be assessed at the individual level. For example, one person's emotional intelligence is defined as his or her self-reflection based on the 16-item emotional intelligence instrument. In addition, for the leader-member relationship, both an employee and an employer need to make an assessment of each other. At the group level, there are two different ways to measure group-level data: one treats group-level situations as an aggregation of individual perceptions: the other measures group-level situations according to group members' perceptions. As mentioned in the literature, peer rating is appropriate to reflect group-level OCB, while self-rating is appropriate to reflect group-level EI and group-level cognitive style.

Another issue related to the level of analysis is aggregation and disaggregation. Aggregation means the combination of data from one level to represent characteristics of a higher-level group, while disaggregation involves the separation of data from one level by assigning its component parts to a lower level (Cronbach, 1976). Therefore, both aggregation and disaggregation influence the variance and covariance of data, thus affecting correlations and regression coefficients. Some scholars insist that disaggregation is more suitable than aggregation for multilevel analysis (e.g.,; Barrick and Stewart, 1988; Bliese, 2000). Rousseau (1985) stresses that ambiguity is inherent in aggregated data. Within-group variance from the analysis is not considered in the aggregation of individual-level perceptions (James, 1982). For example, aggregation may increase reliability by average random individual-level errors and biases when there is within-group homogeneity. However, when these errors are not random, aggregation may reduce reliability. According to Bliese(2000), "*Neither raw nor aggregate-level results are biased in and of themselves; they become biased only when results at one level are used to make inferences at another*". In addition, Mount, Barrick and Stewart (1998, p. 380) contend that "*aggregation can mask important information when individual characteristics do not combine additively to form a collective resource pool*".

In comparison, disaggregation considers differences between groups (Drexler, 1977) and establishes homogeneity of within-group variance or consistency (James, 1982; James et al., 1984; Kozlowski and Hattrup, 1992; Kozlowski and Hults, 1987).

However, Mossholder, and Bedeian (1983, p. 548) indicate that "*The use of aggregate measures is in itself neither good nor bad. How and why they are used are of concern. Not all phenomena can be easily separated into different levels of meaning. Consequently, it is important that a sound rationale exist for interpreting individual measures as functional surrogates of macro constructs.*" Aggregation of individual rating data to the group level is only suitable in a situation where there is a solid theoretical foundation for doing so. Roberts et al. (1978) indicate that if there is no theoretical foundation, the variance would be changed and any correlation between variables, especially for the correlations at a different level, would be inflated when aggregating from individual-level to group-level data.

In view of group-level OCB, peers' perceptions of other group members' OCB needs to be aggregated by averaging the score for OCB, because the potential benefits of OCB for organisational performance are obtained from the aggregate effect of OCB. Organ (1988, p.8) stresses that *"Our requirement of OCB is that it represent actions of individuals that in the aggregate improve the functioning of the organisation [or work group]. In the aggregate is a significant qualifier here. We refer to summing across time for a single person and also summing across persons in the group, department, and organisation."* Therefore, there is a firm theoretical foundation to support aggregation of OCB. In this study, both aggregation and disaggregation were used to represent group-level OCB. Specifically, aggregation was used to measure the relationship between cognitive style diversity and group-level OCB, while disaggregation was used to measure the relationship between group-level EI/cognitive style and group-level OCB. Further details are given in the following chapters.

Individual-level OCB (followers' OCB): defined as an individual's score on the five-factor model of OCB.

Group-level OCB: defined as the aggregate score of peers' evaluation according to the five-factor model of OCB.

Group-level OCB: defined as the score of peers' evaluation nested to group level according to the five-factor model of OCB.

Individual-level cognitive style: defined as an individual's score for CSI.

Group-level cognitive style: defined as the score for self-rating nested to the group level according to CSI.

Individual-level emotional intelligence: defined as an individual's score for the 16 items of emotional intelligence.

Group-level emotional intelligence: defined as the score of self-rating nested to the grouplevel according to the 16 items of emotional intelligence.

3.7 Group composition

In organisational life, individuals are often organised in groups, and therefore different compositions of cognitive styles and levels of EI influence OCB differently. As explained below, group composition is discussed in connection with the degree of diversity and the tendency of the group.

Over the past few decades, many different methods have been used to measure group tendency. Among these, calculating the mean score of individuals has been the most common way to measure group tendency (e.g., Heslin, 1964; Williams and Sternberg, 1988). This approach holds that collective characteristics can be seen as a sum of individual characteristics. For instance, Kirton and McCarthy (1988) argue that a cognitive climate consists of the mean score of clustered group members for cognitive style. With this in mind, if the mean score of group members' EI is high, the group in which those group members are organised is defined as a high EI group, while if the mean score of group members' EI is low, the group in which those group members are organised is defined as a low EI group. In view of cognitive style, if the mean score of group members' CSI is higher than the median score, the group in which those group members are organised is defined as an analytic group, while if the mean score of group members' CSI is lower than the median score, the group in which those group members are organised is defined as an intuitive group

Recently, Harrison and Klein (2007) defined the diversity in a group as having three different types (see Table 3.7.1). First, separation can be considered as group members' differences in continuous attributes (such as attitudes, values and the perceptions of leaders). Second, variety can be seen as group members' differences in categorical attributes, such as being group members from different disciplinary backgrounds (e.g., one is an engineer; others are linguists and psychologists). Third, disparity can be considered as occurring when group members differ in their information processing or perceived proportion of resources. For example, one of the group members is a highly accomplished professor who has advanced knowledge and the others have a lower level of knowledge and work skills.

Table 3.7.1 Meaning and properties of within-unit diversity type

Diversity Type	Meaning and synonyms	Attribute shape at Maximum Diversity	Attribute Examples	Predicted Outcomes	Foundational Theories
Separation (on attribute S)	Composition of differences in (lateral) position or opinion among unit members, primarily of value, belief, or attitude; disagreement or opposition	Bimodal distribution, with half of unit members at highest and lowest endpoints of S continuum	Opinions, beliefs, values, and attitudes, especially regarding team goals and processes	Reduced Cohesiveness, more interpersonal conflict, distrust, decreased task performance	Similarity attraction; social categorization; and attrition (ASA)
Variety (on Attribute V)	Composition of differences in kind, source, or category of relevant knowledge or experience among unit members; unique or distinctive information	Uniform distribution, with even spread of members across all possible categories of V (no continuum)	Content expertise, Functional background, nonredundant network ties, industry experience	Greater creativity, innovation, higher decision quality, more task conflict, increased unit flexibility	Information Processing; law of requisite variety; variation, selection, and retention (VSR)
Disparity (on attribute D)	Composition of (vertical) differences in proportion of socially valued assets or resources held among unit members; inequality or relative concentration	Positively skewed distribution, with one member at highest endpoint of D continuum and others at lowest	Pay, income prestige, status, decision-making authority, social power	More within-unit competition, resentful deviance, reduced member input, withdrawal	Distributive (in) justice and (in)equity; status hierarchy; social stratification

Source: Harrison and Klein, 2007, p.1203

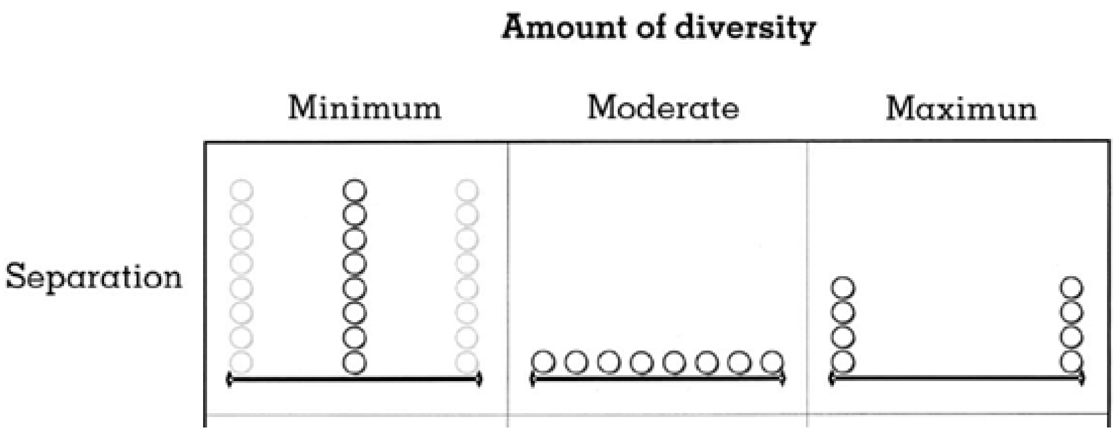
In this research, cognitive style can be seen as a continuous variable as cognitive style is defined as an attribute of stability in processing information (Armstrong et al., 2001) and, therefore, group members' differences in cognitive styles can be seen as separation at the group level. According to Figure 3.7.1, different degrees of diversity among group members can be categorised as minimum, moderate and maximum.

In connecting diversity typology to research design, Harrison and Klein (2007) indicate that methodological errors can be caused by blurring the distinctions between different types of measurement, and so they use different ways to measure diversity. In the field of separation, standard deviation (SD) is appropriate because within-unit SD considers this distance within interval scales. According to the instruments of SD, the degree of diversity in groups can be measured by the following formula: (u-1)/ 2. For example, a seven-point Likert scale ranges from 1 to 7; therefore, the maximum diversity is (7-1)/2= 3 and the minimum scale is 0. Hence, in this research, SD was used to measure the degree of diversity in a group.

Group cognitive style diversity: defined as the SD of group members' CSI scores.

According to the rules of SD, individual-level SD is the same as group-level SD. Therefore, it is unnecessary to consider within-group variance. As a result, the use of aggregation is appropriate for measuring the relationship between group-level OCB and cognitive style diversity.

Figure 3.7.1 Three meanings of within-unit diversity related to the type of separation



Source: Harrison and Klein, 2007

3.8 Development of the questionnaires

This research employed self-report measures to gather information on cognitive styles and EI, and other report measures to gather data on OCB and LMX. In the process of questionnaire development, it was important to consider the wording and translation and the reliability and validity of each instrument.

3.8.1 Questionnaires

A questionnaire is a set of questions which can be answered by research participants. Most questionnaires are designed to collect structured data and so offer choices from which the participants can select an answer (Matthew and Ross, 2010). In this study, one reason for selecting questionnaires was the low cost and the saving of time. Gillham (2008) indicates that if it is efficiently organised, responses to even a large-scale questionnaire can be gathered within a matter of weeks. Moreover, it is straightforward to analyse answers that relate to closed questions, as researchers can have their analysis sheet ready in advance so that they can classify answers before the questionnaires are returned.

Reducing the influences of social desirability can be considered another reason to select a questionnaire as a research instrument. As asserted by Oppenheim (1992), social desirability implies the tendency for participants to choose a 'good answer' which may represent them in a better light. When questionnaires are applied in data collection, participants may feel relatively free when using an anonymous style of response, and it is thus possible to avoid researcher bias (Gillham, 2008).

However, questionnaires undoubtedly have issues of data quality in terms of accuracy and completeness. Gillham (2008) indicates that (a) informants may hesitate to complete or return a questionnaire; (b) questionnaires lack strong motivation for most of the informants; and (c) informants may also misunderstand a questionnaire when translating English into Chinese.

In order to minimise drawbacks to the questionnaires, certain measures were taken in this research. In line with criteria (a) and (b) above, personal support was important in the process of data collection. Before distributing the questionnaires, middle- or low-level managers informed their direct followers that they should focus on the questionnaires, but no manager monitored them in the process of questionnaire completion because of potential pressure being put on respondents. With respect to criterion (c), a pre-test and pilot study (as tests of the data collection instrument) was conducted in this research. Although misunderstandings cannot be entirely removed, a pre-test and pilot study can be considered as effective ways to identify any ambiguous questions.

3.8.2 Administration of the questionnaires

As pointed out by Churchill (2001), the administration of questionnaires plays an important role in the research undertaken, and is mostly motivated by "*the decision of researcher regarding type of information required the structure to be imposed on its collection and the method for administering the questionnaire*" (p. 319).

The nature of this research requires information from the group level. For instance, group-level organisational citizenship behaviour requires an evaluation of all the group members in a work group. A work group is defined as consisting of three or more members who cooperate together and interact with each other regularly (Robinson and O'Leary-Kelly, 1998). Furthermore, in relation to group size, a work group consists of fewer than 20 members (Beebe and Masterson, 2006; West, 1996). In this study, a group limit (having fewer than 20 members) was applied to select work groups.

In the process of selecting work groups, the researcher visited the sites to select all the departments in which groups have fewer than 20 members. Individuals who work in the same department were regarded as group members.

Considering research on leader-member relationships, the next step involved distributing questionnaires separately to leaders and followers. The first version of the questionnaire for the leaders was marked "*L*", while the second version was distributed to four followers, who were assigned randomly from a pool of the leader's subordinates, and marked "*S*". Accordingly, four followers were assigned to four sub-versions, which were marked "*SG1*", "*SG2*", "*SP1*" and "*SP2*".

All versions of the questionnaire were divided into different sections in order to ensure that every question was designed to be "*specific and addresses only one important question*" (Churchill, 2001, p. 341). The first version of the questionnaire consisted of four parts. The first part related to the background of the participants, such as basic information regarding age, gender, qualifications and experience. The second, third and fourth parts of the questionnaire focused on measuring followers' organisational citizenship behaviour (only for the leaders' questionnaires), group-level organisational citizenship behaviour and leaders' perception of followers' LMX, and followers' perception of leaders' LMX (Appendix B). In the second version, participants were asked to provide information about their cognitive style, EI, group-level organisational citizenship behaviour and some basic background information (Appendix B).

Most versions of the questionnaire used in this research were quite lengthy. The first version of the questionnaire included 114 questions and the second 90. Although it is assumed that an increase in the length of a questionnaire will lead to a greater number of non-responses, some scholars (Dillman, 1978; Champion and Sear, 1969) stress that there is no evidence that a lower response rate is caused by a longer questionnaire. Conversely, longer questionnaires could lead to a higher response rate than shorter ones. For example, Champion and Sear (1969, p. 339) observe that "*nine-page questionnaires were returned significantly more often than a shorter three-page questionnaire*".

Moreover, all participants needed to make choices on five-point and seven-point Likert scales. Green and Rao (1970) state that six- and seven-point Likert scales are considered the most appropriate for measuring variables. In addition, Brady et al. (2005) state that it is appropriate to use more scale points because it permits participants to give more precise responses.

However, as pointed out by other authors, there are unlikely to be any problems when measuring variables using different Likert scales. For instance, Colman et al. (1997) indicate that similar findings have been shown when rating scales are different in length. Cox (1980, p. 420) also insists that "*it is ironic that the magic number seven plus or minus two appears to be a reasonable range for the optimal number of response alternatives*". Therefore, it is argued to be appropriate to have used different lengths of scale to measure the variables in this study.

3.8.3 The wording and layout of the instruments

In order to elicit responses from participants, the layout of a questionnaire should be designed so that it "*looks professional and relatively easy to answer*" (Churchill 2001, p. 342). The unprofessional-looking design of a questionnaire may lead to a low response rate because participants may think the study is unimportant (Churchill, 2001). Therefore, the following measures were taken to ensure accurate responses.

First, according to Balnaves and Caputi (2001), a topic heading should be given in order to make participants aware of the purpose of each section. In this study, different questions were located in the different rows and columns of the questionnaires and highlighted in a dark colour in order to differentiate questions from each other.

Moreover, a covering letter plays an important role in introducing a piece of research to the participants (Czaja and Blair, 1996). In the covering letter used in this study, basic information about the researcher and the aims and benefits of this research were first expressed to the participants. The researcher also stressed the importance of confidentiality and following the time plan of the participants.

In addition, clear direction and guidelines are essential for questionnaires (Sproull, 1988). Thus, the meanings of "*leader-member exchange*", "*cognitive style*", "*emotional intelligence*" and "*organisational citizenship behaviour*" were given at the beginning of the relevant section. Therefore, all the participants shared the same information on each variable before making their responses.

As mentioned in the literature review, all of the instruments were adopted according to previous studies. Therefore, the original version of the questionnaires could avoid wording issues, such as ambiguous questions and implication assumptions. However, when the questionnaires were distributed to the Chinese participants, it was necessary to translate English into Chinese. Therefore, it was important to conduct pilot tests. Further details of this procedure are given in the follow sections.

3.8.4 Demographic instrument for Chinese participants

The research participants in this study were asked to provide information concerning the following items: age, gender, current department name, employment, highest level of education, work experience (how many years) and the number of subordinates under direct supervision. These items are shown in Appendix B under "personal profile" and the following variables are described in detail.

(1) Gender: this question indicates a categorical variable of male or female.
(2) Age: asks participants to state their current age.
(3) Current department name: this relates to the participant's department within the organisation.
(4) Status of employment: this indicates a categorical variable of full-time or part-time employment.

(5) Highest level of education: this asks the participants to select the appropriate box showing their highest level of educational achievement: PhD, Master, Bachelor, college or other.

(6) Working experience: participants are asked to state how long they have been working in their unit, their organisation and the manufacturing sector. This is in order to determine the managers' experience of "*supervising*" members and the experience of subordinates working under the "*supervision*" of leaders.

(7) The number of subordinates under direct supervision: participants need to state how many followers are under their supervision.

3.8.5 OCB

The scales applied to measure individual-level (or followers') organisational citizenship behaviours were developed according to the earlier work of Smith et al. (1983) and Podsakoff et al. (1990) (as shown in Appendix B). The original model assesses five dimensions consisting of 24 items: five items for altruism, five for courtesy, five for conscientiousness, five for sportsmanship and four for civic virtue. Furthermore, Coleman and Borman (2000) stress that these five dimensions can be further divided into two sub-scales that represent individual-target citizenship behaviour (OCBI) and organisational-target citizenship behaviour (OCBO). Specifically, altruism and courtesy in the five-factor model are similar to OCBI, while sportsmanship, civic virtue and conscientiousness in the five-factor model are similar to OCBO. Respondents were requested to answer the 24 items on a seven-point Likert scale, ranging from 1 = "*strongly disagree*" to 7 = "*strongly agree*".

The measurements of group-level OCB used in this study were developed from Ehrhart (2004), which were in turn developed from the five-factor model. The researcher asked group members (including leaders) to rate all the other members of the group for OCB. A sample of a group-level OCB item is "*Group members attend functions that are not required, but help the company image*". Group members' responses were collected to reflect their perception of the group-level phenomenon.

3.8.6 CSI

Cognitive styles were assessed using the 38-item Cognitive Style Index (CSI) (Allinson and Hayes, 1996). The scale was administered to all leaders and followers and they were asked to rate themselves on a true-uncertain-false response mode. The 38 items in the self-completion questionnaire of the CSI (shown in Appendix B) range from a minimum score of 0 to a maximum score of 76. In particular, high (analytic) and low (intuitive) scores are decided by the median of the CSI scores: the higher the CSI score, the higher the level of analytic style, and the lower the CSI score, the higher the level of intuitive style. In addition, responses for individual-level cognitive styles were used to reflect the group-level construct.

3.8.7 LMX 7

The LMX7 (as shown in Appendix B) was chosen to measure LMX using seven items (Hooper and Martin, 2008; Huang et al., 2008). Respondents were required to answer seven items on a five-point Likert scale, ranging from 1 = "*rarely*" to 7 = "*very often*". One sample item is, "*How well does your leader understand your job problems and needs?*"

3.8.8 WLEIS

The Wong and Law Emotional Intelligence Scale (WLEIS) (as shown in Appendix B) was developed by Wong and Law (2002) and based on Salovey and Mayer's (1990) EI ability model. The response format was related to a seven-point Likert scale. The original model assesses four dimensions consisting of 16 items: four items for self-emotion appraisal (SEA), four for others' emotion appraisal (OEA), four for use of emotion (UOE) and four for regulation of emotion (ROE). One sample item is, "*I always set goals for myself and then try my best to achieve them*".

3.8.9 Pre-testing and piloting the questionnaire

Before administering the intended survey, it was important to conduct a pre-test and pilot study (Bryman and Bell, 2007) because these not only ensure that each survey question operates well, but also that the research instrument as a whole functions effectively. Specifically, Converse and Presser (1986) state that a pre-test needs to consider the timing, the meaning of the instruments, and the connections between each section and question.

The pre-test was carried out at the University of Hull because of time and cost constraints. Some PhD and Master's students in the Business School were selected to complete the questionnaires. All of the participants were encouraged to raise questions or make comments about the instruments, particularly regarding any ambiguities or awkwardness related to how the questions were phrased and worded, the clarity of the covering letter, and the layout or any lack of ease about the questions.

In addition, the researcher observed the time taken by the respondents to complete the questionnaire and conducted a short interview with the respondents to obtain further feedback after they had finished. Based on their feedback and comments, the new version was presented to two professors who are relative experts in the field of study to obtain further professional comments. After reviewing all the comments, some changes were made to the questionnaires (Table 3.8.9.1).

Table 3.8.9.1: Comments and actions taken as a result of questionnaire pre-testing

Comments	**Actions**
Overall	
It takes about 18-30 minutes to complete a questionnaire.	None
Section A	
"Status of employment" should be added to question 4 in order to clarify the purpose of this question for the participants.	Changed
One more option – "others (please specify)" - should be added to question 5 (highest level of education), as there may be different education levels in China.	Changed
Section (emotional intelligence)	
Table headings should be repeated on every page of the scale.	Changed
The meaning of "emotional intelligence" should be described in a short sentence, as participants' attention may be lost if the sentence is too long.	Changed
Section (organisational citizenship behaviour)	
Table headings should be repeated on every page of the scale.	Changed
The meaning of "organisational citizenship behaviour" should be described in a short sentence, as participants' attention may be lost if the sentence is too long.	Changed
The meaning of "mountains out of molehills" and "squeaky wheel" should be explained because Chinese people may not understand English proverbs.	Changed
Section (leader-member exchange)	
The meaning of "leader-member exchange" should be described in a short sentence, as participants' attention may be lost in a longer sentence.	Changed
Notes to SG and SP need to be more detailed.	Changed
Comments	
Space should be given for participants to write comments.	Changed

3.8.10 Reliability

Reliability refers to the extent to which consistent results are obtained using data collection and analysis measures (Easterby-Smith et al, 2002; Sekaran, 2003). Normally, reliability can be defined from four aspects: internal consistency (assesses the degree to which different raters/observers give consistent estimates of the same phenomenon), test-retest (assesses the consistency of a measure from one time to another); inter-rater or inter-observer (assesses the consistency of results across items within a test); and parallel form (assesses the consistency of the results of two tests constructed in the same way from the same content domain) (Sekaran 2003).

Furthermore, the stability of instruments is normally tested according to internal consistency (Easterby Smith et al., 2002; Ghauri and Gronhaug, 2002). Internal reliability is typically measured by Cronbach's alpha, ranging from 0 to 1 (Nunally, 1978). Moreover, Cronbach's alpha is the average of correlations calculated between the scores on two halves of the instrument when the full set of items is divided in half in all possible ways. As seen in Table 3.8.10.1, when Cronbach's alpha is higher than 0.7, the reliability is acceptable. In the following sections, several instruments in the field of OCB, EI, cognitive styles and LMX are discussed in terms of their reliability.

Table 3.8.10.1: Internal consistency of Cronbach's alpha

Cronbach's alpha	Intemal consistency
a≥0.9	Excellent
0.9＞a≥0.8	Good
0.8＞a≥0.7	Acceptable
0.7＞a≥0.6	Questionable
0.6＞a≥0.5	Poor
0.5＞a	Unacceptable

Source: George and Mallery, 2003

3.8.10.1 OCB

To evaluate individual-level organisational citizenship behaviour, two measurement models were integrated: a two-dimensional model (Williams and Anderson, 1991) and a five-factor model (Podsakoff, MacKenzie, Moorman and Fetter, 1990). Podsakoff et al. (1990) report the internal consistency of OCBs (including OCBI and OCBO) is 0.94

and includes 24 items within five sub-scales. Specifically, 10 of the 24 items were used to assess OCBI (α= 0.88), while 14 out of the 24 items were used to assess OCBO (α= 0.75). In this study, the Cronbach's alpha of OCB was 0.88, which means that it is reliable. Specifically, the internal reliability of OCBI is 0.75 and that of OCBO is 0.95.

3.8.10.2 CSI

Reviewing the temporal stability and internal consistency of the CSI in more than 100 research studies, 53 of the 60 samples (88%) had reliable results, whereby the alpha coefficient was higher than 0.7, while, the reliability of seven samples was lower than 0.7 (Allinson and Hayes, 2000; Bolanos, 2007; Savvas, EI-Kot and Sadler-Smith, 2001; Tanova, 2003). One possible reason for the low reliability of these seven samples is that the participants were from countries in which the first language is not English. They completed either a translated version or an English version of a questionnaire. Therefore, it is possible that they did not fully understand all the questions. Not having a full understanding of English or inadequate translation may have caused these lower alpha scores. Reviewing all cases of CSI analysis, the coefficients range from 0.32 to 0.92 with a median of 0.84. This evidence demonstrates the internal consistency of the CSI to be excellent.

Table 3.8.10.2.1 indicates the results of four test/re-test studies into CSI. According to these findings, it is appropriate to suggest that it is a stable cognitive style construct over time (Hoyland, 2012).

Table 3.8.10.2.1: CSI test re-test results

Sample	Subjects	Interval	Strength	Author
Management Students	30	4 Weeks	0.90 (p<.001)	Allinson and Hayes (1996)
Computing Students	65	8 Weeks	0.82 (p<.001)	Armstrong et al (1997)
Management Students	19	8 Months	0.78 (p<.001	Armstrong (1999)
Management Students	34	13 Months	.056 (p<.001)	Armstrong (1999)

Source: Hoyland, 2012

In China, the first language is Chinese. Therefore there are potential issues that participants may misunderstand the meaning of the questionnaire, leading to lower levels of reliability. However, all the questionnaires in this study were translated using back-translation techniques in order to avoid this problem. In this study, the Cronbach's alpha of the CSI is higher than 0.80, which demonstrates strong reliability.

3.8.10.3 LMX 7

It has been reported that reliability coefficients for LMX range from 0.78 to 0.93 (Golden and Veiga, 2008；Hooper and Martin, 2008；Huang et al 2008; Kacmar et al, 2007). In this study, the internal reliability of LMX was demonstrated as being higher than 0.85.

3.8.10.4 16 items of emotional intelligence (WLEIS)

Wong and Law (2002) give the reliability coefficients for four items of EI (self-emotion appraisal, uses of emotion, regulation of emotion, and others' emotion appraisal) as 0.89, 0.88, 0.76, and 0.85, respectively. In this study, the reliability coefficient is higher than 0.90.

In addition, Wong and Long (2002) use two samples to measure inter-scale correlations. They found that the inter-scale correlations were mild to moderate in one sample (r=0.13-0.42) (n=120) and higher in another sample (r=0.60-0.76) (n=189).

The internal consistency of Cronbach's alpha for these five instruments is higher than 0.7 and can, therefore, be considered as reliable for all of the instruments.

3.8.10.5 Control variable

Control variables refer to those variables which scholars consider in their studies to rule out alternative assessments of their findings (e.g., Schmitt and Klimoski, 1991) or to avoid error terms and enhance statistical power (e.g. Schwab, 1999). There are usually two kinds of control variables in research. One is experimental control in which scholars manipulate the nature of the phenomenon under study; as a result, it is appropriate across participants (Keppel, 1991). The other refers to a statistical design in which scholars test the chosen variables and consider them in the primary analyses (Neter et al., 1996). For instance, in order to manage the employment influences, a scholar may design a dummy code of employment (such as 1= full-time employment;

2= part-time employment) and then consider the dummy-coded variable in the regression analysis.

Becker (2005) asserts that, similarly to independent and dependent variables, decisions about which control variables are involved may influence the significance levels and estimated effect sizes of the other variables. Although control variables should be treated as being as important as dependent and independent variables, misleading outcomes are generated by improperly involving control variables (Becker, 2005). One example comes from job stress research; when negative affectivity is routinely considered as a basic element to be statistically managed, a number of problems may occur (Spector et al., 2000). There is some evidence that negative affectivity is only important for stress-related situations. Controlling for negative affectivity may cause the removal of the influences of the variables (e.g. work conditions) (Spector et al., 2000).

In addition, if there is no theoretical evidence to take control variables into account, it is impossible to replicate the results in one study to different studies. Sackett and Larson (1990) state that the replication and extension of findings in different samples and times play an important role in specifying that empirical results are generalisable. Furthermore, Becker (2005) stresses that even if the control variables are uncorrelated with the dependent variable in the research, if there is good reason to include them, they can be included in the research; while, if there is no good reason to include them, they should not be included in the research because this could lead to problems of methods and measurement. Even if some control variables are considered in the relationship test, the findings of controls are not reported, and later meta-analyses cannot include these findings in the assessment of relationships. For instance, in a study of the relationship between group-level emotional intelligence and group-level organisational citizenship behaviour, a scholar may control group size but not report the findings of the control; later meta-analyses cannot therefore report group size as a control variable in assessing the relationship between group-level emotional intelligence and group-level organisational citizenship behaviour.

Therefore, a theoretical foundation is required to support control variables in research. In the following chapters (involving individual-level data analysis and group-level data analysis), further information on the control variables is given in relation to organisational citizenship behaviour.

3.8.11 Validity

Bernard (2000) defines validity as "*the accuracy and trustworthiness of instruments*" *(2000, p. 46). Normally, validity can be defined from three perspectives: construct validity, content validity and criterion validity (Sekaran, 2003). Content validity refers to* "*a function of how well the dimensions and elements of a concept have been delineated*." Construct validity refers to "*the validity of inferences that observations or measurement tools actually represent or measure the construct being investigated*" (Polit and Beck, 2012). Finally, criterion validity is "*a measure of how well one variable or set of variables predicts an outcome based on information from other variables*" (Donale, 2003, p.37).

In research, validity plays an important role in confirming whether the collected data represent the intention of the research (Collis and Hussey, 2009). Hence, in this research, it was necessary to demonstrate validity and ensure the research findings are meaningful.

In addition, after many years of testing (e.g. Scandura and Graen, 1984; Graen et al, 1982), Graen and Uhl-Bien (1995) hold that the seven-item LMX is the most appropriate measure. Similarly, the construct validity of CSI has been tested in many previous studies (e.g., Allinson and Hayes, 1996; Armstrong and Priola, 2001; Sadler Smith et al, 2000). There are statistically significant relationships between CSI and a number of personality inventories. For example, CSI is correlated with a number of factors of the 16PF (personality factors) Questionnaire. CSI is correlated positively with the extroversion/ introversion ($r = 0.57$; $p < 0.001$) and feeling judgement-thinking ($r = 0.57$; $p < 0.001$) dimensions and negatively with sensing perception-intuitive perception ($r = -0.45$; $p < 0.05$).

Moreover, when CSI is applied in large-scale organisational studies, it is considered to be an easily-administered and easily-scored instrument. Further studies (e.g. Allinson and Hayes, 1996; Miller, 1987; Nickerson, Perkins, and Smith, 1985,) have demonstrated that the Cognitive Style Index can be considered to be a single dimension with intuition at one end of the scale and analysis at the other. Murphy et al. (2001) assert that individuals normally tend to use only one cognitive style and that this may fall along a continuum between the two end points of intuition and analysis.

There has also been criticism of other widely applied instruments of cognitive style. First, Payne (1987) and Taylor (1989) raised problems associated with the use of Kirton's adaption-innovation (KAI) theory (Kirton, 1976) due to its scoring system. Taylor (1989, p.289) asserts "*At the extremes, the total KAI score should be satisfactory, but for many people with middle scores to use the total KAI score is to conflate the three dimensions of KAI. For example, a person of about average total KAI score may be well above average on the "Sufficiency of Originality (O)" subscale, well below average on the "Efficiency" (E) subscale and about average on the "Rule/Group Conformity" (R) subscale. Such a person can be expected to be very different from one who is well below average on "O", well above average on "E", and about average on "R", yet these two people would have similar total KAI scores*".The Learning Style Inventory (Kolb, 1976) has drawbacks in its design because of the impassive format, forced-choice technique, dependent scores, and instrument bias. Moreover, it lacks internal coefficients and instability and the test has been questioned. The Group Embedded Figures Test is criticised by Witkin et al. (1971) for focusing on the measurement of analytic ability rather than cognitive style (Widiger, Knudson and Porter, 1980). In addition, there are questions about the utility of the Myers-Briggs Type Indicator (Myers and Briggs, 1976) in large-scale organisational studies, as a number of items are involved and a considerable amount of time is needed to complete it (Allinson and Hayes, 1996).

Finally, although self-report instruments are susceptible to 'faking', some measures in the self-report WLEIS instrument are used to control for it. For instance, some of the items are designed to evaluate others so it is possible to avoid self-bias (Law et al., 2004). Law et al. (2007) also assert that feedback about one's ability to handle emotions may occur frequently in social interactions and thus one's evaluation of this type of ability may be more accurate than evaluations of other types of ability, such as reasoning and logical deduction.

Wong and Law (2002) explicitly link their scale development to Mayer and Salovey (1997), so four factors of the WLEIS instrument used in this study are similar to those tapped by the MSCEIT (Wong and Law, 2002). Brannick et al. (2009) conducted anexpirical test for the relationship between WLEIS and MSCEIT and indicate that the two constructs are significantly correlated (r= 0.18). Therefore, the WLEIS is considered as the ability model of EI in the same way as the MSCEIT.

Furthermore, Law et al. (2004) examined the construct validity of self-reports and others' ratings of WLEIS by multitrait-multimethod（MTMM） analyses. They found that parents' ratings of EI were a useful predictor of students' self-rating of feelings of powerlessness and life satisfaction, and peers' ratings of an employee's EI were a useful predictor of a leader's rating of same employee's job performance. Thus, WLEIS has demonstrable construct validity for the measurement of EI.

3.8.12 Translation procedures for the questionnaire

The sample of this research was composed of Chinese employees and group leaders. The official language in the country is Chinese. However, the original versions of the OCB, CSI and LMX7 instruments are in English. McGorry (2000) asserts that if scales or instruments are created in one culture, they may not appropriately describe the experience of individuals in another culture. Therefore, in order to make sure the measurement tools providedan an accurate conclusion, it was necessary to translate the questionnaires used in this study into Chinese to enable Chinese workers to understand the meaning of each question fully.

As recommended by McGorry (2000), there are four procedures that can be used to translate an instrument: one-way translation, double translation, translation by committee and decentring. One-way is the simplest method of translation and refers to an instrument that is reviewed in its original language and directly translated into the target language. It does not involve back-translation. Although it is less costly to conduct and consumes less time than other ways, information may be lost by literal translation and the result does not usually compare well with the original. Therefore, this method was not applied in this study.

Translation by committee is conducted by consulting each of two or more individuals who are good at both the languages involved to translate the questionnaire from the original in to the target language; the researcher is then required to reach consensus with two other translators about a final format. Finally, a third independent individual selects a version which effectively obtains the meaning of the version in the original language (Marin and Marin, 1991). However, although this method is more effective than one-way translation and uses fewer resources than other methods, it is possible to miss some information because translators may be reluctant to criticise each other (McGorry, 2000). Therefore, this method was not adopted in this study.

The decentring method does not consider the original-language questionnaire as the final one until it is reviewed in the full translation process, which means that it is required to change words or structure to fit the target cultural group (McGorry, 2000). However, this method may consume a lot of time and resources and increases the length of the instrument. In this study, the participants typically needed to spend half an hour completing the whole questionnaire. With an increased amount of answering time, participants' attention to the questionnaires may have been lost. In addition, this method is more appropriate for developing instruments (Werner and Campbell, 1970) than for translating an existing one. Therefore, this method was not considered for this study.

Double translation, or back translation, requires "*at least two bilingual individuals who participate independently in the translation process*" (McGorry, 2000, p.76). This method is considered to be one of the most effective approaches to translation (Marin and Marin, 1991) because it requires some filters produced independently by researchers.Rsearchers can also apply this method in several iterations in order to ensure proper translation. Craig and Douglas (2000) indicate that back-translation may identify errors of translation and minimise bias.

Therefore, back-translation was applied in this study. Several steps were involved in the translation of the instruments. First, two professional translators who are both familiar with English and Chinese were assigned to work on the translation independently. The first translator translated English into Chinese, and then the translated Chinese version of the instruments was sent to the second translator, who translated it back into English. Second, the researcher compared and reviewed both versions to identify any mis-translations, missing words or inconsistencies. If any differences were found, the researcher discussed these with both translators to seek advice about why this occurred and how the instrument could be revised.

Therefore, the Chinese measurement questionnaires were finalised by: (1) amendments to the words or phrases identified as incongruent between the two back-translation questionnaires and the original English questionnaire; and (2) feedback from the two Chinese academics with respect to the suitability of items to be administered in the China context.

It should be noted that the EI instrument (WLEIS) has both English and Chinese versions. The Chinese version of the WLEIS has been used in some studies (Law et al., 2004; Wong and Law, 2002). Therefore, it was unnecessary to translate the WLEIS into Chinese.

3.8.13The distribution of the questionnaires

As mentioned above, the booklet included six questionnaires with different content. Each booklet for the leaders and the followers has a similar design. The only difference is that for LMX7, where the leaders and followers are expected to complete different variants. The booklet of questionnaires was distributed to the participants at three time points during the process of cross-sectional data collection.

At time point one, the researcher selected all departments with fewer than 20 members. At time point two, the survey mainly focused on the relationship between low-level leaders and their direct followers. First, all of the low-level managers in the target organisations were requested to categorise all of their potential followers into two groups. The individuals in one group were considered as good subordinates, while those in the other were defined as poor subordinates. The leaders then randomly selected two followers from each group. The two good subordinates were marked as "SG" and the other two followers (poor subordinates) were marked as"SP". The criterion for distinguishing between good and poor subordinates was according to the judgement of the leaders. Second, all of the questionnaires were then assigned to these leaders to complete. Finally, the LMX7 was distributed to the four chosen followers (SG and SP) for them to evaluate their direct leader.

At time point three, the survey was conducted across all formal working groups. Individuals in the same group (or the same department) were organised together to complete all of the questionnaires in the booklet. The order of distribution was based on the list of followers obtained from the leaders. At these two time points, the researcher needed to explain the purpose of the study briefly and encourage respondents to finish their questionnaires.Tables3.8.13.1 and 3.8.13.2 indicate basic information regarding the participants.

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Table 3.8.13.1:Basic information regarding followers

Variable	Respondents	Groups	Group size	Group types
Leaders' perceived LMX	409	147	3- 17	Human & Management Department; Manufacturing Department; Financial Department…….
Follower' perceived LMX	404	147	3- 17	
FOCB	415	147	3- 17	
CSI	391	150	3- 17	

Note: Individuals who work in the same department were regardeded as group members.

Table 3.8.13.2 Basic information regarding group members

Variable	Respondents	Groups	Group size	Group types
GOCB	834	150	3- 17	Human & Management Department; Manufacturing Department; Financial Department…….
CSI	834	150	3- 17	
EI	827	150	3- 17	

Note: Individuals who work in the same department were regarded as group members.

3.9 Methods for managing common method variance

Common method variance relates to the measurement methods, rather than to the constructs represented by the measures (Bagozzi, Yi and Phillips, 1991,p.426). Common method variance is a type of systematic measurement error that may seriously affect empirical outcomes and relationships observed between constructs. For instance, in researching the relationship between constructs A and B, the '*real*' situation is that construct A is positively related to construct B. Nevertheless, when common method bias is involved in a piece of research, it may provide a different explanation or outcome for the observed relationship.

In empirical testing, a growing body of literature is examining the influence of common method variance on the relationship between variables (e.g., Gerstner and Day, 1997). After comparison of the strength of the relationship between variables in situations where common method variance is controlled and where it is uncontrolled, it has been indicated that the amount of variance was about 35% when common method variance was present, compared with around 11% when common method variance was not present. Therefore, the results indicate that common method variance affects relationships observed between constructs.

As a result of common method variance seriously affecting research findings, it is important to understand its causes. Podsakoff et al. (2003) summarised four elements which may arise in common method variance: characteristics of the items themselves ("*items of measurement with personal tendencies*"); a common rater (considered as when"*the respondent providing the measure of the predictor and criterion variable is the same person*"); a common item context (referring to "*any influence or interpretation that a subject might ascribe to an item solely because of its relation to the other items making up an instrument*"); and a common measurement context (considered as "*the large research context in which the measures are obtained, and may affect the arti factual covariation observed between constructs*"). However, different measurement biases need to be evaluated for the different sources from which data are obtained. For example, administered questionnaires may have higher accuracy and more socially desirable responses than interviews (Martin and Nagao, 1989). On addition, if data related to dependent and independent variables are collected from the same individual using a similar item context and the same method to collect and analyse data, method biases are particularly large.

Procedural techniques were developed in order to manage method biases in this study. The key assumption of procedural techniques is to find the common elements in measures of dependent and independent variables and then reduce them. Podsakoff et al. (2003) indicate that the connection between measures of dependent and independent variables are influenced by the format or wording of questions, the respondents, and contextual cues indicated in the questionnaires. Considering these elements, two main procedural remedies were adopted.

First, the dependent and independent variables were gathered from different sources. Some scholars (e.g., Conway and Lance, 2010; Organ and Ryan, 1995) indicate that self-reports of measurements may inflate the relationship between variables because they induce common method variance. For instance, Podsakoff and Todor (1985, p.65) assert that,"*invariably, when self-report measures obtained from the same sample are utilized in research, concern over same-source bias or general method variance arises*". With regard to OCB, the rating of one's own OCB is related to subjectivity and,therefore, cannot be a substitute for independent judgements (Organ and Ryan, 1995). Moreover, an empirical test of OCB demonstrates that self-reports of OCB inflate the correlations between predictors and OCB due to common method bias

(Organ and Ryan, 1995). Therefore, in this study, both supervisor and peerrating were used to measure OCB.

Concerning the assessment of EI, there are two different ways to measure EI:self-report and other-report. Some studies indicate that although self-report of EI is often used, there are a number of problems related to it (Day and Carroll, 2007; Grubb and McDaniel, 2007). First, self-report EI does not reflect real performance level and perceived performance. Some studies have indicated a poor correlation between real abilities and self-perceived abilities (Davies et al., 1998; Paulhus et al., 1998). Second, it is easy to give unrealistic ‘good’ answers in a self-report EI instrument. As an alternative method of assessing EI, other-report measurement shows “*how well the scale items describe the focal person’s behaviour*” (Libbrecht et al., 2010, p.1008). It can be argued that others can better perceive information to judge the traits of a target individual. Another benefit is that other-report measurement can assess interpersonal factors of EI (Libbrecht et al., 2010)
However, as mentioned in the literature review, WLEIS, as a self-report instrument, is more suitable for use in a Chinese context than in other cultures (Law et al., 2004; Wong, Law and Wong, 2004; Wong et al., 2007). It has strong predictive power for different variables (e.g.,turnover and satisfaction) (Law et al., 2004; Wong and Law, 2002). Some scholars also indicate that a self-report instrument is also appropriate for reflecting the ‘real’ situation of one’s EI because the way people deploy their EI source is determined by their own perceptions of emotional abilities and their usual actions (Antonakis, Ashkanasy and Dasborough, 2009). Therefore, self-report EI was applied to guide this research.

Some scholars assert that other-report measurement is better than self-reporting in the assessment of job performance, job characteristics and individual ability. However, self-report is more appropriate for the measurement of private characteristics or traits and job satisfaction (Conway and Lance, 2010) because the target individual(s) does not consider social desirability and, therefore, this does not influence their judgement. Self-reported cognitive style is best suited to the target individuals in this study, as cognitive style is considered to be a type of individual trait in perceiving and managing information.

A further step in controlling for common method bias is to design a good cover story and instructions (Aronson et al., 1998). Podsakoff et al. (2012) stress that a cover story makes it appear that there is no connection between the measurement of the independent variables and the dependent variables. This may prevent participants using previous answers to fill in gaps in what is recalled. Moreover, in order to ensure the credibility of a cover story, a pre-test is carried out to develop a convincing cover story (Podsakoff et al., 2012)

Moreover, informants were allowed to answer anonymously and it was stressed that there were no right or wrong answers and that informants could answer honestly. Podsakoff et al. (2003) assert that these techniques make it less likely that informants will edit responses to be more socially desirable and can prevent evaluation apprehension. However, as mentioned, independent and dependent variables were measured separately and, therefore, some methods need to be adapted to link data together. In this study, all of the questionnaires were marked,e.g., M1 and S1, and the questionnaires were disturbed by rank to target employees and direct managers. Furthermore, all of the informants were assured that the answers would only be seen by the researcher

As pointed out by some scholars (e.g., Bowen and Wiersema, 1999; Jarvis, MacKenzie and Podsakoff, 2003; Podsakoff, MacKenzie, Lee and Podsakoff, 2003), longitudinal study plays an important role in solving method bias because it applies different survey design techniques to data collection (Lindell and Whitney, 2001; MacKenzie, Podsakoff and Jarvis, 2005; Rindfleisch, Malter, Ganesan and Moorman, 2008). However, common method bias can also be avoided in cross-sectional design in some situations. More specifically, Rindfleisch et al. (2008) indicate method bias can be controlled in cross-sectional data sets when the data sets relate to concrete and externally verifiable constructs, the measurement format is applied to test some outcomes and a different format of instruments is applied to measure key predictors (e.g., a Likert scale). In addition, Podsakoff et al. (2003) indicate that it is possible to reduce common method bias in cross-sectional studies when appropriate survey design methods are applied. Therefore, as appropriate survey methods were designed in this study, across-sectional approach was used to conduct the research.

3.10 Data analysis instruments

3.10.1 Correlation coefficient

Pearson's correlation coefficient was applied in this study to test the strength and orientation of the relationships between the variables. In data analysis, Pearson's correlation coefficient can be influenced by certain factors, such as the score distribution reflected by the collected data and one or two extreme outriders. Therefore, a test of normality was required before reporting the strength of the relationships between the variables.

3.10.2 T-test

The t-test was used in this study to test hypotheses about the mean differences between two sets of data. This can be considered as one of the best-known parametric methods for comparing average scores for two samples of interval data because prior information about population variance and population mean is not required. In order to test the difference between two sets of scores for significance where there were different independent samples in the research, such as differences between a group with a high level of LMX differentiation and a group with a low level of LMX differentiation (tested in hypothesis 7), an independent sample t-test was required. In analysis, the p-value is the threshold used to test a statistical hypothesis. If the p-value is greater than 0.05, it is rejected for the alternative hypothesis; if it is less than 0.05, the hypothesis is supported.

3.10.3 Analysis of variance (ANOVA)

Analysis of variance (ANOVA) is a type of measure used to test the differences between two or more sets of data. Unlike the t-test, it is not limited to comparing only two sets of data. In this study, ANOVA was used to test whether demographic variables (gender, group size and organisational nature) had a different influence on the independent and dependent variables across different work groups.

3.10.4 Within-group agreement

As mentioned previously, a mean score was applied to measure the central tendency of a group. However, Klein and Kozlowski (2000) stress that a mean score cannot represent higher-level constructs without within-unit agreement. Hence, in order to justify the aggregation of the data across individuals or group members, it is necessary to consider the degree of within-group agreement (e.g., Atwater, Ostroff, Yammarino and Fleenor, 1998). Within-group agreement indicates the degree to which informants provide the same rating (Kozlowski and Hattrup, 1992). Klein and Kozlowski (2000) stress that within-group agreement in the organisational literature is normally marked as 'rwg', which is calculated as "*comparing an observed group variance to an expected random variance*" (p. 351). In particular, within-group agreement considers biases by testing means and standard deviations for responses to instruments. Depending on the group members' answers, the responses range from no agreement (0%) to perfect agreement (100%). In the former case, the answers of the informants are different from each other; in contrast, the latter case shows that every rater provides consistent responses which do not deviate from their means.

3.10.5 Intra-class correlation

As mentioned earlier, this study focuses on different levels of analysis (at the individual and group levels). It is necessary to consider the percentage of variance between the individual level and the group level. Some scholars (e.g., Chan, 1998; Klein et al., 1994; Rousseau, 1985) suggest that it is necessary to demonstrate the degree of similarity between group members before considering an average value. In line with this point, Elfenbein (2006, p. 171) stresses that "*demonstrating similarity can be a worthwhile safeguard when examining psychological phenomena such as attitudes or group culture, because it is difficult to say that group attitudes or cultures exist if colleagues cannot agree upon them*".

In line with the above requirement, the intra-class correlation coefficient (ICC) is normally used to compute the total variance of variables (McGraw and Wong, 1996). ICC is defined as the percentage of variance between groups compared with the sum of variance across all assessments for all subjects (Landis and Koch, 1977). Theoretically, it varies between 0 and 1, where 0 means no variance at the group level and 1 means no variance at the individual level (Leckie and Charlton, 2012). In this study, MLwin, a statistical software package for fitting multilevel models, was used to carry out the ICC.

3.10.6 Structural equation modelling (SEM)

As this study had the aim of identifying the causal relationships between the independent variables and the dependent variable, structural equation modelling (SEM) was employed to test the hypotheses. SEM is considered to be a statistical method of confirmation, rather than one of exploration, to test the suitability of a theoretical or hypothesis model (Moustaki et al., 2004).

A two-step approach was taken in order to apply SEM in the study for theory testing and development. The first step was a measurement model tested by confirmatory factor analysis (CFA), while the second was a structure model tested by path analysis. According to Anderson and Gerbing (1988), CFA offers a basis for making meaningful inferences about theoretical constructs and their interrelations, and can also be used to avoid making erroneous inferences. The measurement model and the structural model together form a comprehensive, confirmatory assessment of construct validity (Bentler, 1978). In addition, the measurement model offers a confirmatory assessment of both convergent and discriminant validity (Campbell and Fiske, 1959). Subsequently, given acceptable convergent and discriminant validities, a confirmatory assessment of nomological validity is then made through the test of the structural model (Campbell, 1960; Cronbach and Meehl, 1955).

In the measurement model, CFA is appropriately used when the research has some knowledge of the underlying latent variable structure (in this case, EI, cognitive style, LMX and OCB theories). With this knowledge of the theory, empirical research, or both, the researcher then proposes, a priori, relations between the observed measures and the underlying factors and then tests this hypothesised structure statistically. The model is then evaluated by statistical means to determine the adequacy of its goodness of fit to the sample data (Byrne, 2010).

In the structural model, path analysis refers to dependencies between independent and dependent variables. In this study, the full structural model is categorised as several path analyses, including the latent variables (OCB, cognitive styles, EI and LMX) and their observed variables, stressing the influence of LMX, cognitive styles and EI on OCB.

In order to ensure the stability of an analysis, the sample size needs to be specific. Normally, a sample size of 200 or more is required (e.g., Velicer and Fava, 1998). Rigdon (2005) indicates that if a sample has fewer than 200, the model parameter is not stable and the statistical test of the model is unreliable. Therefore, in conducting this research, the sample size needed to meet this criterion.

3.10.7 Multilevel linear model

A multilevel linear model (MLM) is an effective method for the analysis of data collected at a nested level, such as students in a classroom (Bauer, 2003). In this study, a multilevel linear model was applied to analyse the relationship between group-level EI/cognitive style and group-level OCB, as this may avoid a type I error rate and loss of information and power (Bauer, 2003; Bryk and Raudenbush, 1992; Goldstein, 1995). In addition, it provides the opportunity to analyse both levels of data (i.e., employees and the organisation) simultaneously, and can even be applied when clusters overlap. Further, it capitalises on data structure, permitting the influences of predictors to differ over clusters (Bauer, 2003).

3.11 Ethical considerations

Ethics can be seen as one of the standards guiding research. Ethics concerns morality in the standard of individual behaviours and relationships with others (Cooper and Schindler, 2008). In this study, the research ethic related to objective perspectives. Dale et al. (1988) indicate that there are few ethical issues related to a questionnaire because it does not explore responses and avoids probing questions to reveal further information. Although the objective paradigm is appropriate for this research, and presents fewer ethical problems than the subjective paradigm, the potential risk of ethical problems cannot be entirely ignored. Hence, the research design was developed to avoid potential bias and personal impartiality at each stage of the PhD project.

Before the process of data collection, one of the main ethical questions is how to protect participants' rights. Saunders et al. (2009) stress that the researcher needs to inform potential participants that they are free to determine whether to participate in the research and their participation should not involve any coercion. In line with this, the researcher sent a consent form to the target organisations to obtain permission to conduct research. In the consent form, it was guaranteed that all of the questionnaire responses would be anonymous and confidential throughout the whole research process. Some basic information about the research (such as its purpose, contribution, potential benefits for the organisation and its being for academic use) were given, as not revealing such information can amount to deception (Sekaran, 2003; Zikmund, 2000).

In the process of data collection, some basic information was also included in the questionnaires, as, although it had already been introduced before the data collection, the participants might have forgotten about it after a period of time. In addition, the researcher did not express any ideas during data collection, as personal ideas may influence the reliability of questionnaires. Saunders et al. (2009) indicate that if subjectivity is employed while data are collected, this may impair the accuracy of the analysis and reporting in the study.

Furthermore, some scholars indicate that ambiguous items will affect informants' ability to give accurate answers (Cronbach, 1950; Feldman and Lynch 1988; Podsakoff et al., 2003). Thus, the items in the questionnaires were assessed by judges to eliminate ambiguous items.

At the stage of data analysis and reporting, this study reported the data honestly, as a lack of objectivity at that stage would have led to the distortion of the conclusions and recommendations (Saunders et al., 2009).

4. Individual level analysis: structure equation modelling (SEM)

The data analysis will be reported in two chapters. This chapter focuses on the analysis of individual level data in relation to structural equation modelling (SEM). At the beginning of this chapter, there is a short discussion about how the accuracy of raw data entry is evaluated in this research. Following this, a review of descriptive statistics of different variables addressing missing data is provided in the surveys.

Before the data analysis, it is necessary to describe and screen data to avoid common errors in SEM (Baumgartner and Hombug, 1996). The discussion then reports the measurement model relevant to the dependent variable (OCB) and independent variables (CSI, LMX, and EI). Finally, hypotheses are tested through the structure model of SEM.

4.1Treatment of missing data

In total, the sample consists of 865 individuals within 150 groups of manufacturing organisations. However, not all of these individuals gave responses to the questionnaires for personal reasons. Therefore, not all of the respondents' responses could be used and it is necessary to cope with missing data. The treatment of missing data is the first step to ensure the accuracy of raw date. Some scholars (Gold and Bentler, 2000; Schafer and Graham, 2002) indicate that the treatment of missing data is considered as a significant procedure as it has implications for data analysis and the interpretation of the results.

The first issue of treating missing data is to "*determine whether the amount of missing data is low enough to not affect the results, even if it operates in a non-random manner*" (Hair et al., 2010, p79). If it is sufficiently low, it is possible to apply some measures to remedy missing data. If it is not sufficiently low, before choosing a measure, it is necessary to determine the randomness of the missing data.

Some scholars (e.g. Gorsuch, 1990; Hattie, 1985) stress that missing data under 10 percent in an individual case or an observation can generally be ignored. A significant number of missing data were identified in this study. The analysis of missing data by SPSS revealed the maximum number of missing values from five instruments. According to Table 4.1.1 and Table 4.1.2, the percentages of missing data are sufficiently low to be ignored. Additionally, the number of cases with no missing data has to be sufficient for the selected analysis measure if replacement values are not imputed for the missing data. In order to ensure the stability of the analysis of SEM, a sample size of 200 or more is required (Velicer and Fava, 1998). This study meets this requirement.

When the percentages of missing data are sufficiently low, removing the cases with the missing data may be the most efficient solution. Cronbach (1951) stresses that less than 15% of missing data in variables is appropriate to be deleted, but higher levels of missing data (20% to 30%) can be remedied. In this study, the missing data were removed.

Table 4.1.1. The missing data for all variables (information for followers)

Variable	All Participants	Respondents	Missing Rate
LLMX	425	409	4%
FLMX	425	404	5%
FOCB	425	415	2.4%
CSI	425	391	8%

Note: FOCB= followers' organisational citizenship behaviours; LLMX= leaders' perceived quality of leader-member exchange; FLMX= leaders' perceived quality of leader-member exchange; CSI= cognitive style index.

Table 4.1.2. The missing data for all variables (information for group members)

Variable	All Participants	Respondents	Missing Rate
GOCB	864	834	2.5%
CSI	864	834	2.5%
EI	864	827	4.3%

Note: GOCB= group-level organisational citizenship behaviours; CSI= cognitive style index.

4.2 Descriptive statistics

For the individual level study, data were collected from 425 followers and 150 leaders within 150 groups in seven Chinese organisations. All of the followers were selected by their leaders. Specifically, a leader was asked to assess four followers at random on the basis of who answered directly to them, and then, they had to spend half an hour to assess the selected followers' OCB and their relationship with him or her. The selection of four followers is a criterion because leaders may lose their concentration if they assess more followers. Similarly, the selected subordinates were required to evaluate their relationship with their leaders.

According to the responses, the average age of followers was 36.34 years, ranging from the age of 19 to 62. On average, the average working experience of followers was 9.14 years. 58.8 percent of followers were male. All participants were in full-time employment. In the following, data of each variable is described in detail.

For the group-level study, the survey resulted in data being received from 864 group members. The average age of group members was 36.8 years, ranging from 19 to 62 years of age. On average, the working experience of group members was 10 years. Sixty-two percent of group members were male. All of the participants were in full-time employment.

4.2.1 CSI and CSI diversity

In order to test cognitive style, the median score is taken as a criterion to split analytic style and intuitive style (Allinson et al., 2001). Therefore, in this study, individuals with low cognitive scores of less than 50 have an intuitive style and those with a high cognitive score of 50 or over have an analytic style. However, the criterion of median score in this research is higher than in other studies in which the median score was 42 (e.g. Allinson et al., 2001; Armstrong, 1999) because their studies were conducted in the UK rather than China. Allinson and Hayes (2000) compared the mean scores of CSI in different countries, and found that most of the intuitive groups were located in European and America, which have individualistic cultures and low power distance, while, most of the analytic groups are located in developing counties, such as China, which have collectivistic cultures and higher power distance (Hickson and Pugh, 1995). Some further studies (Papavero, 2005; Zhang, 2005) are consistent with this idea to report that the mean CSI score for those from China is higher than those from the UK. Table 4.2.1.1 shows the descriptive data of CSI as follows.

Table 4.2.1.1 Descriptive data of CSI in individual level (responses from group members)		
n	834	
mean	50	
Range	20-76	
Std. Deviation	9.02	
	Intuitive	Analytic
n	392	445

As mentioned previously, standard deviation is applied to determine cognitive style diversity. The standard deviation at the team level is similar to standard deviation at the individual level. Additionally, more or less diversity is split according to median of standard deviation (Table 4.2.1.2).

Table 4.2.1.2: Descriptive data of standard deviation of CSI		
n	149	
Mean	7.1	
Range	.58- 16.17	
	Less diversity	More diversity
n	76	73

4.2.2 EI

As followed, the Table 4.2.2.1 indicates detail information of EI

Table 4.2.2.1: Descriptive data of EI in individual level(responses from group members)	
n	827
Mean	81.5
Range	50- 112
Std. Deviation	12.4

4.2.3 LMX

The descriptive data of LMX is shown in Table 4.2.3.1 and 4.2.3.2 below.

Table 4.2.3.1: Descriptive data of followers' perceived quality of LMX(responses from followers)	
n	404
Mean	25.74
Range	10-35
Std. Deviation	4.70

Table 4.2.3.2: Descriptive data of leaders' perceived quality of LMX(responses from leaders)	
n	409
Mean	25.25
Range	7-35
Std. Deviation	4.62

4.2.4 OCB

Two types of questionnaire were used to collect data from individual level and group level. The differences between these two types of questionnaire are in their wording.

The statistics of group-level OCB and individual level of OCB are described separately (Table 4.2.4.1 and Table 4.2.4.2).

Table 4.2.4.1: Descriptive data of individual-level OCB (followers' OCB) (information for followers)	
n	415
Mean	125
Range	53-167
Std. Deviation	21.72

Table 4.2.4.2: Descriptive data of group-level OCB(responses from group members)	
n	834
Mean	130.95
Range	80-167
Std. Deviation	16.52

4.2.5 Control Variables

Some studies indicate that longer tenured employees perform more extra-role activities than workers with shorter tenure (O'Reilly and Chatman, 1986). Therefore, tenure is considered as a candidate of control variable. Further, a variety of demographic variables, consisting of age, gender, education level, and group size, are also taken into account. In the correlation test (Table 4.2.5.1), these demographic variables have no significant relationship with independent variables and dependent variable. In line with Becker's (2005) study, they are not included in the analysis.

Table 4.2.5.1: Descriptive statistics and variable correlations atindividual level

Variables	M	SD	1	2	3	4
1.Followers' Age	36.34	9.12	--			
2. Followers' Tenure	9.14	9.69	.66**	--		
3. Followers' Gender	1.41	.49	.10*	.02	--	
4.Group size	6.53	3.57	.07	.23**	.09	--
5. Leaders' Intuitive Style	44.00	5.13	--	--	--	.03
6.Leaders' Analytic Style	56.00	5.04	--	--	--	-.11
7.Followers' Cognitive Style	51.00	9.22	-.02	-.02	.03	.09
8. Followers' perceived LMX	25.74	4.70	-.02	-.00	.02	.05
9. Leaders' perceived LMX	25.25	4.61	--	--	--	
9. Followers' OCB	126.00	21.37	-.05	.05	-.09	-.01
10.Followers' OCBI	60.54	9.02	-.08	.05	-.07	.04
11. Followers' OCBO	55.30	9.13	-.06	.11	-.08	-.07

Note: *: p<0.05; **: p<0.01; ***: P<0.001.

4.3 Data screening

One of the crucial steps in data analysis is the data screening process. Lack of data screening will cause errors in data analysis. Baumgartner and Homburg (1996) indicate that one of the most common errors in SEM is the lack of data screening. Thus, data screening should be performed before carrying out statistical analysis. Data screening in this study is performed using SPSS, following rules suggested by Baumgartner and Homburg (1996). Firstly, coding errors should be avoided and responses need to be recorded correctly (Baumgartner and Homburg, 1996). The next step is to screen outliers. Finally, skewness and kurtosis are examined to ensure approximately normal distribution. Treatment of outliers and normality and homogeneity of variance will be discussed accordingly in the following sections.

4.3.1 Tests of outliers

Hair et al. (2010, p.96) define outliers as observations with a unique combination of characteristics identifiable as distinctly different from the other observations. These are normally considered as low or high values for one variable or some variables combining values that are observed different from others (Hair et al., 2010). According to the number of variables, outliers can be identified from bivariate, univariate and multivariate aspects.

Outliers with univariate characteristics are identified by analysing and testing the distribution of observations for every variable and choosing as outliers those samples staying at the outer range (high or low) of the distribution (Kline, 1998).

Following univariate detection, bivariate identification of outliers refers to pairs of variables being evaluated jointly through a scatter plot. Some cases can be considered as isolated points in the scatter plot when it falls noticeably outside the range of other observations (Hair et al., 2010).

When more than two variables are considered, the researcher needs to use multivariate methods to measure each observed multidimensional aspect related to many common points (Kline, 1998). Mahalanobis D^2 is a typical multivariate method to test outliers. It assesses each observation across different variables. Additionally, according to the mean centre of all observations, it measures the distance of each observation in multidimensional space and provides a single value for every observation no matter how many variables are taken into account (Kline, 1998). Higher D^2 values indicate samples farther removed from the general distribution of samples in the multidimensional situations. In the interpretation process, the Mahalanobis D^2 measure follows the significance testing that the D^2 measure divided by the number of variables involved (D2/df) is approximately distributed as a t-value (Hair et al., 2010). Given the nature of statistical tests, it is suggested that conservative levels of significance (e.g., .005 or .001) be used as the threshold value for designation as an outlier. Thus, observations having a D^2/df value exceeding 2.5 in small samples and 3 or 4 in large samples can be designated as possible outliers (Kline, 1998).

In order to identify potential outliers, different outlier detecting methods can be applied in a study (Hair et al., 2010). In this research, univariate and multivariate measures are taken to detect outliers. The results of the univariate and multivariate outliers in this study are reported in Table 4.3.1.1. After the outliers are identified, they can be retained unless there is evidence that they are not representative of the whole population, as outliers are normally considered as a segment of sample and thus ensure the generalisability of the sample (Hair et al., 1998). Specifically, reviewing outliers in the datasets shows that they come from respondents' extreme answers (the answers are mainly concentrated at the extreme end of 5- or 7- point Likert scales of the questionnaires). Thus, outliers will be retained unless they influence the analysis, as follows.

Table 4.3.1.1: Outliers of variables

Outliers	Sample	
	Univariate	Multivariate
Leaders' perceived quality of leader-member exchange (LMX)	2	None
Leaders' perceived quality of leader-member exchange (LMX)	6	None
Group-level organisational citizenship behaviour (GOCB)	13	None
Individual-level organisational citizenship behaviour (IOCB)	30	None
Emotional Intelligence (EI)	5	None
Cognitive style Index (CSI)	34	None

4.3.2 Test of normality

Normality can be considered as the most fundamental assumption in the multivariate analysis because the univariate identification of outliers is based on the assumption of univariate normality, and multivariate identification of outliers is based on the assumption of univariate and multivariate normality. Normality refers to "*the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution, the benchmark for statistical methods*" (Hair et al., 2010).as follow, this study tests both univariate and multivariate normality. Firstly, in the assessment of univariate normality, the validity of statistical tests is the foundation of test of normal distribution (F and T statistics are applied in the test of normality). When the variation from the normal distribution is sufficiently large, it leads to the invalidity of statistical tests.

In order to test the normal probability plot, it is usual to use statistical tests. A simple test is a rule of thumb based on the skewness and kurtosis values (available as part of the basic descriptive statistics for a variable computed by all statistical programs). The statistical value (z) for the skewness value is calculated as:

$$Z_{\text{skewness}} = \frac{S-0}{SE_{\text{skewness}}}$$

z value can also be calculated for the kurtosis value using the following formula:

$$Z_{\text{kurtosis}} = \frac{K-0}{SE_{\text{kurtosis}}}$$

In the above formulation, the values of skewness and kurtosis and their correlated standard errors are calculated by SPSS. The critical value is based on z distribution of the significance level. Specifically, when the value is larger than 1.96, it is significant at $p < .05$. When the value is larger than 2.58, it is significant at $p < .01$. The value which is higher than 3.29 is significant at $p < .001$ that the distribution of sample is non-normal. However, if the test is not significant, the distribution of the sample is not significantly different from a normal distribution.

Table 4.3.2.1: Univariate normality test results for variables

Variable	N	Mean	Skewness	Std. error	$Z_{Skewness}$	Kurtosis	Std. error	$Z_{Kurtosis}$
Leaders' perceived LMX	409	25	-0.378	0.121	-3.12	0.231	0.241	0.96
Follower' perceived LMX	404	26	-0.368	0.121	-3.04	0.026	0.242	0.11
GOCB	834	131	-.539	.085	-6.34	.027	.169	.16
FOCB	415	126	-.864	.118	-7.32	.502	.236	2.13
CSI	834	51	.227	0.085	2.67	0.169	0.169	1
EI	827	82	-.205	0.085	-.205	-.663	.085	-3.9

Note: FOCB= followers' organisational citizenship behaviours; GOCB= group-level organisational citizenship behaviours

According to Table 4.3.2.1, these values show significant issues with skew, kurtosis or both (at $p < .05$). However, this is not out of expectation of the research because of the central limit theory which means that with the increase of sample size, the assumption of normality matters less because the sampling distribution will be normal regardless of what the sample data looks like. Therefore, in large samples, both skew and kurtosis can be significant even for small and unimportant influence and even if both of them are not too different from normal (Field, 2009). In this research, the sample size is larger than 400, so even if both skew and kurtosis are significant; the sampling distribution is expected to be normal.

In order to assess multivariate normality, the most important criterion is multivariate kurtotic value and its Critical Ratio (C.R.) which in essence represents Mardia's Coefficient. More specifically, Bryne (2010, p.103) indicate '*in the case of multivariate positive kurtosis, the distributions will exhibit peakedness together with heavy (or thick) tails; conversely, multivariate negative kurtosis will yield flat distributions with light tails*'. Bentler (2005) indicates that when C.R. value is higher than 5, the data is non-normally distributed. According to Table 4.3.2.2, the C.R. values for FOCB, GOCB andLMX are higher than 5, which are highly suggestive of non-normality in the sample. West et al. (1995) assert that no matter whether the distribution of observed variables is univariate normal or not, the model can be multivariate non-normal. However, Byrne (2010) applied same source of data to compare results of multivariate non-normal model and multivariate normal model. They found that model fit indices and regression weight remains the same for both models. Therefore, although the issues of non-normality cannot be solved because of technical drawbacks in Amos, overall conclusions are consistent across CFA estimation approaches as tested in the following section to most appropriately represent the factorial structure of FOCB, GOCB andLMX

Table 4.3.2.2: Multivariate normality test results for variables

Variable	N	Kurtotic	Critical Ratio
Leaders’ perceived LMX	409	16.60	14.88
Follower’ perceived LMX	404	13.94	12.50
GOCB	834	418.83	171.19
FOCB	425	279.93	81.68
CSI	834	3.08	4.53
EI	827	7.46	6.92

Note: FOCB= followers’ organisational citizenship behaviours; GOCB= group-level organisational citizenship behaviours

Finally, histograms are drawn to show the actual trend of the distribution visually. The normal Q-Q plots compare the observed data with the expected values of a normal distribution giving the mean and standard deviation values (Appendix A1).

4.3.3 Testing for homogeneity of variance

Before continuing to confirmatory data analysis with AMOS, all data sets should be tested for the assumption of homogemeity of variance (such as by the Levene test in SPSS). The assumption is that the variance of one variable should be stable at all levels of the other variable (Hair et al., 2010). In accordance with the purpose of this study, five variables (FOCB, LMX, CSI, EI and GOCB) are compared across the sex, group size and organisation in the data set.

Normally, homogeneity of variance is tested by Levene’s test, which tests the null hypothesis that it is equal for variance in different groups. Levene’s test is considered as “*a simple test that works by doing a one-way ANOVA conducted on the deviation scores; that is the absolute difference between each score and the mean of the group from which it came*” (Field, 2009, p150). If the result of Levene’s test is significant ($p \leq .05$), it is concluded that it is different between variables, and the null hypothesis is wrong, so there is heterogeneity of variances. Nevertheless, if the result of Levene’s test is non-significant ($p > .05$), it is concluded that it is equal between variables, and therefore there is homogeneity of variances.

Tables 4.3.3.1, 4.3.3.2 and 4.3.3.3 indicate the results of Levene's test for every variable; the CSI and GOCB across different organisations have a problem of heterogeneity. However, in the Tukey and Scheffe's test, all organisations have non-significant difference in CSI and GOCB (significance is greater than .05). Therefore, it is not necessary to consider GOCB and CSI in different organisations.

Table 4.3.3.1: ANOVA results of gender and variables

	Levene Statistic	Sig.
FOCB VS gender	1.167	.28
Followers' perceived LMX VS gender	.26	.61
Followers' perceived LMX VS gender	.56	.45
CSI VS gender	2.18	.14
EI VS gender	.00	.98
GOCB VS gender	1.80	.18

Table 4.3.3.2: ANOVA results of group size and variables

	Levene Statistic	Sig.
FOCB VS group size	1.603	.07
Followers' perceived LMX VS group size	.96	.49
Followers' perceived LMX VS group size	1.65	.06
CSI VS group size	1.378	.154
EI VS group size	1.62	.06
GOCB VS group size	1.01	.44

Table 4.3.3.3: ANOVA results of organisation and variables

	Levene Statistic	Sig.
FOCB VS organisation	1.495	.19
Followers' perceived LMX VS organisation	1.51	.19
Followers' perceived LMX VS organisation	2.15	.06
CSI VS organisation	2.54	.03
EI VS organisation	1.70	.06
GOCB VS organisation	2.62	.02

Note: FOCB= followers' organisational citizenship behaviours; GOCB= group-level organisational citizenship behaviours

4.4 Confirmatory factor analysis (CFA)

Structural equation modelling (SEM) is "*a statistical methodology that takes a confirmatory (i.e. hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon*" (Byrne, 2010, P3). Normally, it refers to 'causal' processes that produce observations on multiple variables (Bentler, 1988). Two significant steps are covered in the SEM: Firstly, a series of structural (or regression) equations are used to represent the causal processes. Secondly, these structural relations can be stimulated to make a clearer conceptualisation of the theory. In this study, different types of variable are primarily identified in the hypothesised model, and then it can be tested statistically through a measurement model and structural model with goodness-of-fit index. If goodness-of-fit is acceptable, the relationship between variables is accepted; otherwise, it can be rejected.

4.4.1 Types of variables in SEM

In SEM analysis, researchers identify different types of variables, including observed-latent variables, and exogenous-endogenous variables (Byrne, 2010).

According to whether variables can be observed or not, variables can be classified as latent variables and observed variables. Latent variables cannot be identified directly or measured directly. Thus, latent variables need to link some variables which can represent them. As such, the latent variables relate to at least one observed variable. In the SEM analysis, observed variables serve as indicators of latent variables. In the measurement model, dimensions of variables can serve as latent variables, and observed variables are scores of each item. However, sometimes, it is different in the structural model, dimensions of variables transform to observed variables, and independent variables and dependent variables serve as latent variables.

Moreover, latent variables can be further classified as exogenous latent variables and endogenous variables. Exogenous variables (also known as independent variables) "*give rise to*" changes of values of other latent variables. Similarly, they are also influenced by observed variables. Endogenous variables (also called dependent variables) are influenced by exogenous variables.

4.4.2 Model fit indicators

Model fit indicators play an important role in the test of model acceptability because there is normally a discrepancy in the relationships between theoretical and observed variables, which can be caused by measurement error (Hunter and Gerbing, 1982). Four elements (Chi-square (CMIN), the absolute fit indices, the incremental fit indices, and the parsimony fit indices) may provide indices for measurement model fit.

First, Chi-square (CMIN) refers to "*the discrepancy between the unrestricted sample covariance matrix S, and the restricted covariance matrix Σ(θ), and, in essence,* *represents the Likelihood Ratio Test statistic, most commonly expressed as a χ2 statistic*"(Byrne, 2010, p75). χ^2 represents the match between a causal path diagram overall model and actual data. A non-significant χ^2 ($p<0.5$) indicates that there is little discrepancy between a causal path diagram overall model and actual data; on the contrary, a causal path diagram indicates an overall model mismatch with actual data when χ^2 is significant (Rigdon, 1995). Although χ^2 test provides a test of statistical significance, it has some limitations (Hair, 2010). Firstly, it is sensitive to sample size. In the large sample sizes, it is difficult for a model to achieve a statistically insignificant goodness of fit. In this study, the sample size is larger than 400, so it it unlikely to lead to an insignificant χ^2. Secondly, the χ^2 statistic is likely to be greater when the number of observed variables increases. It is difficult to use chi-squre to assess model fit for a model with many observed variables. In this study, there is a large number of oberserved variables involved in some constructs (e.g. there are 24 observed variables in the OCB instrument). Therefore, χ^2 values are possible at a significant level. For these two reasons, it is required to consider other fit indices as follows.

Absolute fit indices evaluate the overall fit of a SEM to a series of empirical observations. They are often called root mean square residual (RMR), Goodness-of-Fit Index (GFI), adjusted goodness-of-fit index (AGFI), and Parsimony Goodness-of-Fit Index (PGFI). The root mean square residual (RMR) refers to "*the average residual value derived from the fitting of the variance–covariance matrix for the hypothesized model Σ(θ) to the variance–covariance matrix of the sample data (S)*" (Byrne, 2010, p77). Additionally, the standardised RMR refers to the average score of all standardised residuals (the score is from 0 to 1) (Hayduk, 1987); the best fit of standardised RMR is less than 0.5 (Hayduk, 1987; Joreskog and Sorbom, 1996). The Goodness-of-Fit Index (GFI) refers to "*a measure of the relative amount of variance and covariance in S that is jointly explained by Σ*" (Byrne, 2010, p77). The adjusted goodness-of-fit index (AGFI) is similar to GFI. The only difference between them is that AGFI modifies the degrees of freedom in the specified model and combines a series of parameters to solve the parsimony problem. The values of AGFI and GFI range from 0 to 1, with values close to 1 being good (Hayduk, 1987; Joreskog and Sorbom, 1996). Byrne (2010) indicates that for a good fit, AGFI needs to be equal to or higher than.9. However, some scholars (Raykiv, 1998; Vassend and Skrondal, 1997) criticise the criterion of .9 as too stringent for models or developing theories. Therefore, a less restrictive criterion (.8) is more appropriate (Hsu and Lin, 2008; Wu and Wang, 2006). The last in this group is the

Parsimony Goodness-of-Fit Index (PGFI), which is introduced to solve parsimony problems, with values higher than 0.5 being good (James et al., 1982).

The third general type of measures for assessing SEM is an incremental fit index, which is based on a comparison of the hypothesised model against a standard. It is normally classified as the comparative-fit-index (CFI), normed-fit-index (NFI), incremental index of fit (IFI) or Tucker-Lewis Index (TLI). Both NFI and CFI indicate a comparison between the estimated model and the baseline model (Bentler, 1992; Bentler and Bonett, 1987). The values range from 0 to 1, with goodness of fit over 0.9 (Byrne, 2010). Additionally, the relative fit index (RFI) indicates a derivative of the NFI and is similar to the other two criteria, the IFI and RFI, which also range from 0 to 1 with goodness of fit over 0.9 (Byrne, 2010).

The final general type of measure for evaluating SEM is parsimonious fit indices. They compare formulations of different models and competing models and consider not only the fit of the model, but also the parsimony of the model from the parsimonious normed fit index (PNFI) and parsimony comparative fit index (PCFI). Both criteria consider the degrees of freedom to obtain a level of fit (Schumacker and Lomax, 2004). Although no absolute threshold levels exist for the PNFI and PCFI, some scholars insist that parsimonious fit indices need to be equal to or higher than 0.5 (e.g. Byrne, 1998). The criteria of model of fit are summarised below.

Table 4.4.2.1: Criterions for model fit

Index	Criterions for model fit indices
P	<0.05
RMR	<0.05
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well
GFI	>0.9
AGFI	>0.8
NFI	>0.9
RFI	>0.9
IFI	>0.9
TLI	>0.9
CFI	>0.9
PNFI	>0.5
PCFI	>0.5

Sources: Byrne,2010; Hair, 2010

4.4.3 Confirmatory factor analysis (CFA) for EI

In this study, the number of participants is 864. The research applies CFA to the EI construct with a four-factor model: self-emotion appraisal (SEA) (4 items), others' emotion appraisal (OEA) (4 items), use of emotion (UOE) (4items) and regulation of emotion (ROE) (4 items) (Wong and Law, 2002). Firstly, all 16 items of EI are incorporated into the measurement model. Secondly, all 16 items are linked to 4 latent variables (SEA, OEA, UOE and ROE) separately. Finally, all latent variables are related to each other. The result of the measurement is that the initial model fit is good without any model modification, as shown in Table 4.4.3.1. More details of the first order of the CFA of EI are illustrated in Figure 4.4.3.1.

Table 4.4.3.1: The model fit results of first order of EI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.048	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.078	Yes
GFI	>0.9	0.92	Yes
AGFI	>0.8	0.89	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.94	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.77	Yes
PCFI	>0.5	0.77	Yes

NPAR=38; CMIN= 629.066;

Then, second-order CFA is conducted, as shown in Figure 4.4.3.2. When the first-order EI model is transformed to the second-order model, it also loads well. However, all of the model-fit-indices are different between first-order CFA and second-order CFA (Table 4.4.3.2) because they have different degrees of freedom and parameters. The following data indicate that all 16 items can be incorporated into 4 latent variables that may consist of EI.

Table 4.4.3.2: The model fit results of second order of EI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.047	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.92	Yes
AGFI	>0.8	0.89	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.78	Yes
PCFI	>0.5	0.79	Yes

NPAR=36; CMIN=638.948

Figure 4.4.3.1: First order of CFA of EI (standardized model)

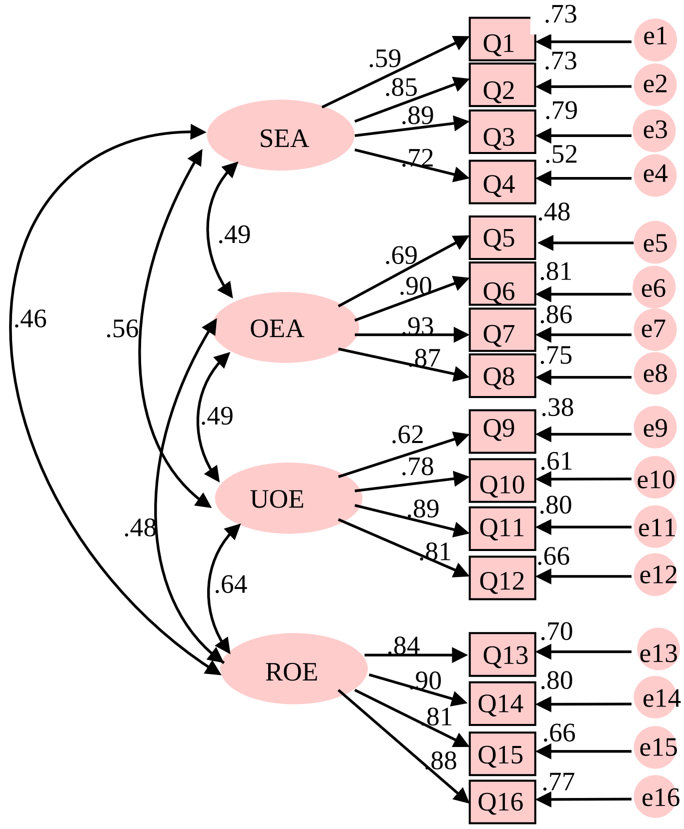
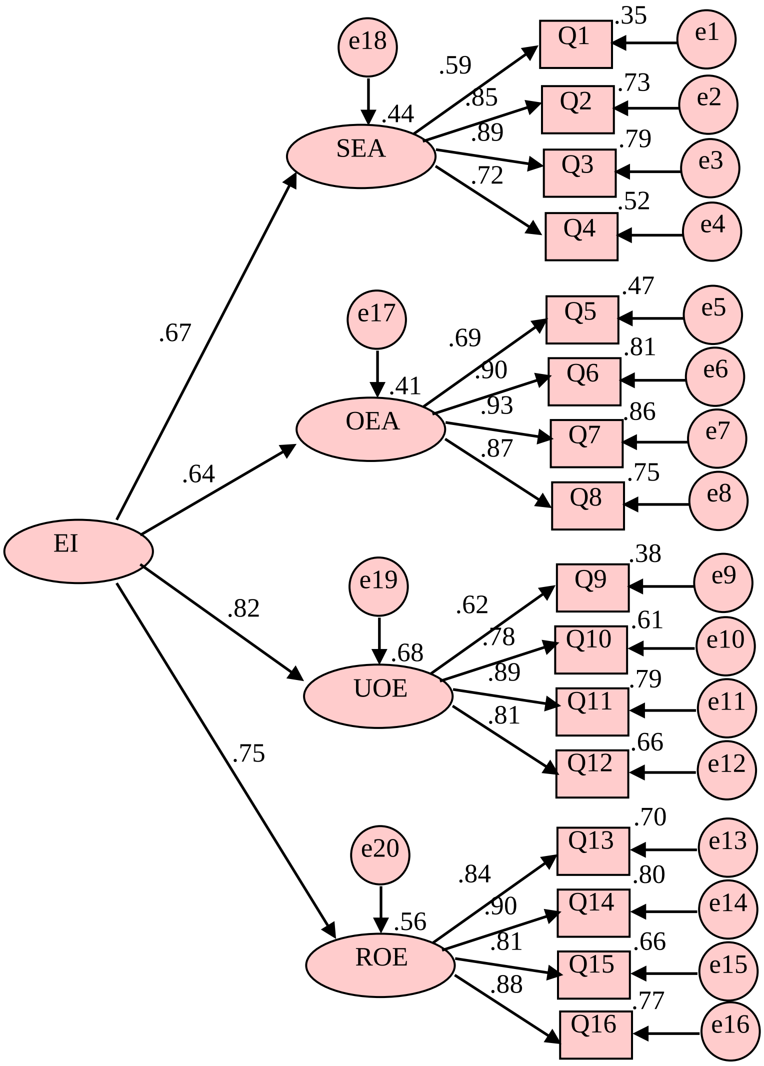


Figure 4.4.3.2: Second order of CFA of EI (standardized model)



Note: SEA= self-emotion appraisal (SEA); OEA= others' emotion appraisal; UOE= Use of emotion (UOE); ROE= regulation of emotion (ROE).

Furthermore, in order to avoid the just-identified issue of second-order structure, as suggested by Byrne (2010), this study places equality constraints randomly on three dimensions of EI (OEA, UOE and ROE). According to Table 4.4.3.3, it demonstrates that the first-order EI model is possibly transformed to the second-order model

Table 4.4.3.3: The model fit results of second order of EI (placed equality constraints)

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.047	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.92	Yes
AGFI	>0.8	0.89	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.78	Yes
PCFI	>0.5	0.79	Yes

NPAR=36; CMIN=613.019

4.4.4 Confirmatory factor analysis (CFA) for LMX

4.4.4.1 Confirmatory factor analysis (CFA) for followers' perception of LMX

In this study, the number of participants is 404. Confirmatory factor analysis is conducted of the construct of LMX. The primary question of LMX is whether LMX is unidimensional or multidimensional. In relation to this question, Graen and Uhl-Bien (1995) review previous studies on the dimensionality of the LMX construct, to conclude that the LMX constructs relate to multiple dimensions; however these dimensions are closely related so that they can be incorporated into a single measure of LMX. Additionally, Schrieshem et al. (1999) indicate that 94% of past studies treat LMX as a single dimension. Further, Geguras and Ford (2006) assert that LMX is considered as a unidimensional scale which consists of 7 items. Therefore, in this study, LMX is measured as a single dimension.

In the process of analysis, all 7 items of LMX are incorporated into the measurement model. All 7 items are then linked to one latent variable (LMX). The result of the measurement, that the initial model fit is good without any model modification, is shown in Table 4.4.4.1.1. More details of the first order of CFA of followers' perception of LMX are illustrated in Figure 4.4.4.1.1.

Table 4.4.4.1.1: The model fit results of followers' perception of LMX

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.1	
GFI	>0.9	0.95	Yes
AGFI	>0.9	0.90	
NFI	>0.9	0.94	Yes
RFI	>0.9	0.91	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.63	Yes
PCFI	>0.5	0.64	Yes

NPAR=14; CMIN=68.483

According to model fit indices, the initial model (particularly for RMSEA) needs to be improved in order to fit the sample data better. According to the test of covariances, the LMX model reveals that misspecified covariances are related to the pairing of error terms associated with item errors (item1 and 2; item 6 and 7). These misspecified error covariances are systematic, rather than random, measurement error in item responses, and they may result from characteristics specific either to theitems or to the respondents (Aish and Joreskog, 1990). They may reflect bias such as yea-saying or nay-saying and social desirability (Aish and Joreskog, 1990). Another reason for misspecified error covariances are that different items ask the same question, so it may lead to redundancy (Bryne, 2010). However, Joreskog (1993) indicate that strong substantive and empirical evidences should be given for correlated errors. There are three reasons to support correlated errors in this study. Firstly, it is possible that item content is overlapped. Secondly, error covariances have been used in previous LMX study (Bernerth et al., 2007). Finally, Bentler and Chou (1987) assert forcing large error terms to be uncorrelated is inappropriate for real data. Therefore, this study adds covariance between items (1 and 2; 6 and 7) which have the largest MI values.

Table 4.4.4.1.2: The model fit results of followers' perception of LMX with modification

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.98	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.97	Yes
RFI	>0.9	0.95	Yes
IFI	>0.9	0.98	Yes
TLI	>0.9	0.97	Yes
CFI	>0.9	0.98	Yes
PNFI	>0.5	0.51	Yes
PCFI	>0.5	0.55	Yes

NPAR=16; CMIN=33.987

Figure 4.4.4.1.1: CFA of followers' perception of LMX (standardized model)

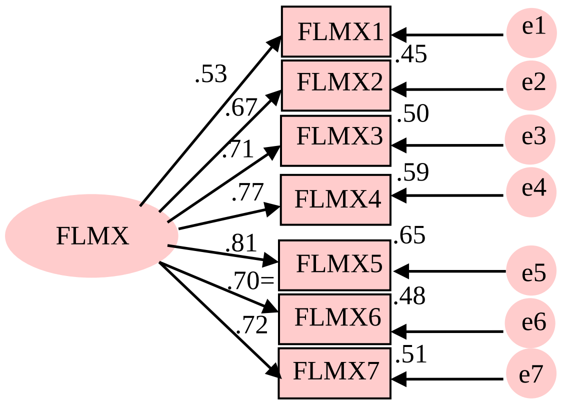
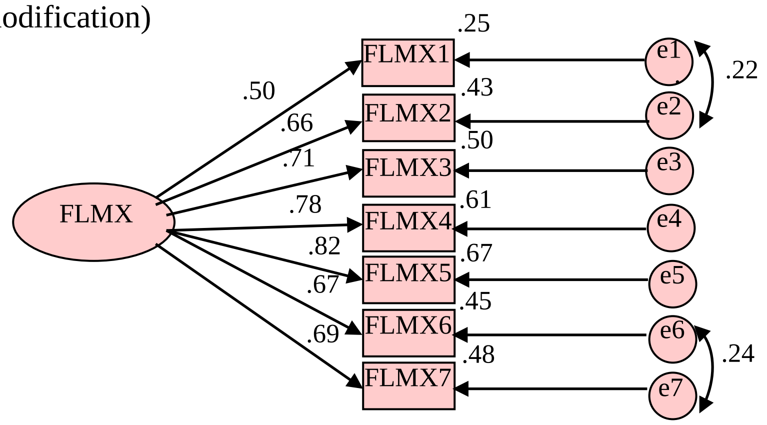


Figure 4.4.4.1.2: CFA of followers' perception of LMX (standardized model with modification)



Note: FLMX 1-7= followers' perception of LMX item 1-7

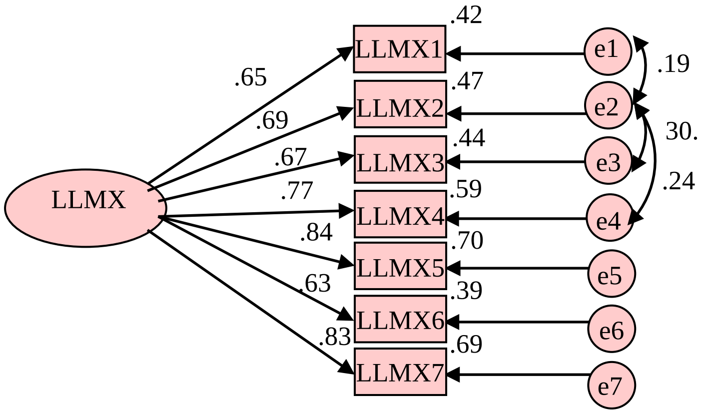
4.4.4.2 Confirmatory factor analysis (CFA) for leaders' perception of LMX

In the next step, the number of participants is 409. Conformatory factor analysis is conducted to assess model fit of leaders' perception of LMX. According to model fit indices, the initial model (particularly for RMSEA) needs to be improved in order to fit the sample data better. Goodness-of-fit statistics related to LMX reveal that incorporation of the error covariance between items (1 and 2; 3 and 4; 2 and 3) made a substantially large improvement to the model fit (Figure 4.4.4.2.1). As seen in Table 4.4.4.2.1, the adjusted model fits the sample data well.

Table 4.4.4.2.1: The model fit results for leaders' perception of LMX

Index	Criterions for model fit indices	The model fit results	The model fit results (modificated)
P	<0.05	0.000	0.00
RMR	<0.05	0.04	0.04
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.12	0.08
GFI	>0.9	0.93	0.97
AGFI	>0.9	0.86	0.93
NFI	>0.9	0.93	0.97
RFI	>0.9	0.90	0.95
IFI	>0.9	0.94	0.98
TLI	>0.9	0.91	0.96
CFI	>0.9	0.94	0.98
PNFI	>0.5	0.62	0.51
PCFI	>0.5	0.63	0.51

Figure 4.4.4.2.1: CFA of leaders' perception of LMX (standardized model with modification)



Note: LLMX1-7= leaders' perception of LMX item 1-7.

4.4.5 Confirmatory factor analysis (CFA) for organisational citizenship behaviours

4.4.5.1 Confirmatory factor analysis (CFA) for individual-level OCB (IOCB)

In this study, the number of participants is 415. The researcher applies CFA for the individual-level OCB construct with a five-factor model: conscientiousness (5 items), sportsmanship (5 items), civic virtue (4items), courtesy (5 items), and altruism (5 items) (Podsakoff et al., 1990). First, all 24 items of OCB are incorporated into the measurement model. Second, all 24 items are linked to the 5 latent variables (conscientiousness, sportsmanship, civic virtue, courtesy, and altruism) separately. Finally, all latent variables are related to each other. The result of the measurement that the initial model fit is not good without any model modification (GFI<.9) is shown in Table 4.4.5.1.1. More details of the first order of CFA of individual-level OCB are shown in Figure 4.4.5.1.1.

Table 4.4.5.1.1: The model fit results of first order of individual-level OCB

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.05	No
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.87	No
AGFI	>0.8	0.84	Yes
NFI	>0.9	0.92	Yes
RFI	>0.9	0.90	Yes
IFI	>0.9	0.94	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.94	Yes
PNFI	>0.5	0.80	Yes
PCFI	>0.5	0.83	Yes

NPAR=58; CMIN=749.541

According to the model fit indices, the initial model (particularly for AGFI) needs to be improved. Hair et al. (2010, P679) posit some criteria to identify the items with bad behaviour in the model. First, the size of the factor loading is one important consideration. In the case of high convergent validity, high loading on factors may indicate that they converge on a common point. At a minimum, standardised loading estimates should be 0.5 or higher (Hair et al., 2010, P679). Therefore, Q5, Q10 and Q11 should be removed from the model (Figure 4.4.5.1.2 and Appendix A2).

Table 4.4.5.1.2: the model fit results of first order of individual-level OCB (modification)

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.90	Yes
AGFI	>0.8	0.87	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.96	Yes
TLI	>0.9	0.95	Yes
CFI	>0.9	0.80	Yes
PNFI	>0.5	0.82	Yes
PCFI	>0.5	0.80	Yes

NPAR=52; CMIN=515.289

Then, the second-order of CFA is shown in the Figure 4.4.5.1.3. When the modification of the first-order GOCB model transforms to the second-order model, it also loads well. The following data indicate that all 21 items can be incorporated into 5 latent variables that may consist of individual-level OCB. Furthermore, in order to avoid the just-identified issue of second-order structure, as suggested by Byrne (2010), this study places equality constraints randomly on four dimensions of IOCB (sportsmanship, civic virtue, courtesy, and altruism). Fit statistics related to a model either as a second-order structure (without equality constraints) and a second-order structure (with equality constraints) will basically be equivalent. It demonstrates that the first-order IOCB model can be transformed to the second-order model.

Table 4.4.5.1.3: The model fit results of second order of individual-level OCB

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.90	Yes
AGFI	>0.8	0.87	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.96	Yes
TLI	>0.9	0.95	Yes
CFI	>0.9	0.96	Yes
PNFI	>0.5	0.82	Yes
PCFI	>0.5	0.84	Yes

NPAR= 47; CMIN=534.441

Figure 4.4.5.1.1: First order of CFA of individual-level OCB (standardized model)

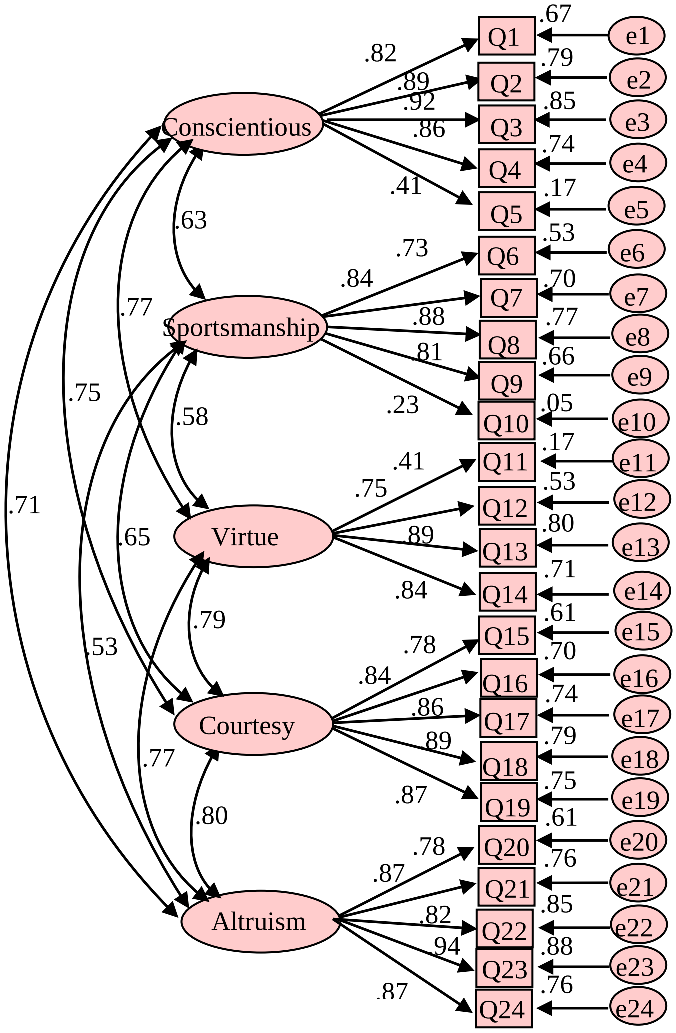


Figure 4.4.5.1.2: First order of CFA of IOCB (standardized model with modification)

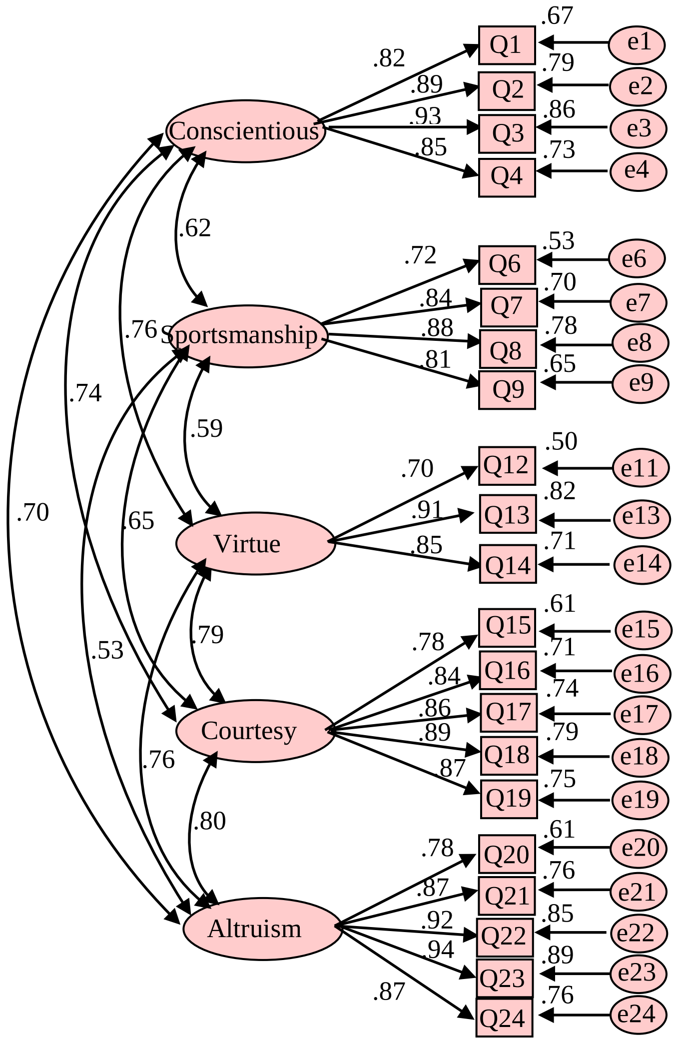
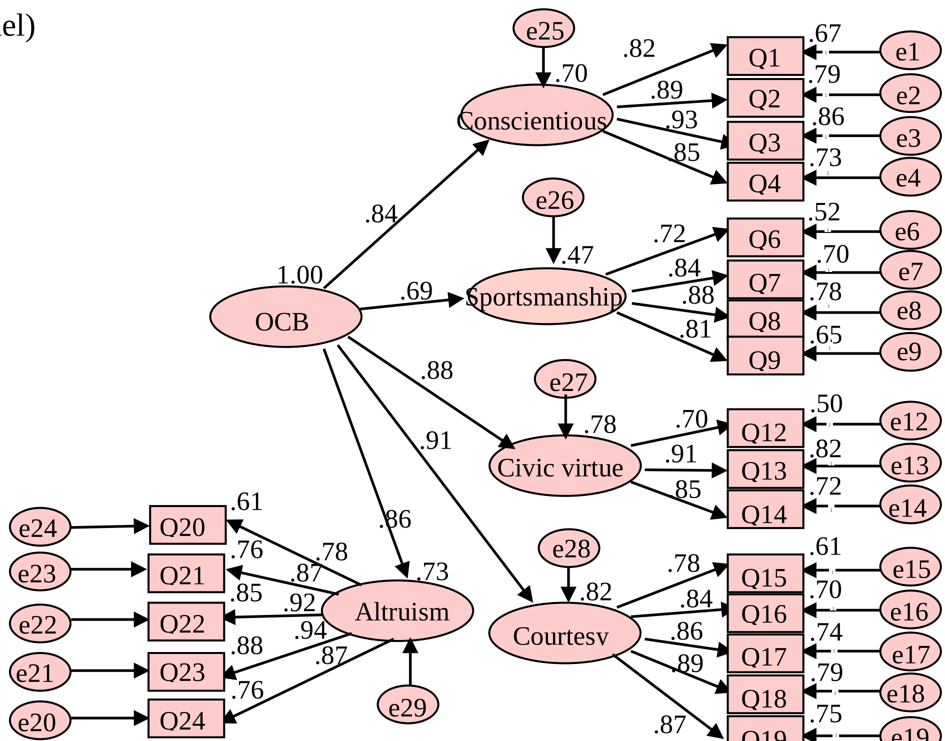


Figure 4.4.5.1.3: Second order of CFA of individual-level OCB (IOCB) (standardized model)



As discussed in the literature review, there is high correlation between the OCBI/OCBO framework and the five-dimension OCB (Hoffman et al, 2007). Specifically, altruism and courtesy in the five-factor model are similar to the OCBI of Williams and Anderson (1991), while sportsmanship, civic virtue and conscientiousness in the five-factor model are similar to the OCBO of Williams and Anderson (1991). Therefore, all subscales (conscientiousness, sportsmanship, civic virtue, courtesy, and altruism) can be further incorporated into OCBI and OCBO. Moreover, as suggested by Byrne (2010), this study places equality constraints randomly on two dimensions of OCBI (civic virtue and courtesy) and one dimension of OCBO (altruism). Fit statistics related to a model either as a second-order structure (without equality constraints) and the second-order structure (with equality constraints) will basically be equivalent. It demonstrates that the first-order IOCB model can be transformed to the second-order model.

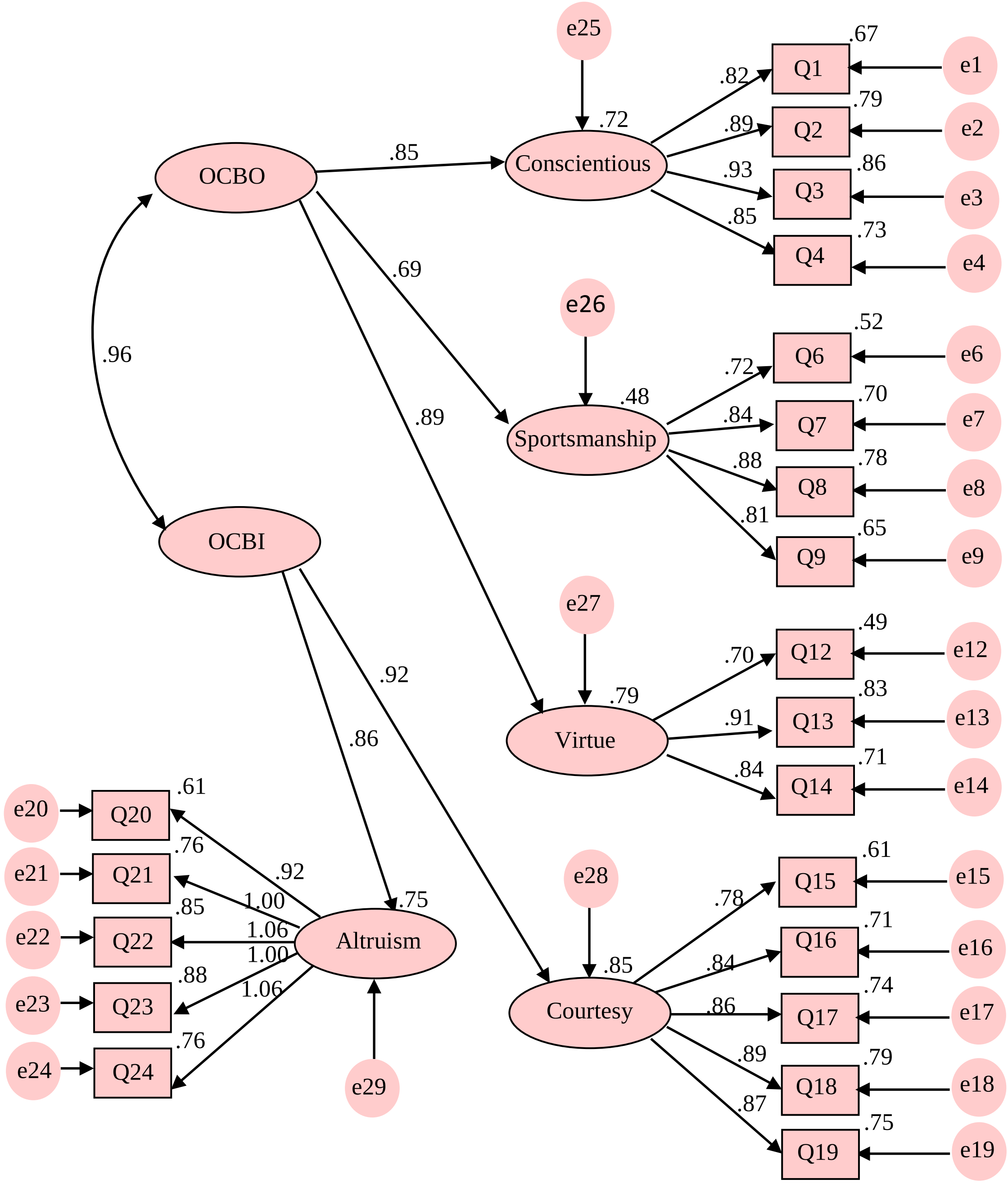
As shown in Table 4.4.5.1.4, the results of the measurement indicate a good model fit. More details of the second order of the CFA are visually illustrated in Figure 4.4.5.1.5

Table 4.4.5.1.4: The model fit results of second order of OCBI and OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.06	Yes
GFI	>0.9	0.90	Yes
AGFI	>0.8	0.87	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.96	Yes
TLI	>0.9	0.95	Yes
CFI	>0.9	0.96	Yes
PNFI	>0.5	0.82	Yes
PCFI	>0.5	0.84	Yes

NPAR= 48; CMIN=529.120

Figure 4.4.5.1.4: Second order of CFA of OCBI and OCBO (standardized model)



4.4.5.2 Confirmatory factor analysis (CFA) for group-level OCB

In this study, the number of participants is 834. The result of the measurement for group-level OCB, that the initial model fit needs to be further improved (GFI>.9), is shown in Table 4.4.5.2.1. More details of first order CFA of group-level OCB are shown in Figure 4.4.5.2.1.

Table 4.4.5.2.1: The model fit results of first order of group-level OCB

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.0	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.87	Yes
GFI	>0.9	0.88	No
AGFI	>0.9	0.85	No
NFI	>0.9	0.90	Yes
RFI	>0.9	0.89	Yes
IFI	>0.9	0.92	Yes
TLI	>0.9	0.91	Yes
CFI	>0.9	0.92	Yes
PNFI	>0.5	0.79	Yes
PCFI	>0.5	0.81	Yes

NPAR=58; CMIN=1327.088

According to model fit indices, the initial model needs to be improved to fit the sample data better. Certain criteria are used to identify the items with bad behaviour in the model. First, the size of the factor loading is one important consideration. At a minimum, standardised loading estimates should be 0.5 or higher (Hair et al., 2010, P679). Therefore, Q5, Q10, Q11 and Q12 should be removed from the model (Figure 4.4.5.2.1 and Appendix A2).

Table 4.4.5.2.2: The model fit results of first order of group-level OCB (modification)

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.0	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.90	No
AGFI	>0.8	0.88	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.95	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.79	Yes
PCFI	>0.5	0.80	Yes

NPAR=50; CMIN=810.382

Then, second-order CFA is shown in Figure 4.4.5.2.2. When the modification of the first-order GOCB model transforms to the second-order model, it also loads well. The following data indicate that all 20 items can be incorporated into 4 latent variables that may consist of group-level OCB. Furthermore, in order to avoid the just-identified issue of second-order structure, as suggested by Byrne (2010), this study places equality constraints randomly on four dimensions of GOCB (sportsmanship, civic virtue, courtesy, and altruism). Fit statistics related to a model either as a second-order structure (without equality constraints) and a second-order structure (with equality constraints) will basically be equivalent. It demonstrates that the first-order GOCB model is can be transformed to the second-order model.

Table 4.4.5.2.3: The model fit results of second order of group-level OCB

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.91	
AGFI	>0.8	0.88	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.94	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.81	Yes
PCFI	>0.5	0.82	Yes

NPAR= 43; CMIN=732.295

Figure 4.4.5.2.1: First order of CFA of group-level OCB (standardized model)

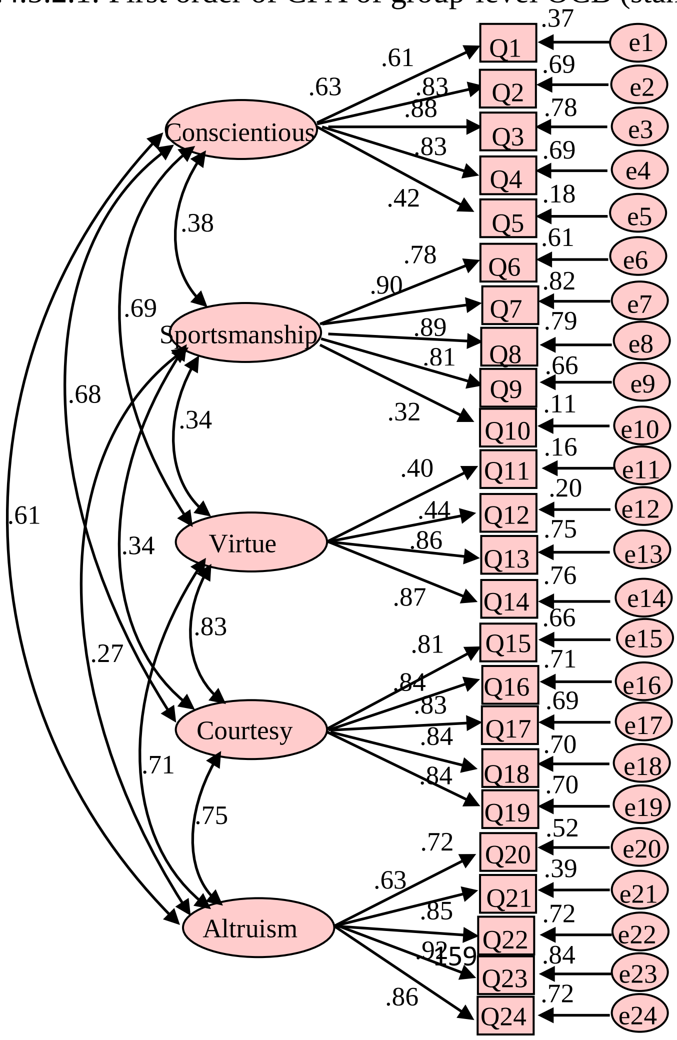
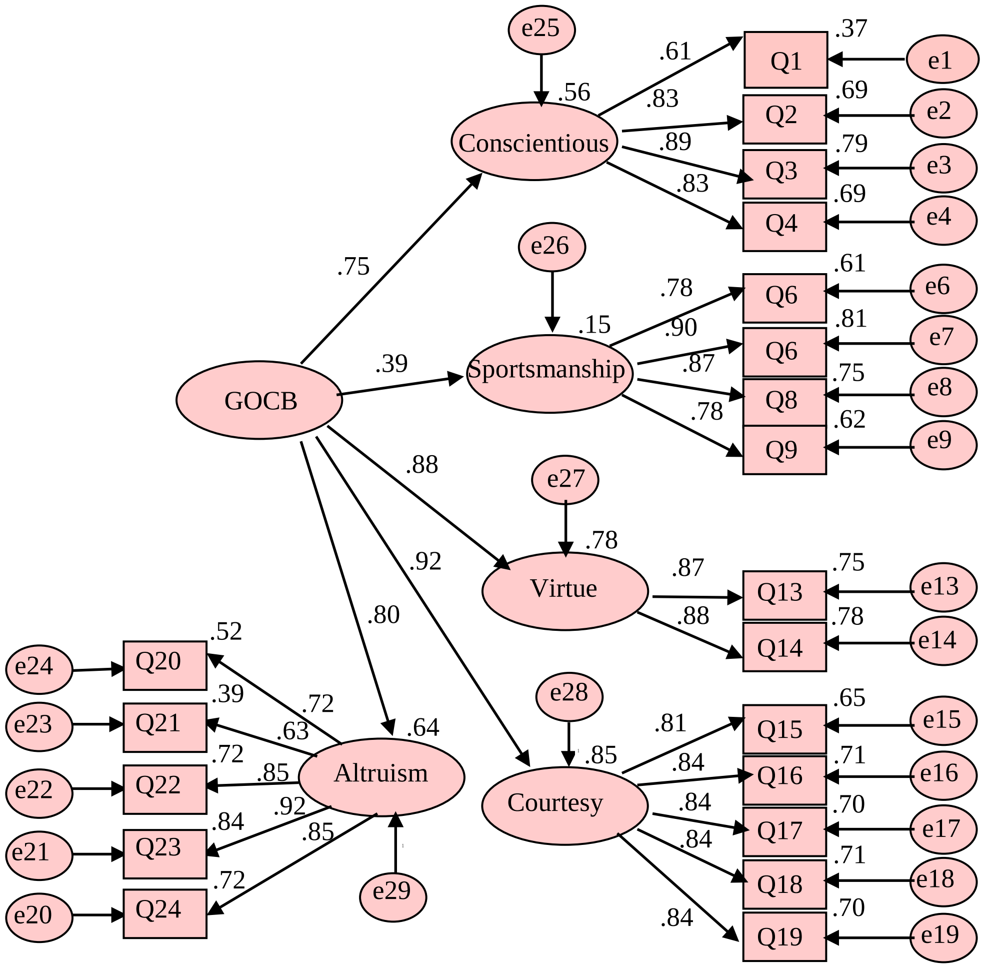


Figure 4.4.5.2.2: Second order of CFA of GOCB (standardized model)



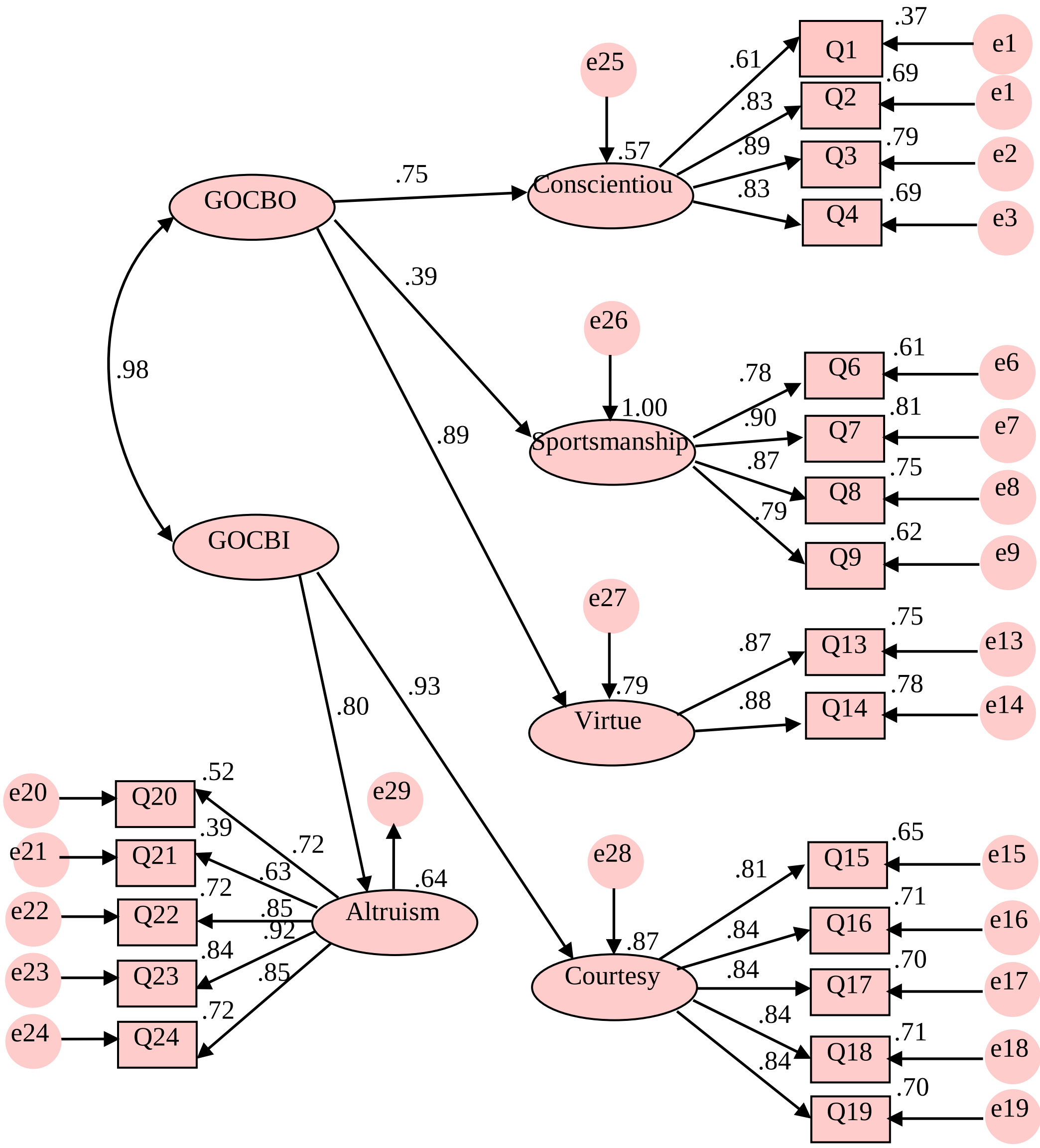
Further, all subscales (conscientiousness, sportsmanship, civic virtue, courtesy, and altruism) can be further incorporated into GOCBI (group-level OCBI) and GOCBO (group-level OCBO). As shown in Table 4.4.5.2.4, the results of the measurement model indicate a good model fit. Further details of the second order of the CFA are visually illustrated in Figure 4.4.5.2.3. Moreover, this study places equality constraints randomly on two dimensions of GOCBI (civic virtue and courtesy) and one dimension of GOCBO (altruism). Fit statistics related to a model either as a second-order structure (without equality constraints) and the second-order structure (with equality constraints) will basically be equivalent. It demonstrates that the first-order GOCB model can be transformed to the second-order model.

Table 4.4.5.2.4: The model fit results of GOCBI and GOCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.91	Yes
AGFI	>0.8	0.88	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.94	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.80	Yes
PCFI	>0.5	0.81	Yes

NPAR= 44; CMIN=730.784

Figure 4.4.5.2.3: Second order of CFA of GOCBI and GOCBO (standardized model)



4.4.6 Confirmatory factor analysis (CFA) for CSI

Reviewing the debates about the measurement of cognitive style, this study measures the CFA of CSI by different approaches, and then determines which is more suitable for the current study.

4.4.6.1 The uni-factorial CSI in CFA

According to Allinson and Hays (1996, p.124), "*if the CSI does measure the superordinate dimension of cognitive style, its internal structure should be uni-factorial*". All 38 items of CSI are incorporated into the measurement model. According to Table 4.4.6.1.1 it shows that model fit is poor in most of the criteria; thus the uni-factorial model of CSI is rejected in the factor analysis.

Table 4.4.6.1.1: The model fit results of one-factor CSI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.09	No
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.74	No
AGFI	>0.8	0.71	No
NFI	>0.9	0.43	No
RFI	>0.9	0.39	No
IFI	>0.9	0.48	No
TLI	>0.9	0.45	No
CFI	>0.9	0.48	No
PNFI	>0.5	0.40	No
PCFI	>0.5	0.45	No
CMIN=3157.289; NPAR=76; N= 834			

Note: N= the number of participants

4.4.6.2 6 parcels of CSI in CFA

The rejection of a one-factor CSI follows the suggestion by Kline (1993) that the inter-item correlations in the one-factor model is low (only around 0.2 with little variance) (Kline, 1993), and it is unstable for items as single variables. In order to solve these limitations of applying the one-factor measure, Cattell (1973) advocates that items are parcelled as groups in the factor analysis. A parcel is defined as an observed variable that is a simple sum of some items which are similar to each other (Cattell, 1973). Applying this method, scales are created that are homogeneous in regard to many statistical criteria and relate to factor analysis methods in the usual fashion (Hodgkinson and Sadler-Smith, 2003).

In the present study, following Allinson and Hayes (1996)'s research, all 38 items are incorporated into 6 parcels on the basis of inter-item correlations. (1) Parcel one comprises items 11, 19, 20, 21, 22, 27, 33 and 35; (2) parcel two comprises items 2, 8, 10, 12, 15 and 32; (3) parcel three comprises items 5, 9, 16, 17, 24 and 34; (4) parcel four comprises items 1, 25, 26, 28, 29 and 30; (5) parcel five comprises items 4, 6, 18, 31, 36 and 38; and (6) parcel six comprises 3, 7, 13, 14, 23 and 37. Each parcel is the aggregation of scores of several items (Allinson and Hayes, 1996).

Little et al. (2013) indicate many advantages for item parcelling. Parcels may have higher reliability, greater communality, and higher ratio of common-to-unique factor variance and lower likelihood of distributional violations. In addition, a model with parcels has fewer parameter estimates, lower indicator-to-sample size ratio and reduced sources of sampling error. However, one argument against parcelling is that it is possible to mask model mis-specifications (Hall et al., 1999). In other words, it is difficult to detect true mis-specification which comes from item cross-loadings or residual correlations when items are aggregated into a parcel. Such mis-specifications can cause biased estimates of other model parameters (Bandalos and Finney, 2001).

Nevertheless, other researchers (e.g. Little et al. 2013) assert that the related pro-parcel viewpoint on the issue of mis-specification focuses on two perspectives. Firstly the parcelled items may reduce Type II errors. Second, careful and well-informed modellers can find out notable mis-specification which may affect structural parameter estimates because they are keenly aware of the item-level relations. The 6-parcels used with the CSI instrument is designed by well-informed modelLers (Hayes and Allinson, 1996) and has been tested in many studies (e.g. Armstrong, 1999; Allinson, Armstrong and Hayes, 2001), so it may avoid the issue of mis-specification. Moreover, according to Hayes and Allinson (1996)'s study, 6 parcels are created according to empirical procedures (e.g. conducting an item-level exploratory factor analysis to test the item-level content, reviewing the matrix of correlations, and testing an item-level reliability analysis) as suggested by Little et al. (2013), so item parcels are justifiably warranted.

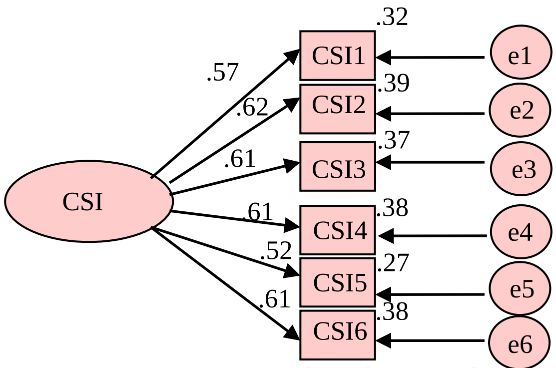
All 38 items of the CSI are incorporated into the measurement model (Figure 4.4.6.2.1). Table 4.4.6.2.1 shows that the results indicate a good model fit. Therefore, the 6 parcels of CSI are acceptable in the measurement model.

Table 4.4.6.2.1: The model fit results of 6 parcels of CSI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.03	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.98	Yes
AGFI	>0.8	0.95	Yes
NFI	>0.9	0.95	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.96	Yes
TLI	>0.9	0.933	Yes
CFI	>0.9	0.96	Yes
PNFI	>0.5	0.58	Yes
PCFI	>0.5	0.58	Yes
CMIN=48.776; NPAR=12; N= 834			

Note: N= the number of participants

Figure 4.4.6.2.1: CFA of CSI (standardized model)



Note: CSI1-6= congnitive style index parcel 1-6

4.4.6.3 Two factors model of CSI in CFA

Although the 6 parcels of CSI result in factors which are more reliable, this method is potentially problematic. In terms of the CSI, applying 6 parcels of the CSI would result in a conceptually heterogeneous group of item parcels (Kline, 1993). For instance, both intuitive items and analytic items are mixed in the parcels. As a result, it is possible to increase the likelihood of inter-correlation between items (Hodgkinson and Sadler-Smith, 2003).

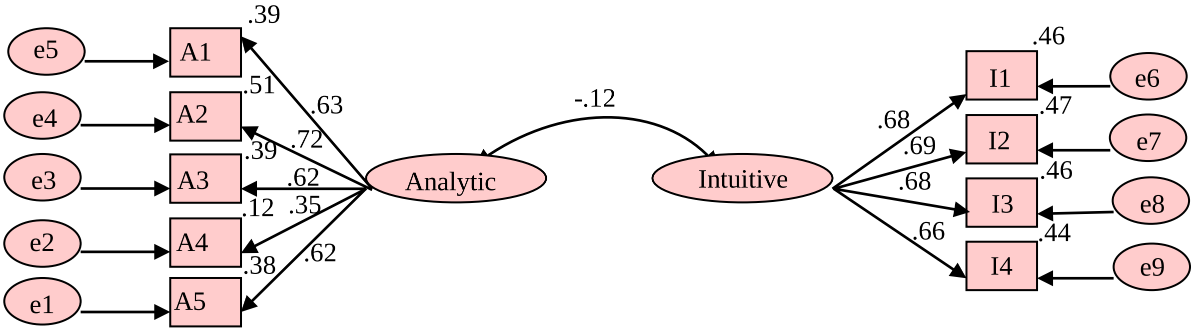
In order to separate intuitive and analytic items into two domains, Hodgkinson and Sadler-Smith (2003) recommend a two-factor model in which all 38 items are incorporated into two factors. A factor with 21 items indicates the analytic cognitive style and a factor with 17 items reflects the intuitive style. Moreover, four items are randomly chosen from each factor to create parcels. In other words, 21 analytic items are allocated randomly into five analytic-specific parcels; 17 intuitive items are allocated randomly into four intuitive-specific parcels. The random selection steps are repeated four times (from iteration 1 to iteration 4) in order to ensure that the results of factor analysis are not specific to the make-up of the parcels. Table 4.4.6.3.1 shows that model fit show different results. Two of the datasets (iteration 3 and 4) reached the standard of model fit indices (AGFI > .90; CFI > .90; NFI > .90; RMSEA < .07), while the other two did not.

Table 4.4.6.3.1: The model fit results of two factor model of CSI

Index	Criterions for model fit indices	Iteration 1	Iteration 2	Iteration 3	Iteration 4
P	<0.05	0	0	0	0
RMR	<0.05	.07	.08	.04	.05
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	.07	.09	.05	.51
GFI	>0.9	.96	.95	.98	.98
AGFI	>0.8	.94	.91	.97	.96
NFI	>0.9	.92	.87	.95	.94
RFI	>0.9	.89	.82	.93	.92
IFI	>0.9	.94	.89	.97	.96
TLI	>0.9	.91	.85	.96	.95
CFI	>0.9	.94	.89	.97	.96
PNFI	>0.5	.66	.63	.69	.68
PCFI	>0.5	.68	.64	.70	.70
N= 834					

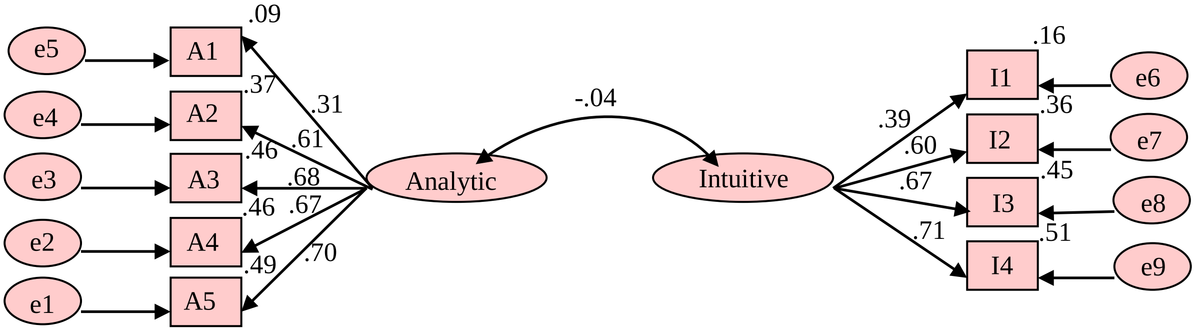
Note: N= the number of participants

Figure 4.4.6.3.1: CFA of two-factor CSI model (iteration 1)



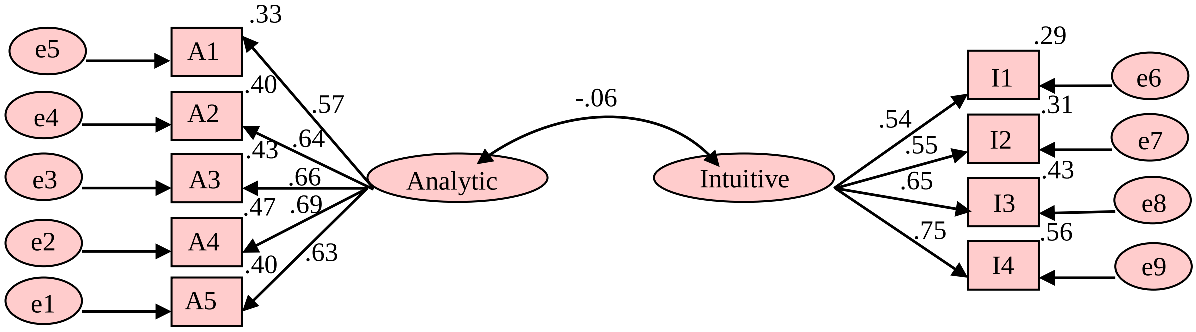
Note: A1-5= analytic parcel 1-5; I1-4= intuitive parcel 1-4

Figure 4.4.6.3.2: CFA of two-factor CSI model (iteration 2)



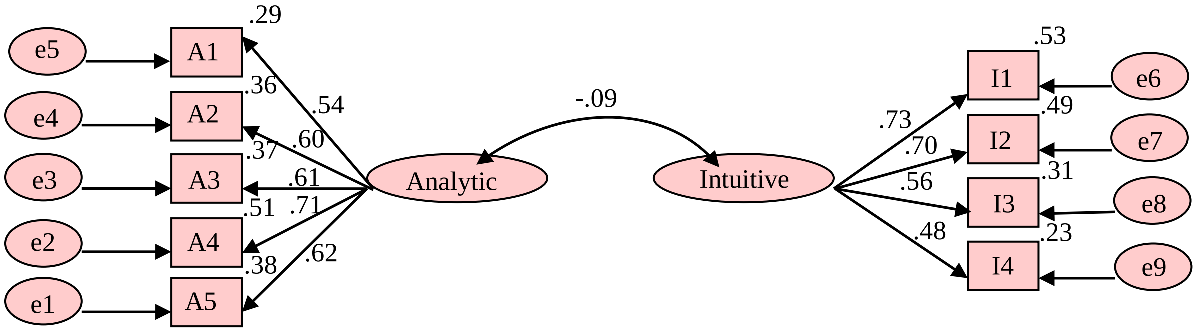
Note: A1-5= analytic parcel 1-5; I1-4= intuitive parcel 1-4

Figure 4.4.6.3.3: CFA of two-factor CSI model (iteration 3)



Note: A1-5= analytic parcel 1-5; I1-4= intuitive parcel 1-4

Figure 4.4.6.3.4: CFA of two-factor CSI model (iteration 4)



Note: A1-5= analytic parcel 1-5; I1-4= intuitive parcel 1-4

In a comparison between the two-factor model, one-factor model and 6-parcel model, the 6-parcel model fits the data better than the others. Hence, it is applied in this research to measure cognitive style.

4.5 The structure model

The previous section showed that the constructs in this research are reliable and valid. In this section, data are tested in the structural model, which indicates the relationships between constructs (Hair et al., 2006).

4.5.1 Test of hypothesis 1

H1: Individuals whose cognitive styles are more intuitive than analytic will exhibit higher levels of OCBI

The relationship between cognitive style and individual-target organisational citizenship behaviours (including altruism and courtesy) is examined by path analysis. The model fit indices without any modification are shown in Table 4.5.1.1. These results indicate that the model fits the data well.

Table 4.5.1.1: The model fit results of CSI and OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.047	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.06	Yes
GFI	>0.9	0.95	Yes
AGFI	>0.8	0.93	Yes
NFI	>0.9	0.91	Yes
RFI	>0.9	0.89	No
IFI	>0.9	0.95	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.72	Yes

NPAR=24; CMIN=96.501

The following table explains the results of CSI and OCBI (group members' OCBI). The correlation between CSI and OCBI is statistically significant at the 0.01 level (*). According to un-standardised and standardised estimates, this result demonstrates that individuals with lower CSI scores (intuitive style) are more likely to tend toward a higher level of OCB than those with higher CSI scores (analytic style). Therefore, hypothesis 1 is supported.

Table 4.5.1.2: Regression weights: OCBI and CSI

			Estimate	S.E.	C.R.	P	Label
OCBI	<---	CSI	-.186	.287	-2.619	.009	par_7
altruism	<---	OCBI	.862				
Courtesy	<---	OCBI	.852	.216	3.634	***	par_1
CSIP6	<---	CSI	.572				
CSIP5	<---	CSI	.472	.143	6.859	***	par_2
CSIP4	<---	CSI	.614	.132	8.218	***	par_3
CSIP3	<---	CSI	.546	.121	7.619	***	par_4
CSIP2	<---	CSI	.648	.134	8.480	***	par_5

			Estimate	S.E.	C.R.	P	Label
CSIP1	<---	CSI	.674	.177	8.651	***	par_6
N= 362							

Note: the column of regression weights is the standardized outputs. All other outputs are from un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6. N= the number of participants.

*: p<0.05; **: p<0.01; ***: P<0.001.

Further analysis is conducted to test the relationship between cognitive style and OCBO. According to Table 4.5.1.3, there is a non-significant negative relationship between these two variables.

Table 4.5.1.3: Regression weights: CSI and OCBO

			Estimate	S.E.	C.R.	P	Label
OCBO	<---	CSI	-.046	.164	-.669	.503	par_7
Conscientious	<---	OCBO	.786				
Sportsmanship	<---	OCBO	.582	.099	7.733	***	par_1
CSIP6	<---	CSI	.617				
CSIP5	<---	CSI	.520	.127	7.774	***	par_2
CSIP4	<---	CSI	.655	.109	9.726	***	par_3
CSIP3	<---	CSI	.634	.111	9.181	***	par_4
CSIP2	<---	CSI	.674	.110	9.873	***	par_5
CSIP1	<---	CSI	.709	.153	9.688	***	par_6
Virtue	<---	OCBO	.655	.073	7.908	***	par_8

4.5.2 Test of hypothesis 4

H4: Intuitive style is more likely to tend toward a higher level of EI than analytic style.

Path analysis is applied to examine the relationship between cognitive style and emotional intelligence. The model fit indices without any modification are shown in Table 4.5.2.1; these results indicate that the model fits the data well.

Table 4.5.2.1: The model fit results of CSI and EI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.049	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.92	Yes

RFI	>0.9	0.90	Yes
IFI	>0.9	0.93	Yes
TLI	>0.9	0.91	Yes
CFI	>0.9	0.93	Yes
PNFI	>0.5	0.69	Yes
PCFI	>0.5	0.70	Yes

NPAR=21; CMIN=171.114

Table 4.5.2.2 below explains the results of CSI and EI. The correlation between CSI and EI is statistically significant at the 0.001 level (***). According to un-standardised and standardised estimates, this result demonstrates that a higher score of CSI (analytic style) indicates a tendency toward a higher level of EI than a lower CSI score of CSI (intuitive style). Therefore, hypothesis 4 is rejected.

Table 4.5.2.2: Regression Weights: EI and CSI

			Estimate	S.E.	C.R.	P	Label
EI	<---	CSI	.223	.076	4.811	***	par_9
CSIP1	<---	CSI	.567				
CSIP2	<---	CSI	.632	.074	12.587	***	par_1
CSIP3	<---	CSI	.605	.073	12.279	***	par_2
CSIP4	<---	CSI	.627	.076	12.530	***	par_3
CSIP5	<---	CSI	.513	.085	11.005	***	par_4
CSIP6	<---	CSI	.610	.072	12.332	***	par_5
SEA	<---	EI	.652				
OEA	<---	EI	.660	.088	15.075	***	par_6
UOE	<---	EI	.786	.082	16.600	***	par_7
ROE	<---	EI	.706	.091	15.798	***	par_8
N= 821							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6; N= the number of participants.

*: p<0.05; **: p<0.01; ***: P<0.001.

After testing the direct and indirect effect of combination of intuitive score and analytic score, in order to get deep understanding of the relationship between EI and cognitive style, further analysis is needed to consider leaders' intuitive style and analytic style separately. Median split is applied to distinguish both styles. In the structural model, there is a non-significant relationship between EI and intuitive style (p=.313). However, the model fit is poor (table 4.5.2.3) and so improvement is not suggested because factor loading is poor in most of the parcels of the CSI. Therefore, a correlation test is conducted to further confirm the result that EI is not related to intuitive style (p=.913) (Table 4.5.2.4).

Table 4.5.2.3: The model fit results of EI and intuitive style

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.06	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.84	No
RFI	>0.9	0.79	No
IFI	>0.9	0.90	No
TLI	>0.9	0.88	No
CFI	>0.9	0.90	Yes
PNFI	>0.5	0.64	Yes
PCFI	>0.5	0.68	Yes

Table 4.5.2.4: Correlations between intuitive style and emotional intelligence

		Intuitive style	Emotional intelligence
Intuitive style	Pearson correlation	1	-.0006
	Sig. (2-tailed)		.913

Additionally, there is a non-significant relationship between EI and analytic style (p=.171). However, the model fit is poor (Table 4.5.2.5) and improvement is not suggested because factor loading is poor in most of the parcels of CSI. Therefore, a correlation test is conducted to further confirm the result that EI is not related to analytic style (p=.08) (Table 4.5.2.6).

Table 4.5.2.5: The model fit results of EI and analytic style

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.06	No
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.93	Yes
NFI	>0.9	0.84	No
RFI	>0.9	0.84	No
IFI	>0.9	0.91	Yes
TLI	>0.9	0.88	No
CFI	>0.9	0.91	Yes

PNFI	>0.5	0.66	Yes
PCFI	>0.5	0.68	Yes

Table 4.5.2.6: Correlations between analytic style and emotional intelligence

		Analytic style	Emotional intelligence
Analytic style	Pearson correlation	1	.085
	Sig. (2-tailed)		.08

Therefore, different CSI measures may obtain different results. This study applies the result from the first option that positive relationship between EI and cognitive because it follows the original definition of cognitive style as a continuum variable.

4.5.3 Test of hypothesis 6

H6: Leaders' cognitive style is negatively related to followers' OCB.

The relationship between leaders' cognitive style and followers' OCB is examined by path analysis. The model fit indices without any modification are shown in Table 4.5.3.1. The initial model indicates that the RMSEA is close to 1 and the goodness of fit is less than .9.Thus, the model needs to be modified.

Table 4.5.3.1: The model fit results of leaders' cognitive style and followers' OCB

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.1	NO
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.06	NO
GFI	>0.9	0.92	Yes
AGFI	>0.8	0.87	Yes
NFI	>0.9	0.84	NO
RFI	>0.9	0.80	NO
IFI	>0.9	0.88	NO
TLI	>0.9	0.84	NO
CFI	>0.9	0.87	NO
PNFI	>0.5	0.66	Yes
PCFI	>0.5	0.69	Yes

NPAR=23; CMIN=181.288

According to model fit indices, the initial model (particularly for RMSEA) needs to be improved in order to fit the sample data better. Goodness-of-fit statistics reveal that incorporation of the error covariance between items or subscales (conscientious and virtue; courtesy and one parcel of cognitive style) made a substantially large improvement to the model fit. As seen in Table 4.5.3.2, the adjusted model fits the sample data well.

Table 4.5.3.2: The model fit results of leaders' cognitive styles and followers' OCB (modificated)

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.000	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.91	Yes
NFI	>0.9	0.90	Yes
RFI	>0.9	0.86	Yes
IFI	>0.9	0.93	Yes
TLI	>0.9	0.90	Yes
CFI	>0.9	0.92	Yes
PNFI	>0.5	0.67	Yes
PCFI	>0.5	0.69	Yes

NPAR=25; CMIN=124.363

The following Table 4.5.3.3 explains the results of leaders' CSI and followers' OCB. The regression weights of path analysis indicate that although leaders' CSI is negatively related to followers' OCB, the relationship is at the non-significant level (p>.01). Therefore, hypothesis 6 is partially supported.

Table 4.5.3.3: Regression Weights: CSI and FOCB

			Estimate	S.E.	C.R.	P	Label
FOCB	<---	LCSI	-.045	.306	-.666	.505	par_7
Altruism	<---	FOCB	.817				
Courtesy	<---	FOCB	.916	.053	17.238	***	par_1
CSIP6	<---	LCSI	.558				
CSIP5	<---	LCSI	.425	.166	5.952	***	par_2
CSIP4	<---	LCSI	.552	.141	7.197	***	par_3
CSIP3	<---	LCSI	.622	.154	7.757	***	par_4
CSIP2	<---	LCSI	.659	.164	8.002	***	par_5
CSIP1	<---	LCSI	.638	.183	7.867	***	par_6
Conscientious	<---	FOCB	.539	.050	9.873	***	par_8
Sportsmanship	<---	FOCB	.697	.056	13.468	***	par_9
Virtue	<---	FOCB	.496	.033	8.990	***	par_10
N= 327							

Note: N= the number of participants

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6. FOCB= followers' organisational citizenship behaviours; *: p<0.05; **: p<0.01; ***: P<0.001.

4.5.4 Test of hypothesis 7

H7a: Leaders' perceived the quality of LMX mediates the effects of leaders' cognitive style on followers OCBI.

As mentioned above, there is no significant relationship between leaders' cognitive style and followers' OCB, so the purpose of this hypothesis is to test whether leaders' perceived quality of LMX may partly mediate the effects of leaders' cognitive style In order to understand the indirect relationship between leaders' cognitive style and followers' OCBI, path analysis is conducted.

The first step is to test the relationship between leaders' cognitive style and LMX. The initial model fit indices for the leaders' perceived LMX and leaders' cognitive style are shown in Table 4.5.4.1

The initial model fit indices without modification are shown in Table 4.5.4.1. These results indicate that the model fits the data well. In the path analysis, leaders' cognitive style (is considered as a continuous variable) does not have a direct impact on the leaders' perceived quality of LMX (Table 4.5.4.2 and Figure 4.5.4.1). Furthermore, this study conducts a bootstrapping test, the relationship between leaders' cognitive style and leaders' perceived quality of LMX is also insignificant (p=.86).

Table 4.5.4.1: the model fit results of Leaders' cognitive styles and leaders' perceived the quality of LMX

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.68	Yes
GFI	>0.9	0.93	Yes
AGFI	>0.8	0.90	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.93	Yes
TLI	>0.9	0.91	Yes
CFI	>0.9	.93	Yes
PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.73	Yes

NPAR=30; CMIN=149.04

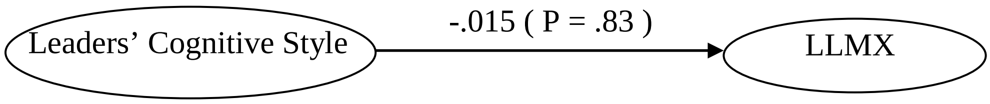
Table 4.5.4.2: Regression Weights: LLMX, Leaders’ cognitive style and FOCBI

			Estimate	S.E.	C.R.	P	Label
LLMX	<---	Leaders’ cognitive style	-.015	.048	-.215	.830	par_12
LLMX1	<---	LLMX	.620				
LLMX2	<---	LLMX	.652	.094	10.163	***	par_1
LLMX3	<---	LLMX	.615	.103	9.011	***	par_2
LLMX4	<---	LLMX	.742	.110	10.373	***	par_3
LLMX5	<---	LLMX	.834	.121	11.175	***	par_4
LLMX6	<---	LLMX	.569	.084	8.466	***	par_5
LLMX7	<---	LLMX	.813	.099	11.016	***	par_6
CSIP6	<---	Leaders’ cognitive style	.479				
CSIP5	<---	Leaders’ cognitive style	.528	.260	5.927	***	par_7
CSIP4	<---	Leaders’ cognitive style	.500	.192	5.751	***	par_8
CSIP3	<---	Leaders’ cognitive style	.653	.237	6.518	***	par_9
CSIP2	<---	Leaders’ cognitive style	.572	.214	6.169	***	par_10
CSIP1	<---	Leaders’ cognitive style	.588	.252	6.252	***	par_11

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6. LLMX= leaders’ perceived quality of leader-member exchange.

*: p<0.05; **: p<0.01; ***: P<0.001.

Figure 4.5.4.1 the direct relationship between leaders’ cognitive style and LLMX



Secondly, this study tests the indirect relationship between leaders’ cognitive style and followers’ OCBI and the mediating role of leaders’ perceived LMX. The initial model fit indices without modification are shown in Table 4.5.4.3. These results indicate that the model fits the data well. Although leaders’ perceived the quality of LMX has a direct impact on followers’ OCBI, leaders’ cognitive style (it is considered as a continuous variable) does not have a direct impact on the leaders’ perceived quality of LMX, and leaders’ cognitive style has no direct impact on followers’ OCBO because this relationship is not significant (Table 4.5.4.4 and Figure 4.5.4.2). Moreover, this study conducts Sobel’s test, which measures whether a mediator carries the influence of an independent variable on a dependent variable. The influence of leaders’ perceived

LMX is insignificant (Test statistic=-.229; S.E.=.186; P= .82). In addition, in the bootstrapping test (Table 4.5.4.5), all three variables do not have a significant and direct or indirect (p=.85) relationship. Therefore, hypothesis 7a is rejected.

Table 4.5.4.3: the model fit results of Leaders' cognitive styles, leaders' perceived the quality of LMX and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.92	Yes
AGFI	>0.8	0.90	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.92	Yes
TLI	>0.9	0.90	Yes
CFI	>0.9	.93	Yes
PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.74	Yes

NPAR=36; CMIN=211.061

Table 4.5.4.4: Regression Weights: LLMX, Leaders' cognitive style and FOCBI

			Estimate	S.E.	C.R.	P	Label
LLMX	<---	Leaders' cognitive style	-.016	.048	-.226	.821	par_14
FOCBI	<---	LLMX	.642	.536	7.242	***	par_8
FOCBI	<---	Leaders' cognitive style	.016	.259	.257	.797	par_15
LLMX1	<---	LLMX	.619				
LLMX2	<---	LLMX	.645	.093	10.159	***	par_1
LLMX3	<---	LLMX	.601	.102	8.889	***	par_2
LLMX4	<---	LLMX	.740	.109	10.417	***	par_3
LLMX5	<---	LLMX	.834	.120	11.271	***	par_4
LLMX6	<---	LLMX	.578	.084	8.619	***	par_5
LLMX7	<---	LLMX	.818	.098	11.144	***	par_6
altruism	<---	FOCBI	.733				
Courtesy	<---	FOCBI	.852	.099	9.498	***	par_7
CSIP6	<---	Leaders' cognitive style	.480				
CSIP5	<---	Leaders' cognitive style	.529	.259	5.935	***	par_9
CSIP4	<---	Leaders' cognitive style	.500	.192	5.752	***	par_10
CSIP3	<---	Leaders' cognitive style	.653	.236	6.524	***	par_11
CSIP2	<---	Leaders' cognitive style	.572	.214	6.175	***	par_12
CSIP1	<---	Leaders' cognitive style	.588	.251	6.255	***	par_13
N= 325							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6.

LLMX= leaders' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours; N= the number of participants.

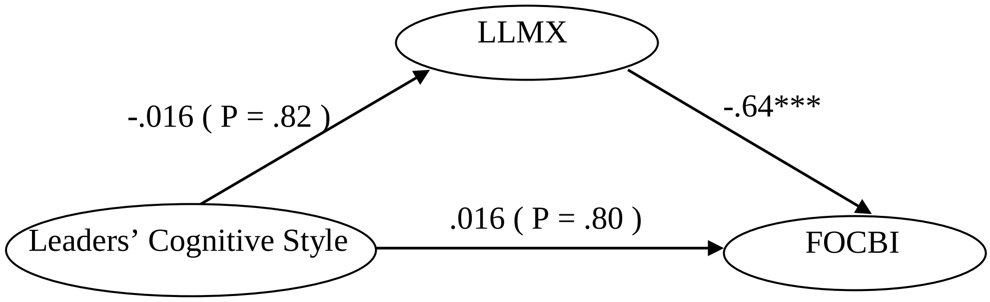
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.4.5: Direct effects (leaders' cognitive style, LLMX, FOCBI) - Two tailed significance

	leaders' cognitive style	LLMX	FOCBI
LLMX	.865	...	...
FOCBI	.827	.001	...

Note: LLMX= leaders' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours.

Figure 4.5.4.2 the relationship between LLMX, Leaders' cognitive style and FOCBI



H7b: Leaders' perceived the quality of LMX mediates the effects of leaders' cognitive style on followers OCBO.

Path analysis is conducted in order to understand the indirect relationship between leaders' cognitive style and followers' OCBO.

The initial model fit indices without modification are shown in Table 4.5.4.6. These results indicate that the model fits the data well. Although the leaders' perceived the quality of LMX has a direct impact on followers' OCBO, leaders' cognitive style does not have a direct impact on the leaders' perceived the quality of LMX , and leaders' cognitive style does not directly impact on followers' OCBO because this relationship is not significant (Table 4.5.4.7 and Figure 4.5.4.3). Moreover, this study conducts Sobel's test which it measures whether a mediator carries the influence of an independent variable on a dependent variable. The influence of leaders' perceived LMX is insignificant (Test statistic=-.224; S.E.=.11; P= .82). In addition, in the bootstrapping test (Table 4.5.4.8), all of the three variables do not have a significant and direct or indirect (p=.85) relationship. Therefore, hypothesis 6b is rejected.

Table 4.5.4.6: the model fit results of Leaders' cognitive style, leaders' perceived the quality of LMX and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.07	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.923	Yes
AGFI	>0.8	0.90	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.93	Yes
TLI	>0.9	0.91	Yes
CFI	>0.9	0.93	Yes
PNFI	>0.5	0.72	Yes
PCFI	>0.5	0.76	Yes

NPAR=38; CMIN=217.713

Table 4.5.4.7: Regression Weights: LLMX, Leaders' cognitive style and FOCBO

			Estimate	S.E.	C.R.	P	Label
LLMX	<---	Leaders' cognitive style	-.016	.049	-.227	.820	par_15
FOCBO	<---	LLMX	.664	.293	7.393	***	par_9
FOCBO	<---	Leaders' cognitive style	.108	.147	1.645	.100	par_16
LLMX1	<---	LLMX	.627				
LLMX2	<---	LLMX	.650	.091	10.291	***	par_1
LLMX3	<---	LLMX	.606	.100	9.040	***	par_2
LLMX4	<---	LLMX	.742	.106	10.568	***	par_3
LLMX5	<---	LLMX	.827	.116	11.387	***	par_4
LLMX6	<---	LLMX	.570	.082	8.599	***	par_5
LLMX7	<---	LLMX	.820	.096	11.326	***	par_6
Virtue	<---	F OCBO	.663				
Conscientious	<---	FOCBO	.602	.161	8.512	***	par_7
Sportsmanship	<---	F OCBO	.805	.185	9.750	***	par_8
CSIP6	<---	Leaders' cognitive style	.480				
CSIP5	<---	Leaders' cognitive style	.530	.259	5.946	***	par_10
CSIP4	<---	Leaders' cognitive style	.498	.191	5.749	***	par_11
CSIP3	<---	Leaders' cognitive style	.646	.234	6.511	***	par_12
CSIP2	<---	Leaders' cognitive style	.578	.214	6.215	***	par_13
CSIP1	<---	Leaders' cognitive style	.589	.251	6.268	***	par_14
N= 325							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6. LLMX= leaders' perceived quality of leader-member exchange. FOCBO= followers' organisational-target organisational citizenship behaviours; N= the number of participants.

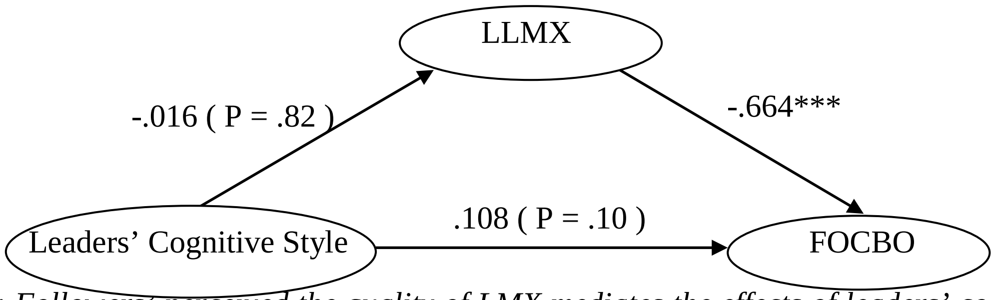
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.5.8: Direct effects (leaders' cognitive style, LLMX, FOCBO)- Two tailed significance

	leaders' cognitive style	LLMX	FOCBO
LLMX	.857	...	...
FOCBO	.080	.001	...

Note: LLMX= leaders' perceived quality of leader-member exchange. FOCBO= followers' organisational-target organisational citizenship behaviours.

Figure 4.5.4.3 the relationship between LLMX, Leaders' cognitive style and FOCBO



H7c: Followers' perceived the quality of LMX mediates the effects of leaders' cognitive style on followers OCBI.

Firstly, regarding the direct relationship between leaders' cognitive style and followers' perceived LMX, the initial model fit indices without modification are shown in Table 4.5.4.9. These results indicate that the model fits the data well. Therefore, further path analysis is conducted as shown in Table 4.5.4.10. and Figure 4.5.4.4. It indicates that leaders' cognitive style does not have a direct impact on the followers' perceived quality of LMX. Furthermore, this study conducts a bootstrapping test, which shows the relationship between leaders' cognitive style and followers' perceived quality of LMX is also insignificant (p=.63).

Table 4.5.4.9: the model fit results of Leaders' cognitive style and followers' perceived the quality of LMX

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.95	Yes
AGFI	>0.8	0.92	Yes
NFI	>0.9	0.91	Yes
IFI	>0.9	0.96	
TLI	>0.9	0.95	Yes
CFI	>0.9	0.96	Yes

PNFI	>0.5	0.72	Yes
PCFI	>0.5	0.76	Yes

NPAR=29; CMIN=114.26

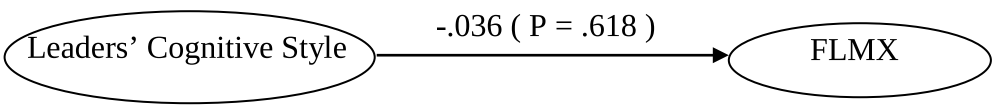
Table 4.5.4.10: Regression Weights: FLMX and Leaders' cognitive style

			Estimate	S.E.	C.R.	P	Label
FLMX	<---	Leaders' cognitive style	-.036	.046	-.498	.618	par_12
FLMX1	<---	FLMX	.495				
FLMX2	<---	FLMX	.636	.143	8.584	***	par_1
FLMX3	<---	FLMX	.728	.156	8.076	***	par_2
FLMX4	<---	FLMX	.793	.166	8.368	***	par_3
FLMX5	<---	FLMX	.817	.166	8.460	***	par_4
FLMX6	<---	FLMX	.659	.111	7.680	***	par_5
FLMX7	<---	FLMX	.671	.132	7.754	***	par_6
CSIP6	<---	Leaders' cognitive style	.484				
CSIP5	<---	Leaders' cognitive style	.528	.256	5.957	***	par_7
CSIP4	<---	Leaders' cognitive style	.502	.190	5.793	***	par_8
CSIP3	<---	Leaders' cognitive style	.654	.234	6.571	***	par_9
CSIP2	<---	Leaders' cognitive style	.578	.212	6.240	***	par_10
CSIP1	<---	Leaders' cognitive style	.587	.249	6.286	***	par_11

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6. FLMX= followers' perceived quality of leader-member exchange

*: p<0.05; **: p<0.01; ***: P<0.001.

Figure 4.5.4.4: The direct relationship between FLMX and leaders' cognitive style



Secondly, path analysis is conducted in order to understand the indirect relationship between leaders' cognitive style and followers' OCBI.

The initial model fit indices without modification are shown inTable 4.5.4.11. These results indicate that the model fits the data well. Therefore, further path analysis is conducted as shown in Table 4.5.4.12. and Figure 4.5.4.5. It indicates that although the followers' perceived the quality of LMX has a direct impact on followers' OCBI, leaders' cognitive style does not have a direct impact on the followers' perceived quality of LMX , and leaders' cognitive style does not directly impact on followers' OCBI because this relationship is not significant. Moreover, this study conducts Sobel's test, which measures whether a mediator carries the influence of an independent variable on a dependent variable. The influence of followers' perceived LMX is insignificant (Test statistic=-.48; S.E.=.057; P= .63). In addition, in the bootstrapping test (Table 4.5.4.13), all three variables do not have significant and direct or indirect (p=.85) relationship.Therefore, hypothesis 6c is rejected.

Table 4.5.4.11: the model fit results of Leaders' cognitive style, followers' perceived the quality of LMX and followers' OCBI with modification

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.91	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.95	
TLI	>0.9	0.94	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.72	Yes
PCFI	>0.5	0.77	Yes

NPAR=35; CMIN=158.95

Table 4.5.4.12: Regression Weights: FLMX, Leaders' cognitive style and FOCBI

			Estimate	S.E.	C.R.	P	Label
FLMX	<---	Leaders' cognitive style	-.036	.046	-.499	.617	par_14
FOCBI	<---	FLMX	.169	.541	2.254	.024	par_8
FOCBI	<---	Leaders' cognitive style	.025	.345	.331	.741	par_15
FLMX1	<---	FLMX	.494				
FLMX2	<---	FLMX	.635	.144	8.565	***	par_1
FLMX3	<---	FLMX	.727	.156	8.054	***	par_2
FLMX4	<---	FLMX	.795	.167	8.356	***	par_3
FLMX5	<---	FLMX	.816	.166	8.435	***	par_4
FLMX6	<---	FLMX	.660	.112	7.670	***	par_5
FLMX7	<---	FLMX	.671	.133	7.735	***	par_6
altruism	<---	FOCBI	.832				
Courtesy	<---	FOCBI	.749	.290	2.509	***	par_7
CSIP6	<---	Leaders' cognitive style	.484				
CSIP5	<---	Leaders' cognitive style	.528	.257	5.953	***	par_9
CSIP4	<---	Leaders' cognitive style	.503	.190	5.792	***	par_10
CSIP3	<---	Leaders' cognitive style	.654	.234	6.567	***	par_11
CSIP2	<---	Leaders' cognitive style	.578	.213	6.238	***	par_12
CSIP1	<---	Leaders' cognitive style	.586	.249	6.278	***	par_13
N= 315							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. CSIP1-CSIP6= cognitive style index parcel 1- 6. FOCBI= followers' individual-target organisational citizenship behaviours. FLMX= followers' perceived quality of leader-member exchange; N= the number of participants.

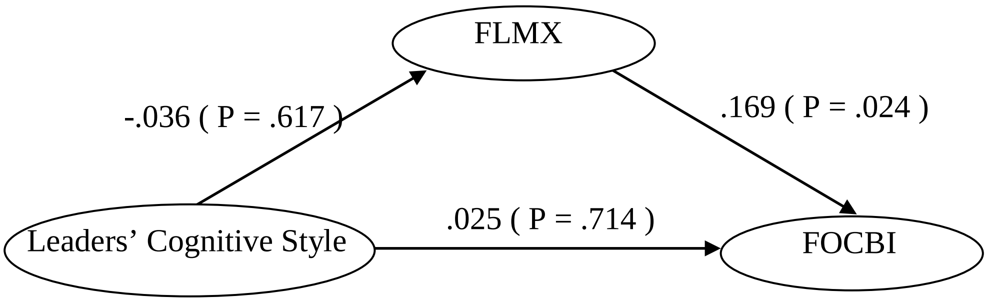
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.4.13: Direct effects (leaders' cognitive style, FLMX, FOCBI)- Two tailed significance

	leaders' cognitive style	FLMX	FOCBI
FLMX	.576	...	...
FOCBI	.793	.008	...

Note: FLMX= followers' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours.

Figure 4.5.4.5 the relationship between FLMX, Leaders' cognitive style and FOCBI



H7d: Followers' perceived the quality of LMX mediates the effects of leaders' cognitive style on followers OCBO.

Path analysis is conducted in order to understand the indirect relationship between leaders' cognitive style and followers' OCBO. The initial model fit indices without modification are shown in the Table 4.5.4.14. These results indicate that the model fits the data well. The model also indicates that although the followers' perceived the quality of LMX has a direct impact on followers' OCBO, leaders' cognitive style does not have a direct impact on the followers' perceived the quality of LMX , and leaders' cognitive style does not directly impact on followers' OCBO because this relationship is not significant (Table 4.5.3.15 and figure 4.5.4.6). Moreover, this study conducts Sobel's test to indicate that the influence of leaders' perceived LMX is insignificant (Test statistic=-.49; S.E.=.03; P= .62). In addition, in the bootstrapping test (Table 4.5.3.16), all three variables do not have significant and direct or indirect (p=.85) relationship. Therefore, hypothesis 6d is rejected.

Table 4.5.4.14: the model fit results of Leaders' cognitive style, followers' perceived the quality of LMX and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.93	Yes
AGFI	>0.8	0.91	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.94	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.94	Yes
PNFI	>0.5	0.73	Yes
PCFI	>0.5	0.78	Yes

NPAR=37; CMIN=181.90

Table 4.5.4.15: Regression Weights: FLMX, Leaders' cognitive style and FOCBO

			Estimate	S.E.	C.R.	P	Label
FLMX	<---	Leaders' cognitive style	-.035	.046	-.495	.621	par_16
FOCBO	<---	FLMX	.172	.257	2.359	.018	par_9
FOCBO	<---	Leaders' cognitive style	.104	.174	1.350	.177	par_17
FLMX1	<---	FLMX	.495				
FLMX2	<---	FLMX	.635	.143	8.583	***	par_1
FLMX3	<---	FLMX	.727	.156	8.071	***	par_2
FLMX4	<---	FLMX	.794	.166	8.374	***	par_3
FMX5	<---	FLMX	.816	.166	8.460	***	par_4
FLMX6	<---	FLMX	.660	.112	7.690	***	par_5
FLMX7	<---	FLMX	.673	.133	7.763	***	par_6
Virtue	<---	FOCBO	.675				
Conscientious	<---	FOCBO	.599	.166	8.134	***	par_7
Sportsmanship	<---	FOCBO	.800	.220	8.065	***	par_8
CSIP6	<---	Leaders' cognitive style	.481				
CSIP5	<---	Leaders' cognitive style	.527	.258	5.935	***	par_11
CSIP4	<---	Leaders' cognitive style	.504	.192	5.786	***	par_12
CSIP3	<---	Leaders' cognitive style	.651	.235	6.537	***	par_13
CSIP2	<---	Leaders' cognitive style	.582	.215	6.240	***	par_14
CSIP1	<---	Leaders' cognitive style	.587	.251	6.266	***	par_15
N= 315							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. FOCBO= followers' organisational-target organisational citizenship behaviours. FLMX= followers' perceived quality of leader-member exchange; N= the number of participants.

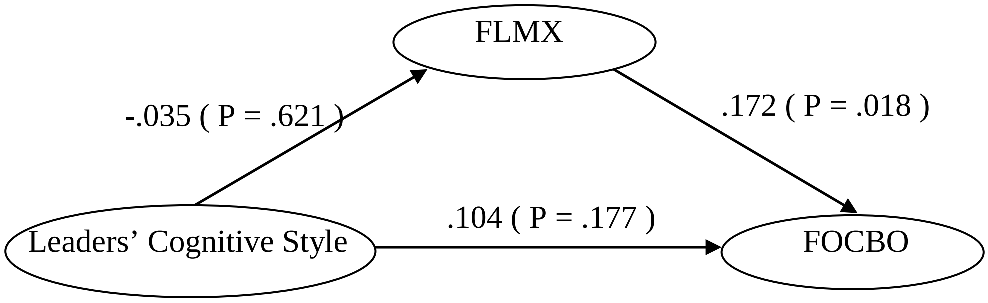
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.4.16: Direct effects (leaders' cognitive style, LLMX, FOCBO)- Two tailed significance

	leaders' cognitive style	FLMX	FOCBO
FLMX	.632	...	...
FOCBO	.121	.022	...

Note: FLMX= followers' perceived quality of leader-member exchange. FOCBO= followers' organisational-target organisational citizenship behaviours.

Figure 4.5.4.6: the relationship between FLMX, Leaders' cognitive style and FOCBO



In the next step, further analysis is conducted to assess whether the congruence between leaders' and followers' cognitive styles influences the relationship between cognitive styles, LMX and OCB. Median score is applied to categorize leaders and followers into four subgroups (intuitive leaders- intuitive followers, intuitive leaders- analytic followers, analytic leaders- intuitive followers, analytic leaders- analytic followers). The results were compared between different groups, it is indicated that when intuitive leaders are assigned to a group to manage analytic followers, there is a significant relationship between leaders' cognitive style and followers' OCB (r= 0.19, p= .03), and leaders' perceived quality of LMX is positively related to followers' LMX. In other words, leaders' perceived quality of LMX may mediate the effect of leaders' intuitive style on followers' OCB. However, in other three groups, the quality of LMX does not mediate the effect of leaders' cognitive styles on followers' OCB (Appendix A3). In the next chapter, the detail of interpretation is given to support the findings.

4.5.5 Test of Hypothesis 8

H8a: Leaders' perceived the quality of LMX will mediate the relationship between leaders' EI and followers' OCBI.

Before measuring the mediating influence of leader's perceived LMX, The first step is to test the relationship between leaders' EI and followers' OCBI. The initial model fit indices are show in the Table 4.5.5.1.

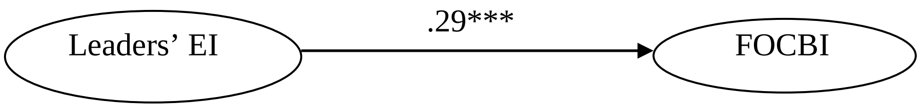
In addition, according to the test of structural model, leaders' EI is positively related to followers' OCBI (regression weight= 0.29, p<.001) (figure 4.5.5.1). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.1: the model fit results of leaders' EI and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.08	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.90	Yes
NFI	>0.9	0.92	Yes
RFI	>0.9	0.90	Yes
IFI	>0.9	0.94	Yes
TLI	>0.9	0.90	Yes
CFI	>0.9	0.94	Yes
PNFI	>0.5	0.51	Yes
PCFI	>0.5	0.51	Yes

NPAR=13; CMIN=35.82

Figure 4.5.5.1: the direct relationship between leaders' EI and followers' OCBI



In the second step, this study focuses on the relationship between leaders' EI and leader's perceived LMX. The initial model fit indices are show in Table 4.5.5.2.

In addition, according to the test of structural model, leaders' EI is positively related to leader's perceived LMX (regression weight= 0.24, p<.001) (figure 4.5.5.2). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

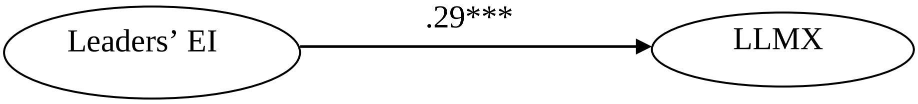
Table 4.5.5.2: the model fit results of leaders' perceived the quality of LMX and leaders' EI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.95	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.97	Yes
TLI	>0.9	0.97	Yes
CFI	>0.9	0.97	Yes

PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.71	Yes

NPAR=26; CMIN=66.34

Figure 4.5.5.2 the direct relationship between leaders' perceived the quality of LMX and leaders' EI



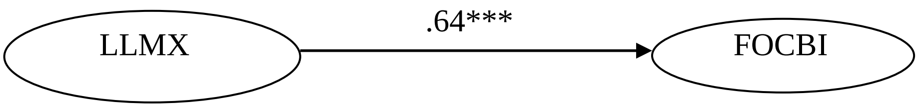
Thirdly, this study tests the relationship between leaders' perceived LMX and followers' OCBI. The orginal CFA model has a good model fit (Table 4.5.5.3.). Moreover, in the structural model, leaders' perceived LMX positively relate to followers' OCBI (regression weight= 0.64, p<.001) (figure 4.5.5.3.) In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.3: the model fit results of leaders' perceived the quality of LMX and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.97	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.97	Yes
RFI	>0.9	0.95	Yes
IFI	>0.9	0.98	Yes
TLI	>0.9	0.97	Yes
CFI	>0.9	0.98	Yes
PNFI	>0.5	0.62	Yes
PCFI	>0.5	0.63	Yes

NPAR=22; CMIN=43.72

Figure 4.5.5.3 the direct relationship between leaders' perceived the quality of LMX and leaders' EI



In summary, leaders' perceived LMX, leaders' EI and followers' OCBI are directly related with each other. As follow, this study considers the indirect relationship between leaders' EI and followers' OCBI and the mediatoring effects of leaders' perceived LMX.

The structure model tests the influence of leaders' perceived the quality of LMX in the relationship between leaders' EI and followers' OCBI. The model fit indices without any modification are shown in Table 4.5.5.4. These results indicate that the model fits the data well.

Table 4.5.5.4: the model fit results of leaders' perceived the quality of LMX, leaders' EI and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.06	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.91	Yes
NFI	>0.9	0.93	Yes
RFI	>0.9	0.90	Yes
IFI	>0.9	0.96	Yes
TLI	>0.9	0.95	Yes
CFI	>0.9	0.96	Yes
PNFI	>0.5	0.7	Yes
PCFI	>0.5	0.73	Yes

NPAR=32; CMIN=117.11

The regression weight (as summarised in the Table 4.5.5.5) indicates that leaders' emotional intelligence has a direct influence on leaders' perceived quality of LMX (regression weight= 0.24, p=0.001), and leaders' perceived quality of LMX has a direct influence on followers' OCBI (regression weight= 0.64, p=0.00), Similarily, leaders' EI has significant influence on followers' OCBI (regression weight= 0.14, p=0.04) (figure 4.5.5.4). Moreover, this study conducts Sobel's test to indicate that the influence of leaders' perceived LMX is significant (Test statistic=3.01; S.E.=.08; P=.002). Moreover, in the bootstrapping test, all three variables are significantly and directly related (Table 4.5.5.6). Leaders' EI also indirectly related to followers' OCBI (p=.001). Therefore, the result shows that followers' perceived the quality of LMX partly mediates the relationship between leaders' EI and followers' OCBI.

Table 4.5.5.5: Regression Weights: LLMX, Leaders' EI and FOCBI

			Estimate	S.E.	C.R.	P	Label
LLMX	<---	leaders' EI	.244	.018	3.263	.001	par_11
FOCBI	<---	LLMX	.637	.558	7.092	***	par_12
FOCBI	<---	leaders' EI	.135	.101	1.479	.042	par_13
LLMX1	<---	LLMX	.606				
LLMX2	<---	LLMX	.663	.096	10.404	***	par_1

			Estimate	S.E.	C.R.	P	Label
LLMX3	<---	LLMX	.585	.095	9.390	***	par_2
LLMX4	<---	LLMX	.754	.116	10.192	***	par_3
LLMX5	<---	LLMX	.836	.127	10.797	***	par_4
LLMX6	<---	LLMX	.575	.088	8.351	***	par_5
LLMX7	<---	LLMX	.812	.103	10.703	***	par_6
ROE	<---	leaders' EI	.547				
UOE	<---	leaders' EI	.831	.156	7.769	***	par_7
OEA	<---	leaders' EI	.550	.118	7.203	***	par_8
SEA	<---	leaders' EI	.627	.111	7.241	***	par_9
altruism	<---	FOCBI	.745				
Courtesy	<---	FOCBI	.840	.093	9.878	***	par_10
N= 314							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. LLMX= leaders' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours; N= the number of participants.

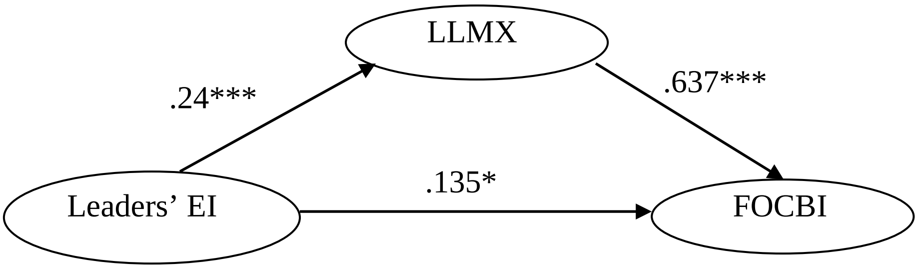
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.5.6: Direct effects (leaders' EI, LLMX, FOCBI)- Two tailed significance

	leaders' EI	LLMX	FOCBI
LLMX	.001	...	...
FOCBI	.040	.001	...

Note: LLMX= leaders' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours.

Figure 4.5.5.4： the relationship between LLMX, Leaders' EI and FOCBI



H8b: leaders' perceived the quality of LMX will mediate the relationship between leaders' EI and followers' OCBO.

The first step is to test the relationship between leaders' EI and followers' OCBO. The initial model fit indices are show in the Table 4.5.5.7.

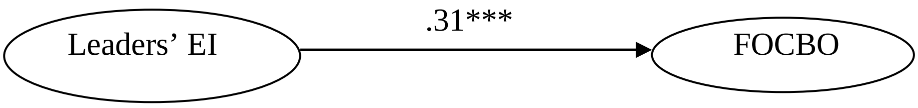
In addition, according to the test of structural model, leaders' EI is positively related to followers' OCBO (regression weight= 0.31, p<.001) (figure 4.5.5.6). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.7: the model fit results of leaders' EI and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.07	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.88	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.90	Yes
TLI	>0.9	0.90	Yes
CFI	>0.9	0.90	Yes
PNFI	>0.5	0.54	Yes
PCFI	>0.5	0.55	Yes

NPAR=15; CMIN=64.70

Figure 4.5.5.6 the relationship between leaders' EI and followers' OCBO



In the second step, this study focuses on the relationship between leaders' EI and leaders' perceived LMX. The initial model fit indices are show in Table 4.5.5.8.

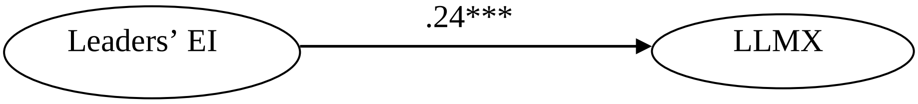
In addition, according to the test of structural model, leaders' EI is positively related to leader's perceived LMX (regression weight= 0.24, p<.001) (figure 4.5.5.7). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.8: the model fit results of leaders' perceived the quality of LMX and leaders' EI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.95	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.97	Yes
TLI	>0.9	0.97	Yes
CFI	>0.9	0.97	Yes
PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.71	Yes

NPAR=26; CMIN=66.34

Figure 4.5.5.7 the direct relationship between leaders' perceived the quality of LMX and leaders' EI



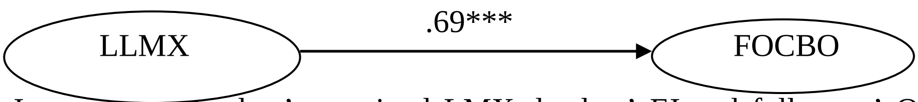
Thirdly, this study tests the relationship between leaders' perceived LMX and followers' OCBO. The orginal CFA model hoave a good model fit (Table 4.5.5.9.). Moreover, in the structural model, leaders' perceived LMX positively relate to followers' OCBO (regression weight= 0.69, p<.001) (figure 4.5.5.8). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.9: the model fit results of leaders' perceived LMX and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.03	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.03	Yes
GFI	>0.9	0.98	Yes
AGFI	>0.8	0.96	Yes
NFI	>0.9	0.97	Yes
RFI	>0.9	0.96	Yes
IFI	>0.9	0.99	Yes
TLI	>0.9	0.99	Yes
CFI	>0.9	0.99	Yes
PNFI	>0.5	0.62	Yes
PCFI	>0.5	0.63	Yes

NPAR=24; CMIN=37.84

Figure 4.5.5.8 the direct relationship between leaders' perceived LMX and followers' OCBO.



In summary, leaders' perceived LMX, leaders' EI and followers' OCBO are directly related with each other. As follow, this study considers the indirect relationship between leaders' EI and followers' OCBO and the mediatoring effects of leaders' perceived LMX.

The structure model tests the influence of leaders' perceived the quality of LMX in the relationship between leaders' EI and followers' OCBO. The model fit indices without any modification are shown in the Table 4.5.5.10. These results indicate that the model fits the data well.

Table 4.5.5.10: The model fit results of leaders' perceived LMX, leaders' EI and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.91	Yes
NFI	>0.9	0.92	Yes
RFI	>0.9	0.90	Yes
IFI	>0.9	0.96	Yes
TLI	>0.9	0.95	Yes
CFI	>0.9	0.96	Yes
PNFI	>0.5	0.72	Yes
PCFI	>0.5	0.75	Yes

NPAR=34; CMIN=133.22

The regression weight (as summarised in Table 4.5.5.11) indicates that leaders' emotional intelligence has a direct influence on the leaders' perceived quality of LMX (regression weight= 0.25, p<0.0), and the quality of LMX has a direct influence on followers' OCBO (regression weight= 0.66, p<0.00), and leaders' emotional intelligence has a direct influence on followers' OCBO (regression weight= 0.14, p=0.035) (Figure 4.5.5.9). Moreover, this study conducts Sobel's test to indicate that the influence of leaders' perceived LMX is significant (Test statistic=3.02; S.E.=.04; P=.002). In addition, in the bootstrapping test, all three variables are significantly and directly related (Table 4.5.5.12). Leaders' EI also indirectly related to followers' OCBI (p=.001). Therefore, the result shows that the quality of leaders' LMX mediates the relationship between leaders' EI and followers' OCBO.

Table 4.5.5.11: Regression Weights: LLMX, Leaders' EI and FOCBO

			Estimate	S.E.	C.R.	P	Label
LLMX	<---	Leaders' EI	.249	.019	3.332	***	par_12
FOCBO	<---	LLMX	.656	.290	7.320	***	par_13
FOCBO	<---	Leaders' EI	.141	.055	2.112	.035	par_14
LLMX1	<---	LLMX	.629				
LLMX2	<---	LLMX	.649	.091	10.274	***	par_1
LLMX3	<---	LLMX	.608	.098	9.123	***	par_2
LLMX4	<---	LLMX	.740	.106	10.468	***	par_3
LLMX5	<---	LLMX	.827	.116	11.237	***	par_4
LLMX6	<---	LLMX	.570	.082	8.518	***	par_5
LLMX7	<---	LLMX	.820	.096	11.237	***	par_6
ROE	<---	Leaders' EI	.549				

			Estimate	S.E.	C.R.	P	Label
UOE	<---	Leaders’ EI	.831	.154	7.809	***	par_7
OEA	<---	Leaders’ EI	.547	.116	7.201	***	par_8
SEA	<---	Leaders’ EI	.627	.110	7.274	***	par_9
Virtue	<---	FOCBO	.664				
Sportsmanship	<---	FOCBO	.610	.164	8.481	***	par_10
Conscientious	<---	FOCBO	.790	.178	9.885	***	par_11
N= 314							

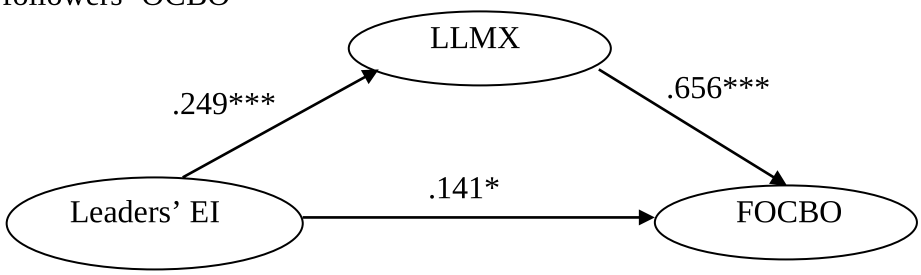
Note: the column of regression weights shows the standardized outputs. All other outputs are from the un-standardized estimates. LLMX= leaders’ perceived quality of leader-member exchange. FOCBO= followers’ organisational-target organisational citizenship behaviours; N= the number of participants

*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.5.12: Direct effects (leaders’ EI, LLMX, FOCBO)– Two tailed significance

	leaders’ EI	LLMX	FOCBO
LLMX	.001	...	...
FOCBO	.010	.001	...

Figure 4.5.5.9 the relationship between leaders’ perceived LMX, leaders’ EI and followers’ OCBO



H8c: Followers’ perceived the quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBI.

In view of the relationship between leaders’ EI and followers’ OCBI, the initial model has a good model fit as shown in Table 4.5.5.13. In addition, according to the test of structural model, leaders’ EI is positively related to followers’ OCBI (regression weight= 0.29, p<.001). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.13: the model fit results of leaders' EI and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.08	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.90	Yes
NFI	>0.9	0.92	Yes
IFI	>0.9	0.94	Yes
TLI	>0.9	0.90	Yes
CFI	>0.9	0.94	Yes
PNFI	>0.5	0.51	Yes
PCFI	>0.5	0.51	Yes

NPAR=13; CMIN=36.52

In the second step, this study focuses on the relationship between leaders' EI and follower's perceived LMX. The initial model fit indices are show in Table 4.5.5.14.

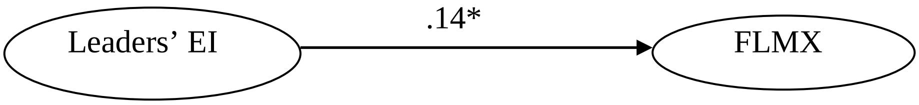
In addition, according to the test of structural model, leaders' EI is positively related to follower's perceived LMX (regression weight= 0.14, p<.05) (figure 4.5.5.10). In the bootstrapping test, both of them are also significantly and directly related (p=.02).

Table 4.5.5.14: the model fit results of followers' perceived the quality of LMX and leaders' EI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.93	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.97	Yes
TLI	>0.9	0.96	Yes
CFI	>0.9	0.97	Yes
PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.72	Yes

NPAR=25; CMIN=70.97

Figure 4.5.5.10 the direct relationship between followers' perceived the quality of LMX and leaders' EI



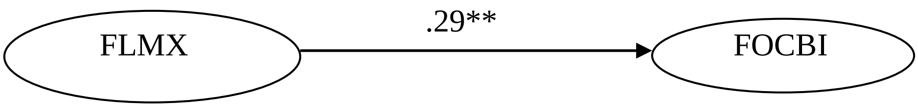
Thirdly, this study tests the relationship between followers' perceived LMX and followers' OCBI. The orginal CFA model hoave a good model fit (Table 4.5.5.15.). Moreover, in the structural model, followers' perceived LMX positively relate to followers' OCBI (regression weight= 0.20, p=.01) (figure 4.5.5.11). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.15: the model fit results of followers' perceived LMX and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.01	Yes
RMR	<0.05	0.03	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.97	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.96	Yes
RFI	>0.9	0.94	Yes
IFI	>0.9	0.98	Yes
TLI	>0.9	0.97	Yes
CFI	>0.9	0.98	Yes
PNFI	>0.5	0.64	Yes
PCFI	>0.5	0.65	Yes

NPAR=21; CMIN=42.78

Figure 4.5.5.11 the direct relationship between followers' perceived LMX and followers' OCBI



In summary, followers' perceived LMX, leaders' EI and followers' OCBI are directly related with each other. As follow, this study considers the indirect relationship between leaders' EI and followers' OCBI and the mediatoring effects of followers' perceived LMX.

The structure model tests the influence of followers' perceived the quality of LMX in the relationship between leaders' EI and followers' OCBI. The model fit indices without any modification are shown in Table 4.5.5.16. These results indicate that the model fits the data well.

Table 4.5.5.16: the model fit results of followers' perceived the quality of LMX, leaders' EI and followers' OCBI

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.95	Yes
AGFI	>0.8	0.93	Yes
NFI	>0.9	0.93	Yes
RFI	>0.9	0.90	Yes
IFI	>0.9	0.97	Yes
TLI	>0.9	0.96	Yes
CFI	>0.9	0.97	Yes
PNFI	>0.5	0.71	Yes
PCFI	>0.5	0.74	Yes

NPAR=31; CMIN=103.25

The regression weight (as summarised in Table 4.5.5.17) indicates that leaders' emotional intelligence has a direct influence on followers' perceived the quality of LMX (regression weight= 0.15, p=0.04), and leaders' perceived the quality of LMX has a direct influence on followers' OCBI (regression weight= 0.16, p=0.03). Similarily, leaders' emotional intelligence has significantly influence on followers' OCBI (regression weight= 0.24, p=0.00) (Figure 4.5.5.12). Moreover, this study conducts Sobel's test to indicate that the influence of followers' perceived LMX is significant (Test statistic=2.14; S.E.=.03; P= .03). In addition, in the bootstrapping test, all three variables are significantly and directly related (Table 4.5.5.18). Leaders' EI also indirectly related to followers' OCBI (p=.024). Therefore, the result shows that followers' perceived the quality of followers' LMX partly mediates the relationship between leaders' EI and followers' OCBI. Hypothesis 8c is supported

Table 4.5.5.17: Regression Weights: FLMX, Leaders' EI and FOCBI

			Estimate	S.E.	C.R.	P	Label
FLMX	<---	leaders' EI	.148	.017	2.023	.043	par_11
FOCBI	<---	FLMX	.163	.513	2.148	.032	par_12
FOCBI	<---	leaders' EI	.239	.131	2.944	.003	par_13
FLMX1	<---	FLMX	.492				
FLMX2	<---	FLMX	.632	.146	8.432	***	par_1
FLMX3	<---	FLMX	.733	.158	8.065	***	par_2
FLMX4	<---	FLMX	.792	.170	8.119	***	par_3
FLMX5	<---	FLMX	.806	.169	8.182	***	par_4
FLMX6	<---	FLMX	.642	.112	7.409	***	par_5
FLMX7	<---	FLMX	.673	.137	7.626	***	par_6

			Estimate	S.E.	C.R.	P	Label
ROE	<---	leaders' EI	.547				
UOE	<---	leaders' EI	.829	.156	7.772	***	par_7
OEA	<---	leaders' EI	.551	.119	7.169	***	par_8
SEA	<---	leaders' EI	.628	.112	7.182	***	par_9
altruism	<---	FOCBI	.781				
Courtesy	<---	FOCBI	.800	.189	4.432	***	par_10
N= 312							

Note: the column of regression weights is the standardized outputs. All other outputs are from the un-standardized estimated. FLMX= followers' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours; N= the number of participants.

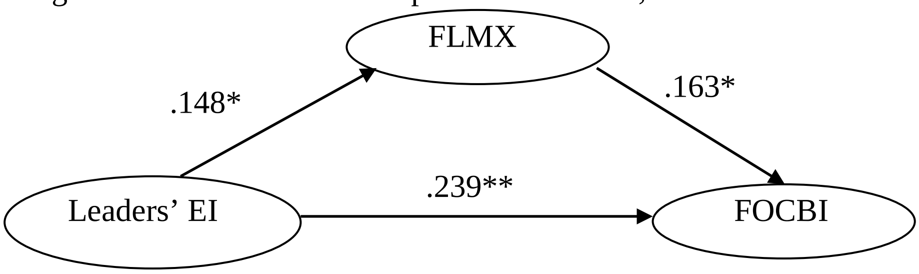
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.5.18: Direct effects (leaders' EI, FLMX, FOCBI)- Two tailed significance

	leaders' EI	FLMX	FOCBI
FLMX	.022	...	...
FOCBI	.006	.031	...

Note: FLMX= followers' perceived quality of leader-member exchange. FOCBI= followers' individual-target organisational citizenship behaviours.

Figure 4.5.5.12 the relationship between FLMX, Leaders' EI and FOCBI



H8d: Followers' perceived the quality of LMX will mediate the relationship between leaders' EI and followers' OCBO.

In view of the relationship between leaders' EI and followers' OCBO, the initial model has a good model fit as shown in Table 4.5.5.19. In addition, according to the test of structural model, leaders' EI is positively related to followers' OCBO (regression weight= 0.21, p<.001). In the bootstrapping test, both of them are also significantly and directly related (p=.001).

Table 4.5.5.19: the model fit results of leaders' EI and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.05	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.08	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.87	Yes
NFI	>0.9	0.90	Yes
IFI	>0.9	0.90	Yes
TLI	>0.9	0.89	Yes
CFI	>0.9	0.90	Yes
PNFI	>0.5	0.54	Yes
PCFI	>0.5	0.56	Yes

NPAR=15; CMIN=64.23

In the second step, this study focuses on the relationship between leaders' EI and follower's perceived LMX. The initial model fit indices are shown in Table 4.5.5.20.

In addition, according to the test of structural model, leaders' EI is positively related to follower's perceived LMX (regression weight= 0.14, p<.05). In the bootstrapping test, both of them are also significantly and directly related (p=.02).

Table 4.5.5.20: the model fit results of leaders' EI and follower's perceived LMX

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.93	Yes
NFI	>0.9	0.94	Yes
RFI	>0.9	0.92	Yes
IFI	>0.9	0.97	Yes
TLI	>0.9	0.96	Yes
CFI	>0.9	0.97	Yes
PNFI	>0.5	0.70	Yes
PCFI	>0.5	0.72	Yes

NPAR=25; CMIN=70.97

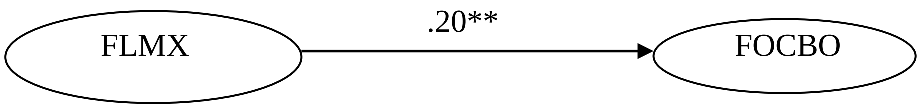
Thirdly, this study tests the relationship between followers' perceived LMX and followers' OCBO. The orginal CFA model has a good model fit (Table 4.5.5.21.). Moreover, in the structural model, followers' perceived LMX positively relate to followers' OCBO (regression weight= 0.20, p=.008) (figure 4.5.5.13). In the bootstrapping test, both of them are also significantly and directly related (p=.004).

Table 4.5.5.21: the model fit results of followers' perceived LMX and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.05	Yes
GFI	>0.9	0.96	Yes
AGFI	>0.8	0.94	Yes
NFI	>0.9	0.95	Yes
RFI	>0.9	0.93	Yes
IFI	>0.9	0.98	Yes
TLI	>0.9	0.97	Yes
CFI	>0.9	0.98	Yes
PNFI	>0.5	0.68	Yes
PCFI	>0.5	0.70	Yes

NPAR=23; CMIN=57.06

Figure 4.5.5.13 the direct relationship between followers' perceived LMX and followers' OCBO



In summary, followers' perceived LMX, leaders' EI and followers' OCBO are directly related with each other. As follow, this study considers the indirect relationship between leaders' EI and followers' OCBO and the mediatoring effects of followers' perceived LMX.

The structure model tests the influence of followers' perceived quality of LMX in the relationship between leaders' EI and followers' OCBO. The model fit indices without any modification are shown in Table 4.5.5.22. These results indicate that the model fits the data well.

Table 4.5.5.22: The model fit results of followers' perceived LMX, leaders' EI and followers' OCBO

Index	Criterions for model fit indices	results	Estimate of model fit
P	<0.05	0.00	Yes
RMR	<0.05	0.04	Yes
RMSEA	<0.08 (<0.05, fit very well; <0.08 fit well	0.06	Yes
GFI	>0.9	0.94	Yes
AGFI	>0.8	0.91	Yes
NFI	>0.9	0.90	Yes
RFI	>0.9	0.90	Yes
IFI	>0.9	0.95	Yes
TLI	>0.9	0.93	Yes
CFI	>0.9	0.95	Yes
PNFI	>0.5	0.71	Yes
PCFI	>0.5	0.75	Yes

NPAR=33; CMIN=146.45

The regression weight (as summarised in Table 4.5.5.13) indicates that leaders' emotional intelligence has a direct influence on followers' perceived the quality of LMX (regression weight= 0.15, p=0.04), and leaders' perceived the quality of LMX has a direct influence on followers' OCBO (regression weight= 0.16, p=0.03). Similarily, leaders' emotional intelligence has no significantly influence on followers' OCBO (regression weight= 0.28, p<00) (Figure 4.5.5.14). Moreover, this study conducts Sobel's test to indicate that the influence of followers' perceived LMX is significant (Test statistic=1.97; S.E.=.02; P= .048). In addition, in the bootstrapping test, all three variables are significantly and directly related (Table 4.5.5.24). Leaders' EI also indirectly related to followers' OCBO (p=.025). Therefore, the result shows that followers' perceived the quality of LMX partly mediates the relationship between leaders' EI and followers' OCBO. The hypothesis 8d is supported.

Table 4.5.5.23: Regression Weights: FLMX, Leaders' EI and FOCBO

			Estimate	S.E.	C.R.	P	Label
FLMX	<---	Leaders' EI	.146	.017	2.003	.044	par_12
FOCBO	<---	FLMX	.159	.263	2.151	.031	par_13
FOCBO	<---	Leaders' EI	.284	.069	3.480	***	par_14
FLMX1	<---	FLMX	.493				
FLMX2	<---	FLMX	.631	.145	8.447	***	par_1
FLMX3	<---	FLMX	.731	.156	8.076	***	par_2
FLMX4	<---	FLMX	.790	.169	8.135	***	par_3
FLMX5	<---	FLMX	.808	.168	8.206	***	par_4
FLMX6	<---	FLMX	.644	.112	7.436	***	par_5

			Estimate	S.E.	C.R.	P	Label
FLMX7	<---	FLMX	.674	.137	7.649	***	par_6
ROE	<---	Leaders' EI	.548				
UOE	<---	Leaders' EI	.833	.156	7.807	***	par_7
OEA	<---	Leaders' EI	.544	.118	7.142	***	par_8
SEA	<---	Leaders' EI	.628	.111	7.238	***	par_9
Virtue	<---	FOCBO	.680				
Sportsmanship	<---	FOCBO	.613	.171	8.032	***	par_10
Conscientious	<---	FOCBO	.777	.200	8.512	***	par_11
N= 312							

Note: the column of regression weights shows the standardized outputs. All other outputs are from the un-standardized estimates. FLMX= followers' perceived quality of leader-member exchange. FOCBO= followers' organisational-target organisational citizenship behaviours; N= the number of participants.

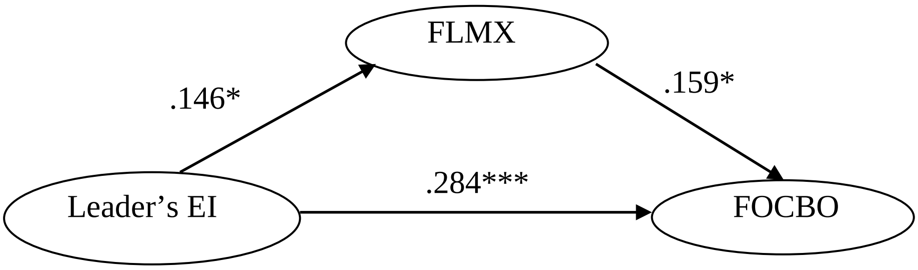
*: p<0.05; **: p<0.01; ***: P<0.001.

Table 4.5.5.24: Direct effects (leaders' EI, FLMX, FOCBI)- Two tailed significance

	leaders' EI	LLMX	FOCBO
LLMX	.018	...	...
FOCBO	.006	.030	...

Note: FLMX= followers' perceived quality of leader-member exchange. FOCBO= followers' organisational-target organisational citizenship behaviours.

Figure 4.5.5.14 the relationship between FLMX, Leaders' EI and FOCBO



4.6 Summary of Individual level findings

Hypothesis	Description	Finding
H1	Individuals whose cognitive styles are more intuitive than analytic will exhibit higher levels of OCBI	Supported
H4	Intuitive style is more likely to tend toward a higher level of EI than analytic style.	Refuted
H6	Leaders’ cognitive style is negatively related to followers’ OCB.	Partially Support
H7a	Leaders’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBI.	Refuted
H7b	Leaders’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBO.	Refuted
H7c	Followers’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBI.	Refuted
H7d	Followers’ perceived quality of LMX mediates the effects of leaders’ cognitive style on followers OCBO.	Refuted
H8a	Leaders’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBI.	Supported
H8b	Leaders’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBO.	Supported
H8c	Followers’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBI.	Supported
H8d	Followers’ perceived quality of LMX will mediate the relationship between leaders’ EI and followers’ OCBO.	Supported

5. Group Level Analysis: MLWin and SPSS

This chapter gives an overview of the group-level research data analyses adopted in the present study. This chapter begins by focusing on the problem of treatment of clustered data normally used to analyse data collected in aggregated and disaggregated form before the development of data analysis. According to the nature of the collected data, this chapter then proceeds to report the descriptive statistics of the group level data. In the multilevel model, two approaches (the random intercepts model and the random slope model) are contrasted for response data. This is followed by an outline of two perspectives of preliminary analyses. Finally, the hypotheses are tested by MLwin and SPSS.

5.1 Introduction of multilevel analysis

Multilevel analysis refers to "*a methodology for the analysis of data with complex patterns of variability, with a focus on nested sources of such variability- pupils in classes, etc*" (Snijders and Bosker, 2012). Thus, following this conception, this research focuses on the analysis of macro data on groups with connection to the multilevel model, such as employees and employers being nested within groups.

In the analysis of multilevel data, it is normal to consider each level of nesting in relation to variability. It is wrong to assume that no difference exists between different sources of variability. Gelman and Hill (2007) further recommend that the core part of multilevel modelling is varying coefficients and models for those very coefficients. Therefore, the main feature of multilevel model is variation between groups and individuals.

5.2 Treatment of clustered data

In this research, the collected data are classified into a number of different groups. In order to test hypotheses, there are different approaches to cope with collected data, such as aggregation, disaggregation or individual-level analysis. As follows, these approaches are discussed, and then, statistics are analysed based on the purpose of this study.

5.2.1 Different levels of measurement: individual-level analysis, aggregate analysis and multilevel model

During the development of group-level analysis, researchers suggest two measures to analyse data: according to the level of aggregation and multilevel model (also known as random effects models, random coefficients models and mixed models) (Snijders and Bosker, 2012).

First, it is significant to differentiate individual-level approaches and group-level approaches. In the individual-level approaches, it is assumed that there are two levels with J within level 2, y_{ij} is the response for individual I in the cluster j and x_{ij} is considered as a covariate. Therefore, the individual-level model as:

$y_{ij} = \beta_0 + \beta_1 x_{ij}$, $i = 1,\ldots,n_{ji}$ $j = 1,\ldots,J$

$e_{ij} \sim N(0, \sigma^2)$,

$COV(e_{ij}, e_{i'j'}) = 0, \quad ij \neq i'j'$

The issue of individual-level data analysis is that all of individuals are seen as independent, even in the same group. The independence between individuals will lead to invalid assumptions in research (Alker, 1969).

Two alternative ways to analysis group-level data are data aggregation and multilevel model. Data aggregation refers to aggregate responses for every unit in the second level. This method is presented as follows:

$$\bar{y}_j = \beta_0 + \beta_1 \bar{x}_j + \bar{e}_j$$

$$\bar{y}_j = \frac{1}{n_j}\sum_{i=1}^{n_j} y_{ij},$$

$$\bar{x}_j = \frac{1}{n_j}\sum_{i=1}^{n_j} x_{ij},$$

$$\bar{e}_j = \frac{1}{n_j}\sum_{i=1}^{n_j} e_{ij}.$$

There are two main questions related to data aggregation in the group level. Firstly, data aggregation at the macro-level refers to a macro-unit rather than micro-units (Firebaugh, 1978; Huttner, 1981). In this study, the average rating of group-level organisational citizenship behaviour may be used as an index for the variable of a group, not directly to individuals. Secondly, data aggregation fails to consider within-group variability (Snijders and Bosker, 2012). The averages of all groups are almost exactly on the regression line (the observed average $\bar{y}$ can be almost perfectly predicted from the observed average $\bar{x}$), therefore leading researchers to conclude that there are almost no differences between groups. In order to overcome this problem, standard deviation is used in this study to measure cognitive style diversity and leader-member exchange differentiation.

The multilevel model considers both the macro-unit (j) and micro-unit (i). It is possible to determine not only the individual-level features which cause differences in individuals' characteristics, but also the extent to which these differences may be related to their background. The feature of multilevel model plays an important role in this research in that it takes into account group-level emotional intelligence and organisational citizenship behaviour after considering the features of individuals in every group.

As suggested by some scholars (Snijders and Bosker, 2012; Aikin and Longford, 1986; Diez-Roux, 1998), in the macro-units analysis, only disaggregated or only aggregated data can give rise to erroneous or misleading conclusions. Thus, in this study, both data aggregation and data disaggregation are taken into account.

5.2.2 Descriptive Statistics

Data were collected using a questionnaire from 150 work groups across seven manufacturing companies in China. Group sizes ranged from 3 to 16 members who reported directly to one leader. The survey resulted in data being received from 864 group members. The average age of group members was 36.8 years, ranging from 19 to 62 years of age. On average, the working experience of group members was 10 years. Sixty-two percent of group members were male. All of the participants were in full-time employment.

5.2.2.1 Group-level CSI

Group-level CSI is measured by disaggregation and individuals' responses are directly nested into group level rather than calculating the mean of the group being calculated. Therefore, basic information of groups is given below.

Table 5.2.2.1.1 Descriptive data of CSI in group level		
N (groups)	150	
Range of groups size	3- 17	
	Intuitive groups	Analytic groups
n	70	80

5.2.2.2 Group-level EI

Group-level EI is measured by disaggregation and individuals' responses are directly nested into group level rather than the mean of the group being calculated. Therefore, basic information on groups is given below.

Table 5.2.2.2.1 Descriptive data of EI in group level	
N (groups)	150
Range of groups size	3- 17

5.2.2.3 Group-level OCB

Both data aggregation and disaggregation are used to represent group-level OCB. Thus, the analysis of group-level OCB not only considers means of groups, but also takes into account within-group and between-group variance. The basic information of group-level OCB is indicated as follows:

Table 5.2.2.3.1: Descriptive data of group-level OCB for individuals' responses	
n	834
Mean	131
Std. Deviation	16.52
Range	80-167

Table 5.2.2.3.2: Descriptive data of group-level OCB in group level	
N (groups)	150
Range of groups size	3- 17

5.2.2.4 LMX differentiation

As mentioned in section 2.3.3.6, LMX differentiation is developed based on dynamic and interactive exchanges between leaders and members (Henderson et al., 2009).

Therefore, before testing LMX differentiation, it is important to demonstrate when a leader and a follower can be treated as a dyad. Baker and Useem (1942) defined a dyad thus: "*Two persons may be classified as a dyad when intimate, face to face relations have persisted over a length of time sufficient for the establishment of a discernible pattern of interacting personalities*" (p.13). Therefore, dyadic studies focus on the mutual interaction between two individuals. Kenny et al (2006) indicated that the most important part of dyadic data analysis is non-independence and that two members of a dyad are not simply two independent individuals. Rather, they share something in common. A formal conceptual definition of dyadic non-independence is: "*If the two scores from the two members of the dyad are non-independent, then those two score are more similar to (or different from) one another than are two score from two people who are not members of the same dyad*" (Kenny et al., 2006, P4).

Measuring non-independence with distinguishable dyad members is straightforward: scores of dyad members are correlated by applying a Pearson correlation coefficient ($p<.20$) (Kenny et al., 2006). Thus, in order to treat data at a dyadic level, it is significant to collect data from both leaders and followers, then, an interdependence criterion comes from the correlation coefficient by relating one Pearson score with leaders and followers. According to Table 5.2.2.4.1, the result indicates that there is a significant correlation between leaders and followers. Therefore, it is clear that LMX data can be seen as dyadic data (Kenny et al., 2006).

Table 5.2.2.4.1: The correlation test of LMX

	r	p-value
LMX between leader and follower	0.1	0.04*

Note: * correlation is significant at the 0.05 level (2-tailed)

Where interdependence exists, Kenny and Kashy (1991) assert that the proper analysis is to average the two scores for each dyad. The descriptive data of LMX is shown in Table 5.2.2.4.2 below.

Table 5.2.2.4.2: Descriptive data of LMX	
n	404
Mean	25.5
Range	13.5-34
Std. Deviation	3.45

Furthermore, LMX differentiation refers to "*the degree of the within-group variation of the different quality level of LMX*" (Chan et al., in press, p2). Following Chan's (1998) dispersion and previous studies of LMX differentiation (e.g. Boies and Howell, 2006; Liden et al., 2006), the within-group variance (standard deviation) of LMX results are calculated to operationalise LMX differentiation (Table 5.2.2.4.3).

Table 5.2.2.4.3: Descriptive data of standard deviation of LMX		
n	418	
Mean	2.41	
Range	0- 8.84	
Std. Deviation	1.56	
	Less diversity	More diversity
n	210	208

5.2.2.5 Control variable for group-level OCB

Becker (2005) proposes that if there are no reasonable explanations for testing control variables, this may lead to results being untrustworthy. Specifically, it causes both type I and type II errors because of partial true variance from the relationship of interest and no criterion being associated with predictors (Spector, Zapf, Chen and Frese, 2000). Although there is a lack of attention to antecedents of group-level OCB forum and little theory to suggest which control variables may be of most significance, some studies provide evidence for the relationship between demographic variables and group-level performance (Hackman and Vidmar, 1970). Taking the demographic variables into account, there is no relationship between group-level OCB and size/tenure/age (Table 5.2.2.5). With this in mind, the results are presented without control variables.

Table 5.2.2.5: Descriptive statistics and variable correlations in the group level

Variables	M	SD	1	2	3
1.Average Age	36.77	9.77	--		
2.Average Tenure	10.00	10.40	.66**	--	
3.Group size	7.71	4.15	.11**	.28**	--
4. Groups Tending to Intuitive Style	47.00	2.33	--	--	.24
5. Groups Tending to Analytic Style	54.00	4.09	--	--	-.00
6.Group-level EI	81.50	12.61	-.04	-.09*	-.09*
7.Group-level OCB	131.00	16.37	-.07	-.08	-.00
8.LMX Differentiation	2.41	1.56	--	.02	.20*
9.Cognitive Style Diversity	7.12	3.76	--	.13	.21*

Note: *: p<0.05; **: p<0.01; ***: P<0.00

5.3 The multilevel model for response data

In the multilevel model, there are normally two basic approaches used to process data: the random intercept model and the random slope model. In the following sub-section, these two approaches are discussed separately.

5.3.1 The random intercepts model

The random intercept model is considered as a model of the random coefficient view, and it is the simplest form of multilevel model. The random intercept model consists of two parts: the fixed part and the random part. The fixed part refers to the coefficients β_0 and β_1 and the random part is the variances of σ_0^2 and σ_e^2 .

In this model, regression lines for the relationship between the variable y and variable x can have different intercepts for each group, through every line, to obtain the same slope (Snijders and Bosker, 2012)..In other words, the average response may differ in different groups (higher than average or lower than average is determined by $\beta_0 + u_{0j}$), but the influence of variable x is limited to the same for every group.

The random intercept model is presented, as follows. According to the model, the variable y_{ij} is the response of individual I in the group j (it can also be seen as the sum of level 1 and level 2 variance) and x_{ij} can be covariate. Additionally, according to the assumption of multilevel model, individuals are different from each other in groups (individual deviations from group line e_{ij}) and also differ across groups (group deviations from average line u_{0j}). These two types of deviations reflected in the random intercept model are σ_0^2 and σ_e^2

$y_{ij} = \beta_{0j} + \beta_1 x_{ij} + e_{ij}$,

$\beta_{0j} = \beta_0 + u_{0j}$.

$e_{ij} \sim N(0, \sigma_e^2)$,

$u_{0j} \sim N(0, \sigma_u^2)$,

Note: (1) β_1 is the increase in the response for a 1 unit increase in x

(2) σ^2_u is the unexplained variation at level 2 after controlling for the explanatory variables.

(3) σ^2_e is the unexplained variation at level 1 after we control for the explanatory variables.

5.3.2 The random slope model

An extension of the random intercept model is used to permit the slope parameter β_1 to differentiate across groups. One could fit a fixed effects model which would involve fitting a separate regression line for each cluster, but this is not feasible if there are a large number of clusters. Further, some clusters are likely to contain too few individuals to estimate a regression model. It is more efficient to use the multilevel approach which assumes that the cluster-specific intercept and slope parameters come from certain distributions for which we estimate the variances (Snijders and Bosker, 2012). The random coefficient or random slope model can be written as:

$$Y_{ij} = \beta_0 + \beta_1 x_{ij} + e_{ij}$$

$$\beta_{0j} = \beta_0 + u_{0j}$$

$$\beta_{1j} = \beta_1 + u_{1j}$$

$$\begin{bmatrix} u_{0j} \\ u_{1j} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} \sigma^2_{u0} & \\ \sigma_{uo1} & \sigma^2_{u1} \end{bmatrix}$$

β_0 and $\sigma^2{}_{e0}$can be interpreted as the same as for the random intercepts model, so β_0 is the intercept of the overall line, and $\sigma^2{}_{e0}$ is the level 1 variance. β_1 now, is the slope of the average line. Specifically, it is the average change (that is, the average across all groups) in y for a 1 unit change in x_1. $\sigma^2{}_{u0}$, while $\sigma^2{}_{u1}$ and σ_{u01} are slightly more complicated to interpret. Basically, $\sigma^2{}_{u1}$is the variance in slopes between groups and $\sigma^2{}_{u0}$ is the variance in intercepts between groups, which means it is the level 2 variance when x=0; σ_{u01} is the covariance between intercepts and slopes. Normally, deviations from average intercept and slope assume bivariate normality with variances.

5.4 Preliminary Analysis

As mentioned above, both disaggregated and aggregated data are tested in this research. Therefore, preliminary analysis plays an important role in determining the reliability of disaggregated and aggregated data. In the multilevel model, within- and between-group variance is a significant criterion to determine the appropriateness of using the multilevel model. Normally, they are tested through intra-class correlation coefficient, followed by a test of disaggregated data. The rwg (j) index is used to determine the reliability of the aggregation.

5.4.1 Intra-class correlation

Applying the multilevel model, the total variance of the group-level EI, group-level CSI and group-level OCB can be divided into different parts of variation and indicate the degree of similarity in the responses between two randomly selected groups at the same level. The variance and similarity are normally described as the intra-class correlation coefficient (ICC) or the variance partition coefficient (VPC). ICCs are used "*when one is interested in the relationship among variables of a common class, which means variables that share both their metric and variance*" (McGraw and Wong, 1996, p. 30).

In the simple model, the formula for the two coefficients is described as σ_u^2 /(σ_u^2 + σ_e^2). In level two, the formulation changes to σ_u^2 /(σ_u^2 + σ_v^2 + σ_e^2), which stresses the percentage of variance that comes from differences between individuals in different groups, or, the degree of similarity between responses for the same individual. Following by the multilevel model, this research considers all of the groups by relating within- and between-group variance. As follows, three variables (OCB, EI and cognitive style) are tested through the Mlwin which measures the overall similarity between individuals in the same group (overall ICC) (Rasbash, 2012).

$GOCB_{ij} \sim N(XB, \Omega)$

$GOCB_{ij} = \beta_{0ij}$ cons

$\beta_{0ij} = 81.784(0.592) + u_{0j} + e_{oj}$

$[u_{0j}] \sim N(0, \Omega_u)$: $\Omega_u = [25.227(6.026)]$

$[e_{0ij}] \sim N(0, \Omega_e)$: $\Omega_e = [132.958(7.143)]$

-2*loglikelihood(IGLS Deviance) = 6555.384（835 of 864 cases in use）

According to the formulation, ICC= 25/ (25+133)= 16%. Therefore, 16% of the unexplained variation rests at group level, and 84% remains at individual level.

$EI_{ij} \sim N(XB, \Omega)$

$EI_{ij} = \beta_{0ij}$ cons

$\beta_{0ij} = 116.962(0.655) + u_{0j} + e_{oj}$

$[u_{0j}] \sim N(0, \Omega_u)$: $\Omega_u = [24.208(7.328)]$

$[e_{0ij}] \sim N(0, \Omega_e)$: $\Omega_e = [195.558(10.602)]$

-2*loglikelihood(IGLS Deviance) = 6702.714（817 of 864 cases in use）

According to the formulation, ICC= 24/ (24+196) = 11%. Therefore, 11% of the unexplained variation rests at group level, and the remaining 89% at individual level.

$Cognitive\_style_{ij} \sim N(XB, \Omega)$

$Cognitive\_style_{ij} = \beta_{0ij}$ cons

$\beta_{0ij} = 50.556(0.423) + u_{0j} + e_{oj}$

$[u_{0j}] \sim N(0, \Omega_u)$: $\Omega_u = [12.262(3.097)]$

$[e_{0ij}] \sim N(0, \Omega_e)$: $\Omega_e = [69.378(3.798)]$

-2*loglikelihood(IGLS Deviance) = 5814.087（808 of 864 cases in use）

According to the formulation, ICC= 12/ (12+69) = 15%. Therefore, 15% of the unexplained variation rests at group level, while 85% remains at individual level. Hence, the variances of variables are not only related to group influence, but also linked to individual effect. The within- and between-group variances are confirmed by ICC.

5.4.2 The rwg(j) index

As mentioned above, individual scores of perceived group-level OCB will be aggregated to the group level by considering the mean scores of individuals' responses. However, there is a potential risk of reliability of aggregation. As follows, the rwg(j) index is used to determine the reliability of the aggregation.

The rwg(j) index is a measure of interrater agreement, and is normally applied to determine whether data can be aggregated to the higher levels of analysis. The formulation of this is presented thus:

$$r_{wg(j)} = \frac{J[1-(\bar{s}x_j^2 / \sigma_E^2)]}{J[1-(\bar{s}x_j^2 / \sigma_E^2)] + (\bar{s}x_j^2 / \sigma_E^2)}$$

rwg(j) is the within-group agreement coefficient for judges' mean scores based on

J items, $s\bar{x}_j^2$ is the mean of the observed variances on the J items, and σ_e^2 is the expected variance of a hypothesised null distribution (James et al., 1984, p. 88). Some scholars indicate that a .70 criterion is normally used in research to determine whether there is data aggregation or not (Castro, 2002; George, 1990). A low rwg(j) shows that raters in the group do not agree, or do not perceive the construct similarly. There could be a number of reasons for the lack of agreement, including the existence of subgroups and alternative levels of analysis. In this situation, aggregating the data may lead to misinterpretation. Additionally, when the rwg(j) index is used in data analysis, it is normally related to discrete response formats, for instance, a 5- or 7-point Likert scale. A shorter response format (such as a 2-point Likert scale) may relate to a low level of inter-rater agreement (James et al., 1984). Thus, with this in mind, a 7-point Likert scale is used to measure group-level OCB.

In this research, every group has one rwg (j) index (group-level OCB), and these scores are averaged across groups. Values are calculated across groups to obtain mean values of 0.89. This demonstrates satisfactory agreement in line with the measurement of group-level OCB.

5.5 Hypothesis test with multilevel model: MLwin

According to the ICC, the group-level EI and group-level CSI have within- and between-group variance, which meets the criteria of the multilevel model. Hypotheses 2 and 5 are tested using MLwin, as described below.

5.5.1 The test of hypothesis 2

H_2: Intuitive groups will exhibit a higher degree of group-level OCB than analytic groups.

The two-level multilevel model comprises 812 group members with 149 groups for the two sets of constructs representing CSI and group members' perception of group-level OCB. The relationship between group-level intuitive/analytic style and group-level OCB are empirically tested with the MLwin software.

5.5.1.1 Group-level analytic style and GOCBI

First, a statistical test is conducted to determine whether the relationship between group-level analytic style and GOCBI is significant. In this study, the statistical test is calculated as: statistical test = estimated slope/ standard error= 0.130/ 0.049= 2.65. According to the criterion of larger than 1.96 (5% level of significance) (Snijders and Bosker, 2012), the statistical test of this study is strongly significant. It is concluded that there is strong evidence for a linear trend of data distribution.

According to the results of the random coefficient model, the number of 0.130 indicates the positive relationship between groups with analytic style and OCBI across groups. Therefore, groups with the analytic style are positively related to group-level organisational citizenship behaviour. Additionally, 0.024 shows that the positive relationship between CSI and OCBI varies across groups. Annlytic groups with more analytic members may have a higher level of group-level OCB than those analytic groups with fewer analytic members. Further findings show that 95% coverage of CSI lay in the area of 0.130 +/- (1.96 * $\sqrt{0.024}$).

(1) Random coefficient model (group-level analytic style and GOCBI)

$GOCBI_{ij} = \beta_{0j} + \beta_{1j} ANALYTIC\_STYLE_{ij} + e_{ij}$

$\beta_{0j} = 49.751(2.690) + u_{0j}$

$\beta_{ij} = 0.130(0.049) + u_{ij}$

$$\begin{bmatrix} u_{0j} \\ u_{ij} \end{bmatrix} \sim N(0, \Omega u) : \Omega u = \begin{bmatrix} 86.132 □ 71.457 □ & \\ -1.414 □ 1.256 □ & 0.024 □ 0.022 □ \end{bmatrix}$$

$e_{ij} \sim N(0, \sigma_e^2)\ \sigma_e^2 = 55.426(4.312)$

-2*loglikelihood = 2966.242(427 of 427 cases in use)

5.5.1.2 Group-level intuitive style and GOCBI

In order to test the relationship between group-level intuitive style and GCB, first, statistical tests are conducted to ensure the results are significant. In this study, the statistical test is calculated as: statistical test = estimated slope/ standard error= 0.150/ 0.064= 2.34. According to the criterion of 1.96 (5% level of significance) (Snijders and Bosker, 2012), the statistical test of this study is strongly significant. It is concluded that there is strong evidence of a linear trend of the data set.

According to the results, the number 0.150 indicates the positive relationship between groups with an analytic style and OCBI across groups. Therefore, groups with an intuitive style are positively related to group-level organisational citizenship behavior. Additionally, 0.068 shows that the positive relationship between intuitive style and OCBI varies across groups. Intuitive groups with more intuitive members may have higher level of group-level OCB than those intuitive groups with fewer intuitive members. Further findings show that 95% coverage of CSI lay in the area of 0.150 +/- (1.96 * $\sqrt{0.068}$). Comparing the results as given, groups with the intuitive style may exhibit a higher level of group-level OCBI than groups with the analytic style.

(1) Random coefficient model (group-level intuitive style and GOCBI)

$GOCBI_{ij} = \beta_{0j} + \beta_{1j}INTUITIVE\_STYLE_{ij} + e_{ij}$

$\beta_{0j} = 48.532(3.076) + u_{0j}$

$\beta_{ij} = 0.150(0.064) + u_{ij}$

$$\begin{bmatrix} u_{0j} \\ u_{ij} \end{bmatrix} \sim N(0, \Omega u) : \Omega u = \begin{bmatrix} 172.047(95.266) & \\ -3.365(1.945) & 0.068(0.040) \end{bmatrix}$$

$e_{ij} \sim N(0, \sigma_e^2)\ \sigma_e^2 = 47.629(4.079)$

-2*loglikelihood = 2639.074(385 of 385 cases in use)

Comparing the results from the multilevel model, groups tending towards the intuitive style will exhibit a higher degree of group-level OCBI than groups tending towards the analytic style (.150 Vs .130).

5.5.2 The test of hypothesis 5

H5: Group-level emotional intelligence is positively linked to group-level organisational citizenship behaviour.

The two-level multilevel model is fitted with 810 group members with 150 groups for the two sets of constructs representing EI and group members' perception of group-level OCB. The analysis is estimated using the random intercept model and random coefficient model in the software of MLwin, which is associated with high quality estimation in terms of two-level analysis.

In order to ensure results are significant, a statistical test is conducted. The examination of statistical tests is also considered as the examination of fixed effects. When testing the fixed effects, it is composed with fixed effect and standard error. In this study, the statistical test is calculated as: statistical test = estimated slope/ standard error= 0.563/ 0.053= 10.62. Snijders and Bosker (2012) indicated that when the value of statistical test is much larger than 1.96, the critical value is at the 5% level of significance. Therefore, the statistical test of this study is highly significant. It is concluded that there is strong evidence of a linear trend.

Furthermore, the likelihood ratio test is considered a criterion of comparing the fit of two models (the one is the null model; the other one is the alternative model). The formulation is written as: Likelihood ratio test = -2*loglikelihood of individual-level model - 2*loglikelihood of random intercept model (group level) = 6631.297-6604.572= 26.725 (1 degree of freedom; p=.00) (1 extra parameter in model). The significance result confirms that the random intercept model provides a better fit to the data than single-level data. Additionally, further test is conducted on which model fit data well. According to Likelihood ratio test (-2*loglikelihood of random intercept model- *loglikelihood of random slope model), there is strong evidence (2 degree of freedom; p=.000) that the random slope model provides a better fit to the data than random intercept model.

(1)Single-level model (individual-level EI and individual-level OCB)

$GOCB_i = 82.716\ (3.506) + 0.589(0.042)EI_i + e_i$

$e_{ij} \sim N(0,\ \sigma^2_e)\ \sigma^2_e = 223.633\ (11.154)$

-2*loglikelihood =6631.297 (810 of 810 cases in use)

(2)Random Intercept model (group-level EI and GOCB by peers' assessments)

$GOCB_{ij} = \beta_{0j} + 0.564(0.043)EI_{ij} + e_{ij}$

$\beta_{0j} = 84.687(3.566) + u_{0j}$

$u_{0j} \sim N(0，\ \sigma^2_{u0})\quad \sigma^2_{u0} = 27.932（7.885）$

$e_{ij} \sim N(0,\ \sigma^2_e)\ \sigma^2_e = 195.539\ (10.713)$

-2*loglikelihood =6604.572 (810 of 810 cases in use)

(3) Random coefficient model (group-level EI and GOCB)

$GOCB_{ij} = \beta_{0j} + \beta_{1j}EI_{ij} + e_{ij}$

$\beta_{0j} = 84.593\ (4.565) + u_{0j}$

$\beta_{1j} = 0.563\ (0.053) + u_{1j}$

$$\begin{bmatrix} u_{0j} \\ u_{1j} \end{bmatrix} \sim N\ (0, \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 920.07\square 314.93\square & \\ -10.134\square 3.682\square & 0.114\square 0.043\square \end{bmatrix}$$

$e_{ij} \sim N(0,\ \sigma^2_e)\,\sigma^2_e = 179.857\ (10.50)$

-2*loglikelihood = 6582.778 (810 of 810 cases in use)

According to the results of the random intercept model and random slope model, 920.07 is the group level variance in intercept; the number 0.563 indicates the positive relationship between EI and OCB across groups. Therefore, hypothesis 5 is supported. 0.114 shows that the positive relationship between EI and OCB varies across groups. Groups with higher EI may perform higher level of group-level organisational citizenship behavior than those with lower EI. Further findings show that 95% coverage of EI lay in the area of 0.563 +/- (1.96 * $\sqrt{0.114}$). Additionally, EI is positively related to OCB at individual level (0.56); model fit= 6604.572. According to the formulation, ICC= 28/ (28+195) = 12.5%, this suggests that about 12.5% of the total unexplained in GOCB is attributable to unobserved group-level EI. 0.563 is now the average relationship between EI and OCB across all groups; Group j EI effect= 0.563 +u_{1j}.

Podsakoff and Mackenzie (1994) stress that group-level OCB also can be measured according to the leaders' assessments. Therefore, in order to understand that different sources of group-level OCB may have different relations with other variables, the further analysis takes leaders' assessments into account in relation to group-level EI.

(1)Random Intercept model (group-level EI and GOCB by leaders' assessments)

$GOCB_{ij} = \beta_{0j} + 0.045(0.061)EI_{ij} + e_{ij}$

$\beta_{0j} = 109.179(5.079) + u_{0j}$

$u_{0j} \sim N(0, \sigma^2_{u0})$ $\sigma^2_{u0} = 60.022$（16.552）

$e_{ij} \sim N(0, \sigma^2_{e})$ $\sigma^2_{e} = 200.801(16.991)$

-2*loglikelihood =3464.996(415 of 415 cases in use)

According to the results, the value of the statistical test is less than 1.96. The critical value is not included in the 5% level of significance. Therefore, the statistical test of this study is non-significant. In other words, there is no significance relationship between group-level OCB and group-level EI by leaders' rating

Although the data collected from the leaders' rating fits the model well through confirmatory data analysis, it has potential problems in that their feedbacks do not fully reveal actual group-level organisational citizenship behaviours because leaders' rating reflects average OCB and it is impossible to consider group environment as a criterion.

Therefore, the peers' assessment is more appropriate in this study. In the next section, further details will be given.

5.6 Hypothesis test with group-level: SPSS

In this study, groups with cognitive style diversity and LMX differentiation are tested by standard deviation. In line with cognitive style diversity and LMX differentiation, group-level OCB is aggregated from mean of individual level. Therefore, there is no within-group variance to conduct group-level analysis. SPSS and AMOS are two software programs used to conduct a single-level model. Some scholars (e.g. Hair et al., 2010) indicate that AMOS is more advanced in invidual-level analysis, and it has a strict criterion for applying sample size (200). In this study, when data is aggregated to group level, the sample size is limited to 149. Therefore, SPSS is applied to analyze H3 and H9.

5.6.1 The test of hypothesis 3

H3: Groups with low diversity of cognitive styles will exhibit a higher degree of group-level OCB than groups with high cognitive style diversity.

In order to examine whether there is a relationship between CSI diversity and group-level OCB, it is necessary to conduct a Pearson's correlation analysis to measure the linear relationship between the two variables. Correlation coefficients are indicated in Table 5.6.1.1. These results show that there is a small negative correlation between cognitive style diversity and group-level OCB, but it is non-significant.

Table 5.6.1.1: Correlations between CSI diversity and group-level OCB

		CSI diversity	Group-level OCB
CSI diversity	Pearson correlation	1	-.14
	Sig. (2-tailed)		.10

To examine hypothesis 3, an independent samples t-test is conducted. The CSI diversity is divided into two groups based on a median split. Those groups with a standard deviation above the median (Std. deviation= 6.81) are defined as more diverse groups, labelled 2, while those equal to or below the median are defined as less diverse groups, labelled 1.

Table 5.6.1.2 indicates that there are 74 less diverse groups with a mean group-level OCB of 131.17, with a standard deviation of 10.35, while 71 highly diverse groups have a similar mean group-level OCB to less diverse groups, with a standard deviation of 11.18. The last table (Table 5.6.1.3) contains the main test statistics. First, the Levene's test examines whether variances are different among different groups. The Levene's test is non-significant (p= .679, which is larger than .05) in this study, and it is thus concluded that variances are roughly equal and test statistics are run in the row of assumed equal variance. Additionally, 2-tailed significance is used as a criterion to test whether means of samples are equal. If p ≥.05, there is no significant difference between means of samples (Field, 2009). In this research, less diverse groups reveal levels of group-level OCB equal to those of more diverse groups (p=0.378). Therefore, hypothesis 3 is refuted.

Table 5.6.1.2: Group statistics

	CSI diversity (Binned)	N	Mean	Std. Deviation	Std. Error Mean
Group-level OCB	Less diverse	74	131.1686	10.35470	1.20371
	More diversity	71	129.5881	11.17956	1.32677

Table 5.6.1.3: Independent sample test between CSI diversity and group-level OCB

		Levene's test for equality of variances		t-test for equality of mean				
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference
Group-level OCB	Equal variance assumed	.172	.679	.884	143	.378	1.58057	1.78858
	Equal variances not assummed			.882	141.035	.379	1.58057	1.79143

5.6.1.1Further analysis: the moderating role of group-level EI in the relationship between group-level OCB and group-level cognitive style diversity

Some scholars (Homan et al., 2008; Van Knippenberg et al., 2004; Pelled, Eisenhardt and Xin, 1999) indicate that it is hard to understand the influences of diversity without considering the effects of moderators because firstly the focus on main influences cannot elucidate the inconsistent influence of diversity as it does not consider moderating variables which determine whether diversity has no, negative or positive influences. Secondly, the main influences approach is unable to explain the underlying processes which are important for explaining the influences of diversity on team outcomes, which may be different according to the traits of a situation. Therefore, as followes, group-level EI and leaders' EI are taken into account as a moderator variable to explain the results.

Further analysis is conducted to explore whether group-level EI moderates the relationship between group-level OCB and group-level cognitive style diversity. According to the results, moderation is shown by a non-significant interaction effect, and in this case the interaction is not significant, b =0.063, 95% CI [-.04, .16], t =1.2, p>.1, indicating that the relationship between the group-level cognitive style diversity and group-level OCB is not moderated by group-level EI.

Table 5.6.1.1.1 Linear model of predictors of aggression

	b	SE B	t	P
Constant	130.57	.84	162.35	.000
Group-level EI (centred)	.68	.14	4.80	.000
Cognitive style diversity (centred)	-.28	.25	-1.09	.28
Leaders' EI * Cognitive style diversity	.06	.05	1.20	.23

Note: R^2= .25

5.6.1.2 Further analysis: the moderating role of leaders' EI in the relationship between group-level OCB and group-level cognitive style diversity

Further analysis is conducted to explore whether leaders' EI moderate the relationship between group-level OCB and group-level cognitive style diversity. According to the results, moderation is shown by a non-significant interaction effect, and in this case the interaction lacks significance, b =0.04, 95% CI[-0.05, 0.12], t =.83, p=.40, indicating that the relationship between the group-level cognitive style diversity and group-level OCB is not moderated by leaders' EI.

Table 5.6.1.2.1 Linear model of predictors of aggression

	b	SE B	t	P
Constant	130.30	.95	137.76	.000
Leaders' EI (centred)	.32	.13	2.51	.01
Cognitive style diversity (centred)	-.29	.300	-.98	.33
Leaders' EI * Cognitive style diversity	.036	.043	.832	.41

Note: R^2= .09

5.6.2 The test of hypothesis 9

H9: Groups with higher cognitive style diversity will exhibit greater LMX differentiation than groups with lower cognitive style diversity.

To examine whether there is a relationship between CSI diversity and LMX differentiation, Pearson' correlation analysis is conducted to measure the linear relationship between two variables. Correlation coefficients are indicated in Table 5.6.2.1. These results show that there is a weak negative correlation between cognitive styles diversity and LMX differentiation, but it is non-significant.

Table 5.6.2.1: Correlations between CSI diversity and LMX differentiation

	CSI diversity	LMX differentiation
Pearson correlation	1	-.042
Sig. (2-tailed)		.618

An independent sample t-test was conducted to examine the hypothesis 9. In this study, the variable of cognitive style diversity is defined as a test variable. The cognitive style diversity is divided into two groups based on a median split. Those groups with a standard deviation above the median are defined as more diverse groups, while those equal to or below the median are defined as less diverse groups.

Both groups have the same sample size (71). According to Table 5.6.2.2, the Levene's test examine whether variances differ among different groups. The Levene's test is non-significant (p= .88, which is larger than .05) in this study; it is therefore concluded that variances are roughly equal and test statistics are run in the row of assumed equal variances. Additionally, 2-tailed significance is used as a criterion to test whether means of samples are equal. If p≥.05, there is no significance different between means of samples (Field, 2009). In this research, less diverse groups perform level of LMX differentiation equal to that of more diverse groups (p=0.72). Therefore, hypothesis 9 is rejected.

Table 5.6.2.2: Independent sample test between CSI diversity and LMX differentiation

		Levene's test for equality of variances		t-test for equality of mean				
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference
LMX differenti-ation	Equal variance assumed	.022	.882	.359	140	.720	.230	.640
	Equal variances not assummed			.359	140	.720	.230	.640

5.6.2.1 Further analysis: the moderating role of group-level EI in the relationship between LMX differentiation and group-level cognitive style diversity

Further analysis was conducted to test whether group-level EI moderate the relationship between LMX differentiation and group-level cognitive style diversity. According to the results, moderation shows a significant interaction effect, and in this case the interaction is highly significant, b =-.0085, 95% CI[-0.017, 0.0003], t =-2.05, p=.04, indicating that the relationship between the group-level cognitive style diversity and LMX differentiation is moderated by group-level EI.

To interpret the moderation effect, it is necessary to examine the simple slopes, which are shown in Table 5.6.2.1.2. Essentially, the Table shows us the results of three different regressions: the regression for group-level cognitive style diversity as a predictor of aggression (1) when group-level EI is low (to be precise when the value of group-level EI is -7.18); (2) at the mean value of group-level EI (because group-level EI is centred its mean value is zero as indicated in the output); and (3) when the value of group-level EI is 7.18 (i.e., high). In order to interpret these three regressions, it is interested in the value of b (called Effect in the output), and its significance.

1 When group-level EI is low, there is a non-significant positive relationship between LMX differentiation and group-level cognitive style diversity, b = .026, 95% CI [-.0624, 0.1144], t = .458, p =.56.

2 At the mean value of group-level EI, there is a non-significant negative relationship between LMX differentiation and group-level cognitive style diversity, b = -.035, 95% CI [-.1011, 0.0307], t =-1.06, p = .29.

3 When group-level EI is high, there is a significant negative relationship between LMX differentiation and group-level cognitive style diversity, b = -.096, 95% CI [-.1848, -.0079], t =-2.15, p =.03

Table 5.6.2.1.1 Linear model of predictors of aggression

	b	SE B	t	P
Constant	2.3896	.1313	18.2	.000
Group-level EI (centred)	.0245	.0153	1.5982	.1123
Cognitive style diversity (centred)	-.0352	.0333	-1.0553	.2931
Leaders' EI * Cognitive style diversity	-.0085	.0042	-2.0503	.04

Note: R^2= .04

Table 5.6.2.1.2Conditional effect of x on y at values of the moderator

Group-level EI	effect	se	t	p	LLCI	ULCT
-7.18	.026	.0447	.45817	.5617	-.0624	.1144
.00	-.035	.0333	-1.0553	.2931	-.1011	.0307
7.18	-.096	.0447	-2.1533	.0330	-.1848	-.0079

5.6.2.2 Further analysis: the moderating role of leaders' EI in the relationship between LMX differentiation and group-level cognitive style diversity

Further analyses was conducted to test whether leaders' EI moderate the relationship between group-level OCB and group-level cognitive style diversity. According to the results, moderation is shown by a significant interaction effect, and in this case the interaction is significant, b =-.0059, 95% CI[-0.01, -0.003], t =-1.99, p=.04, indicating that the relationship between the group-level cognitive style diversity and group-level OCB is moderated by leaders' EI.

To interpret the moderation effect, we can examine the simple slopes, which are shown in Table 5.6.2.2.2. Essentially, the Table shows us the results of three different regressions: the regression for group-level cognitive style diversity as a predictor of aggression (1) when leaders' EI is low (to be precise when the value of group-level EI id -12.08); (2) at the mean value of leaders' EI (because leaders' EI is centred its mean value is zero as indicated in the output); and (3) when the value of leaders' EI is 12.08 (i.e., high). In order to interpret these three regressions, interest lies in the value of b (called Effect in the output), and its significance.

1 When leaders' EI is low, there is a non-significant positive relationship between LMX differentiation and group-level cognitive style diversity, b = .02, 95% CI [-.067, 0.11], t = .46, p =.63.

2 At the mean value of leaders' EI, there is a non-significant negative relationship between LMX differentiation and group-level cognitive style diversity, b = -.05, 95% CI [-.12, 0.019], t =-1.44, p = .15.

3 When leaders' EI is high, there is a significant negative relationship between LMX differentiation and group-level cognitive style diversity, b = -.12, 95% CI [-.233, -.0012], t =-2.21, p =.03

Table 5.6.2.2.1 Linear model of predictors of aggression

	b	SE B	t	P
Constant	2.3558	.1361	17.31	.000
Leaders' EI (centred)	.0133	.0114	1.1648	.0464
Cognitive style diversity (centred)	-.0510	.0352	-1.4482	.1501
Leaders' EI * Cognitive style diversity	-.0059	.0030	-1.9925	.04

Note: R^2= .07

Table 5.6.2.2.2Conditional effect of x on y at values of the moderator

Leaders' EI	effect	se	t	p	LLCI	ULCT
-12.08	.0209	.0445	.4693	.6397	-.0672	.1089
.00	-.0510	.0352	-1.4482	.1501	-.1207	.0187
12.08	-.1228	.0577	-2.2058	.0292	-.2331	-.0126

5.6.2.3 Further analysis: the moderating role of group size in the relationship between LMX differentiation and group-level cognitive style diversity

Further analysis was conducted to explore whether group size moderates the relationship between group-level OCB and group-level cognitive style diversity. According to the results, moderation is shown by a non-significant interaction effect, and in this case the interaction is non-significant, b =0.0007, 95% CI[-0.14, 0.02], t

=.072, p=.95, indicating that the relationship between group-level cognitive style diversity and group-level OCB is not moderated by group size.

Table 5.6.2.3.1 Linear model of predictors of aggression

	b	SE B	t	P
Constant	2.4112	.1245	19.4	.000
Group size (centred)	.1076	.0342	3.15	.002
Cognitive style diversity (centred)	-.0618	.0319	-1.94	.05
Leaders' EI * Cognitive style diversity	.0007	.0093	.0719	.95

Note: R^2= .06

5.7 Summary of group level findings

Hypothesis	Descriptive	Finding
H2	Intuitive groups will exhibit a higher degree of group-level OCB than analytic groups	Supported
H3	Groups with low diversity of cognitive styles will exhibit a higher degree of group-level OCB than groups with high cognitive style diversity.	Refuted
H5	Group-level emotional intelligence is positively linked to group-level organisational citizenship behaviour.	Supported
H9	Groups with higher cognitive style diversity will exhibit greater LMX differentiation than groups with lower cognitive style diversity	Refuted

6 Discussion

This section returns to the hypotheses in light of the findings presented in Chapter 5. Specifically, the discussions are separated into two parts. The first part focuses on the measurement model of all the variables. After moderation, all the models fitted the data well and can be used to present the sample. In the second part, both the supported and refuted hypotheses are discussed and linked to the reviewed literature in order to identify the overlapping and non-overlapping areas in previous studies and the current research. The results of this research play an important role in demonstrating the relationship between the independent variables (cognitive styles, emotional intelligence and leader-member exchange) and the dependent variable (organisational citizenship behaviour).

6.1 Discussion of the measurement model

As stated earlier, CFA is a type of analysis method that tests whether constructs of variables fit the researcher's observations of a phenomenon. Although all of the instruments had high levels of reliability and validity, further testing was required to establish whether these instruments could accurately reflect the real situation of this research. Detailed information on CFA is given below.

6.1.1 Organisational citizenship behaviour

In this study, Podaskoff's (1990) questionnaire was used to measure group-level and individual-level OCB. The main difference between these two types is the wording: "*Group members have work attendance that is above the norm" (group-level OCB) and "the employee (SG2) has work attendance that is above the norm" (individual-level OCB).*

A review of studies conducted over the past few decades reveals that there are two common ways to measure group-level OCB (Podsakoff, 1990; Podsakoff, 1996; Posdakoff and MacKenzie, 1994). One is that leaders evaluate each member's OCB in their team and the other is that group members evaluate other members' OCB. Although previous studies demonstrate that both types of measurement can be predicted by the same antecedents (e.g., interpersonal relationships and leadership) and influence task performance, they fail to compare the differences between peers' rating of group-level OCB and leaders' rating of OCB empirically when they are predicted by the same variables. Therefore, in this study, both leaders' and group members' evaluations are compared and connected to group-level antecedents.

However, in this study, those group members who were assessed by their leaders are different from those who were evaluated by their peers. In the target organisations, the group size varied across different groups, ranging from three to 17 members. As a consequence of the time limitation, it was difficult for leaders in the larger groups to evaluate each member, so leaders were encouraged to evaluate a maximum of four members. Therefore, those individuals who were evaluated by their direct leaders were considered as a group. In comparison, according to peers' perceptions, only individuals who worked in the same department could be called group members.

In the empirical test, the CFA of the individual-level organisational citizenship behaviours construct consisted of 21 items for the five dimensions. This model fitted data well when 20 items were loaded on five dimensions (RMR = 0.04, RMSEA = 0.067, GFI = 0.90, AGFI = 0.87, NFI = 0.94). Furthermore, the five factors also loaded significantly on group-level organisational citizenship behaviours (RMR = 0.04, RMSEA = 0.07, GFI = 0.91, AGFI = 0.88, NFI = 0.94). Therefore, both models are discussed and then related to the hypotheses.

6.1.2 Leader-member exchange

With the empirical test, the confirmatory model of leader-member exchange fitted data well (RMR = 0.02, RMSEA = 0.08, GFI = 0.971, AGFI = 0.926, NFI = 0.969). Therefore, the LMX7 model was appropriate for application in this study.

6.1.3 Emotional intelligence

With the empirical test, the CFA of the emotional intelligence construct consisted of all 16 items for the four dimensions. This model fitted data well when all the items were loaded on five dimensions (RMR = 0.05, RMSEA = 0.078, GFI = 0.917, AGFI = 0.887, NFI = 0.935). Furthermore, the five factors were also significantly loaded on emotional intelligence. Therefore, this model was appropriate for application in this study.

6.1.4 Cognitive styles

As mentioned in the previous chapter, the unidimensional model of CSI (without parcels) was inappropriate in this research because of poor model fit. However, the results support parcels for a unidimensional model, as with many studies (e.g., Allinson and Hayes, 1996; Hayes et al., 2003), but also contradicts others in the multidimensional field (Hodgkinson and Sadler-Smith, 2003).

Some scholars (Allinson and Hayes, 1996) define cognitive styles as a unitary model according to the six parcels of CSI. They argue that the six-parcel model reduces some dimensions and combines some items. Therefore, it makes the cognitive style construct simple. Another reason is that, compared with other relatively complex counterparts, it is less time-consuming to administer. Thus, in view of selection decisions, assessors "*need only attend to one potential source of information (e.g. the extent to which candidates are characterised by analytic versus intuitive cognitive style)*" (Hodgkinson and Sadler-Smith, 2003).

Nevertheless, although there is high internal consistency and test-retest reliability, some recent studies (Hodgkinson and Sadler-Smith, 2003) query the unitary model developed by Allinson and Hayes (1996) as having a limited number of samples ($n < 100$ in two sub-samples), which will influence maximum likelihood factor analysis. Kline (1994, p. 95) argues that "*with maximum likelihood factor analysis inferences are made from the sample to the population and therefore large and adequate samples are required*". Therefore, the sample size in Allinson and Hayes's (1996) study does not meet the criterion that sample size should be greater than 150 (Kline, 1994).

In this study, an appropriate sample size ($n = 865$) was applied to test the maximum likelihood of the six-parcel model. According to the results, the maximum likelihood in this model's estimates was significant and the critical ratio values were larger than 1.96; therefore, it is statistically significant for the six parcels of cognitive styles. In addition, the six-parcel model fitted the model better (RMR = 0.035, RMSEA = 0.073, GFI = 0.98, AGFI = 0.954, NFI = 0.919) than the two-factor model in some situations (data collected in iteration 1 and iteration 2), in which most of the criteria had a poorer fit. Therefore, the six-parcel model was appropriate for this study.

In response to Hodgkinson and Sadler-Smith's (2003, p. 248) argument about "*a mixture of analytic and intuitive items biasing the research in favour of the emergence of a single factor solution*", it is questionable how much substance there is to support these propositions. Hayes et al. (2003) stress that it is probably conceptually heterogeneous for the six-parcel model, but the model is created by grouping together items that are significantly empirically related. Furthermore, they argue that "*it does not follow logically that the parcels of Allinson and Hayes are more likely to be highly intercorrelated; in fact, the reverse is more likely to be the case*" (Hayes et al., 2003, p. 274). Therefore, the conceptual and empirical correlation is confused in Hodgkinson and Sadler-Smith's argument. The origin of the six-parcel model was developed according to empirical correlations, while Hodgkinson and Sadler-Smith's argument is based on the idea that it should be correlated between conceptually different items.

In order to overcome potential issues in Allinson and Hayes's parcels, some domain-specific item parcels were developed by Hodgkinson and Sadler-Smith to collect items randomly from the analytic and intuitive areas. Hodgkinson and Sadler-Smith (2003) believe that keeping intuitive and analytic items separate ensures that every parcel comprises either all analytic or all intuitive items. However, reliability is in doubt in the process because they introduced bias to the empirical results at the beginning. Although they randomly allocated items to different parcels, the procedure was reliant on personal judgement rather than on empirical data, and thus the results are influenced by method bias.

Another methodological issue in Hodgkinson and Sadler-Smith's study is the factor extraction procedures. They use three models to justify the fit of data. However, a considerable amount of consideration is based on their personal judgement, rather than on empirical data. This may explain the low level of model fit in iteration 1 and iteration 2 of the two-factor model. Thus, there is no unified criterion for creating parcels; it is likely that items with low inter-item correlation are aggregated. This may explain the low level of model fit in iteration 1 and iteration 2. Although there is an acceptable model fit in iterations 3 and 4, the created parcels are likely to bias the empirical results. In addition, although nine parcels are created, as was done by Hodgkinson and Sadler-Smith (2003), these parcels consist of different items, which may explain why the findings of the present study are different from those of Hodgkinson and Sadler-Smith (2003). Hayes (2003) also states that factor analysis needs to be processed in a purely empirical way. If empirical results are guided by conceptual preconceptions, the results will be biased in favour of the adopted conceptualisation. Therefore, Hodgkinson and Sadler-Smith's applied model leads to method bias and so it is unsurprising that, in their view, the Allinson and Hayes model is rejected.

As part of the theoretical background, Hodgkinson and Sadler-Smith developed their two-factor model based on four types of Jungian personality type theory (Jung, 1923): sensation (perception by applying the senses), intuition (sensing in unconscious situations or unconscious backgrounds), thinking (intellectual cognition and logical conclusions) and feeling (subjective perception). In particular, intuitive style is positively related to or based on intuition and feeling perception, while analytic style is positively related to or based on sensation and thinking perception. However, on the one hand, Keen (1973) states that some of the dimensions in the model of Jungian personality (perception and judgement) are correlated rather than independent in data collection and decision making. Therefore, this means that in the process of data collection and assessment, many individuals are either consistently intuitive or consistently analytic.

On the other hand, Miller (1991) states that two dimensions of Jungian personality (sensation-intuition and thinking-feeling) are not related to differences in perception and judgement. Judgement and perception are not on the orthogonal dimensions. Studies of the four types of Jungian personality type also support that individuals whose perceptual style tends to be analytic would be analytic in thinking and memory. Miller (1991, pp. 218-219) argues that “*a more reasonable formulation would be to contrast sensation/thinking (akin to an analytical style) with intuition/feeling (holistic style)*”. Following these arguments, Jungian personality type theory provides a significant theoretical foundation for the unidimension model, rather than the multidimension model of cognitive styles.

In addition, most of the cognitive style instruments upon which Hodgkinson and Sadler-Smith depend have been described as lacking validity or reliability. For example, as mentioned previously, the Learning Style Inventory has drawbacks in its design (e.g., the ipsative format, forced-choice technique, dependent scores, and instrument bias), the model is unstable and its validity has been questioned. The Group Embedded Figures Test has been criticised as focusing on the measurement of analytic ability rather than cognitive style (Widiger, Knudson and Porter, 1980). In recent studies, Armstrong et al. (2012, p. 253) assert that “*the three most commonly used instruments for the assessment on cognitive styles in business and management research were the MBTI (24%), the KAI (21%) and the CSI (14%)*”. Of these three instruments, the MBTI was originally developed as a multidimensional construct, while KAI is a single-factor dimension.

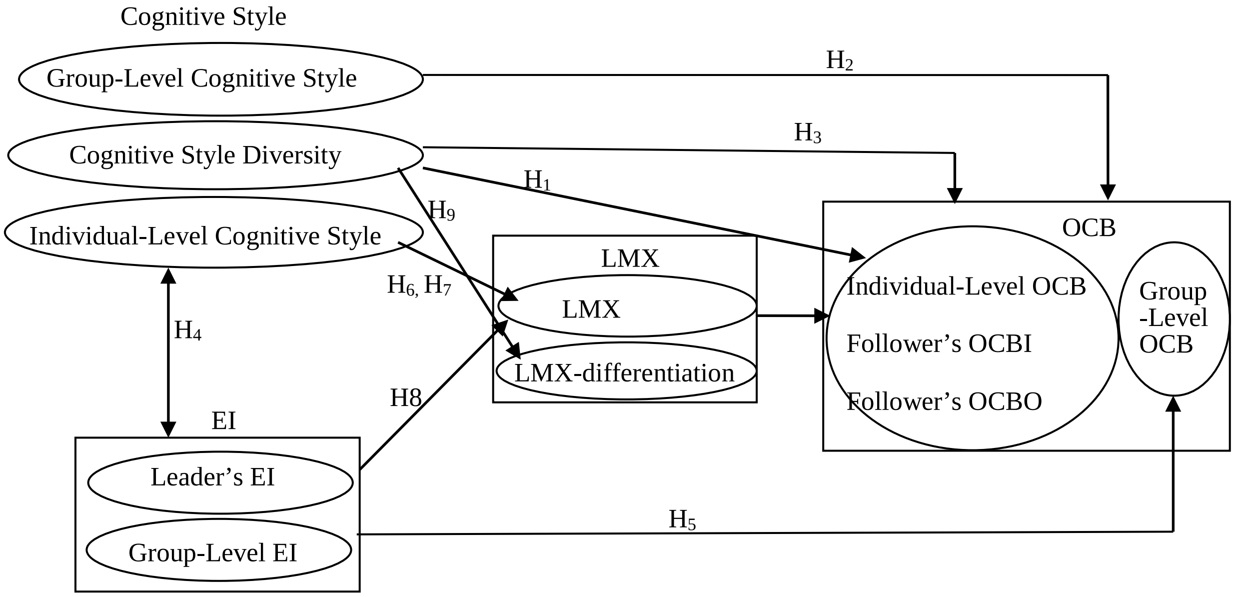
Therefore, there is a lack of evidence for the dominant role of a multidimensional construct in business and organisational research.

Therefore, as noted above, the six-parcel model was used in this research, not only according to the empirical results, but also based on a sound theoretical foundation. This section of the research makes a significant contribution to knowledge surrounding the ongoing debate on whether cognitive style is complex or unitary (Hayes, Allinson, Hudson and Keasy, 2003; Hodgkinson and Sadler-Smith, 2003; Hodgkinson, Sadler-Smith, Sinclair, and Ashkanasy, 2009; Vance, Groves, Paik and Kindler, 2007).

6.2 Discussion related to study hypotheses

The following section discusses the research framework which is established in Chapters 2, 4 and 5. Additionally, within the framework, findings from each hypothesis will be discussed and compared with the reviewed literature.

Figure 6.2.1: Hypothesized model



6.2.1 The relationship between cognitive styles and organisational citizenship behaviour

After testing the direct relationship, the cognitive styles score was found to be negatively related to levels of organisational citizenship behaviours. As noted, the higher the score, the greater the possibility of analytic style; the lower the score, the greater the possibility of intuitive style. In other words, intuitive style is positively related to a higher level of organisational citizenship behaviours than analytic style.

This finding supports the theory of cognitive styles, which suggests that intuitive individuals have a strong preference for interpersonal relationships, whereas analytic individuals tend to be more impersonal in their interpersonal relationships.

According to Mezoff (1986), different styles have a tendency for either internal or external referents. For example, field-dependence (FD) is closely related to external referents, and field-independence (FI) is closely connected to internal referents. With respect to internal referents, individuals may strongly focus on self-no-self segregation. In other words, individuals with field-independence may prefer "*to rely on the self as the primary referent in psychological functioning*" (Witkin and Goodenough, 1997, p. 25). Armstrong (1999) compared 54 different dimensions of cognitive styles and found a relationship between intuitive style and field-dependence and a relationship between analytic style and field-independence. Thus, when results and evidence are provided through the dimensions of FD-FI, these can be replicated to the dimension of intuitive and analytic styles. Therefore, individuals with an analytic style are self-oriented. When they consider any actions which cannot bring direct benefits, they may refrain from undertaking them. Organisational citizenship behaviours are considered as extra-role activities that may not directly relate to individuals' daily payment or tasks. They are not motivated to exhibit OCB.

In comparison, according to Witkin and Goodenough (1977), an interpersonal setting relies heavily on the external referents. In other words, individuals with an intuitive style may focus on interpersonal relationships. In their daily work, individuals with an intuitive style may look for effective functioning but their own knowledge is sometimes not enough to produce this and thus they may actively develop interpersonal relationships looking for others' knowledge of their own function. They may tend to be warm and friendly in order to maintain positive interpersonal relationships. At the same time, their 'looking' behaviour may enable them to sense others' situations. As a kind of reciprocation for others' help, they may provide personal help to them. Therefore, the intuitive style is more affect-driven than the analytic style.

In considering the internal characteristics of both styles, Riding and Wright (1995) surveyed 149 undergraduate students with a cognitive style analysis (CSA) instrument to identify how these students rated their flatmates in terms of individual characteristics. Flatmates with a wholist (intuitive) style were evaluated as helpful and humorous, while others with an analytic style were evaluated as shy. Organisational citizenship behaviour as a type of social-emotional behaviour emphasises the feeling of harmony, so wholists (intuitivists) may very likely exhibit OCB. These findings have been replicated in this research because there is a positive relationship between intuitive style and the style of wholist-analytics (high scores indicate an analytic style for CSA and CSI) (Armstrong, 1999). In other words, the intuitive style has similar characteristics to the wholist style, while the analytic style associated with CSI has similar characteristics to the analytic style associated with CSA.

According to the empirical test associated with hypothesis 1, there is a highly positive relationship between OCBI and OCBO (Pearson correlation = 0.76; $p < 0.00$). However, although the CSI score is positively related to OCBI, there is no significant relationship between cognitive styles and organisational-target organisational citizenship behaviours. Cognitive style has different implications for OCBI and OCBO because of the distinction between OCBI and OCBO. Although some scholars indicate that different factors or aspects of OCB are related (Lepine et al., 2002), others indicate that individuals may be good at one or more aspects of OCB rather than all aspects of OCB uniformly (Organ, 1997; Settoon and Mossholder, 2002; Van Dyne et al., 1995). As mentioned in the literature review, the various aspects of OCB differ and have different correlates with other variables.

OCBI helping individuals at work may have indirect implications for the balance of transactions between employees and the organisation. In comparison, OCBO is considered as individuals evaluating their working environment. It has direct implications for maintaining the balance of social exchange between organisation and staff. Lee and Allen (2002, p. 138) assert that OCBO refers to "*planned and deliberate behaviour, motivated by reciprocity need, rather than expressive emotional behaviour*". In addition, as pointed out by McNeely and Meglino (1994), OCBO is related to individuals' job cognition, such as recognition and reward equity, rather than OCBI. Furthermore, Skarlicki and Latham (1996, 1997) state that fairness cognitions are more strongly connected to OCBO than to OCBI. Therefore, based on these findings, it is suggested that OCBO is more positively related to perceptions of environment than being affect-driven, which stresses the expression of emotions through behaviours. The theory of cognitive style overlaps with OCBI in the affect-driven field rather than OCBO, so cognitive style may relate to OCBI rather than to OCBO.

6.2.2 The relationship between emotional intelligence and cognitive styles

In order to test the relationship between emotional intelligence and different cognitive styles, it is first important to consider how to measure each construct. In this study, two different methods were used to test cognitive style. First, both intuitive style and analytic style were considered as a whole. The structural model in Chapter 5 indicates that cognitive style is positively related to emotional intelligence. In other words, individuals with an analytic style may exhibit a higher level of EI than those with an intuitive style. Therefore, hypothesis 4 is rejected.

This finding represents a special case, which contradicts most theoretical and empirical tests but provides a novel version for considering the relationship between cognitive style and emotional intelligence. Further studies are suggested to provide more evidence and develop theories for this finding.

The second option for measuring cognitive style is median score. Median splits of the CSI score were used to distinguish intuitive style and analytic style. However, Aiken and West (1991) stress that transforming continuous variables in dichotomies will waste information; the power of the statistical test may then be reduced and the likelihood of type II error may be created.

The correlation model in Chapter 5 shows that neither style has a relationship with emotional intelligence. In more detail, intuitive style is not significantly related to EI ($p = 0.913$) and neither is analytic style ($p = 0.08$). This result can be explained by both ability-model EI and cognitive style having different theoretical implications. First, the ability model of EI focuses on intelligence rather than cognitive styles (Hayes and Allinson, 1994; Riding and Pearson, 1994). Intelligence, as one of the important components of the ability model of EI, is defined as the mental ability to deal with or reason with information (Carroll, 1993; Spearman, 1927; Sternberg and Detterman 1986) which is either specific or general. In particular, mental ability goes through several hierarchies to process information (Carroll, 1993). However, according to the theory of cognitive style, it is separate from intelligence. Riding and Pearson (1994) further confirm the distinction between the two theories based on empirical testing. After an investigation involving 119 students, they found that there was no correlation between intelligence and cognitive styles.

Second, another difference between the ability model of EI and cognitive style is that ability is considered as unipolar, but cognitive styles are regarded as bipolar. In other words, a higher level of ability may obtain more positive results than a lower level of ability. However, this is more complex for cognitive styles in different situations. Individuals at one end of a style dimension may find it difficult to perform some tasks, but these tasks may be easy for individuals at the end of other dimension (Riding, 1997). For instance, individuals with an analytic style may perform well in mechanistic tasks, while individuals with an intuitive style may perform well in organic tasks (Armstrong and Priola, 2001), while more abilities are valued as good. However, different cognitive styles may have different judgements (positive or negative) in different circumstances (Hayes and Allinson, 1994). In other words, individuals' cognitive styles are either appropriate or inappropriate according to the nature of the job, while ability is considered as good in any situation. Therefore, both cognitive styles and emotional intelligence have different implications for organisational studies. Cognitive styles may encourage individuals to take one type of familiar performance and not to choose perfect performance (Hayes and Allinson, 1994).

Moreover, the results (applying median splits to measure the relationship between cognitive style and emotional intelligence) support the notion that the relationship between cognitive styles and EI is different when applying different models to measure EI. Previous studies support that there is a significant relationship between cognitive styles and a mixed-model of EI. The reason is that, although EI includes both personality and the ability to manage and understand emotions, its construct mainly focuses on personality, emotional knowledge and "*personal functioning that is rather loosely related to emotion, including: motivation, personality traits, temperament character, and social skills*" (Zeidner et al., 2004, p. 375). In addition, the mixed model of EI with regard to its psychological focuses is affect-driven. As discussed, cognitive styles can also be considered as affect-driven. Thus, previous studies may support the correlation between the mixed model of EI and cognitive styles rather than the relationship between the ability model of EI and cognitive styles.

For hypothesis 4, two different results were obtained according to different CSI measures. This study considers the first option to be better than the second because the results were not influenced by type II error. Thus, this study concludes that cognitive style is positively related to emotional intelligence.

6.2.3 The relationship between the quality of LMX, leaders' cognitive styles and followers' OCB

By reviewing the relationship between the quality of LMX, leaders' cognitive styles and followers' OCB, the findings indicate that although leaders' perceived quality of LMX and followers' perceived quality of LMX have a positive influence on OCB (both OCBI and OCBO), neither of them significantly relates to leaders' CSI and there is no relationship between leaders' CSI and followers' OCB. In other words, leaders' CSI has neither a direct nor an indirect effect on followers' OCB. Thus, the quality of LMX has no mediating effect on the relationship between leaders' CSI and followers' OCB. This does not support the reviewed literature.

One possible way to explain the result is the similarity between leaders and followers. As presented in the previous chapter, when intuitive leaders are assigned to a group to manage analytic followers, the leaders' perceived quality of LMX may mediate the effect of the leaders' intuitive style on followers' OCB. The finding partially supports the theory of dominance-nurturance (Pincus and Wiggin, 1992) and the theory of complementary needs (Winch, Ktsanes and Ktsanes, 1954), but contradicts similarity-attraction theory (Byrne, 1971).

According to dominance-nuturance theory, behaviours on the dominant side tend to take the dominant role in the interaction. Behaviours on the nurturance side concentrate on the degree of closeness between the individuals in the relationship. In relation to cognitive styles, intuitive leaders are considered to be more nurturing than analytic leaders in that they encourage group members to develop positive relationships in their groups and advocate a harmonious environment and humanistic care. In other words, they may advocate equal relationships and do not force followers to follow their will. A similar theory is advocated by Cattell and Nesselroade (1967), in which individuals may be attracted to others on account of a willingness to deal with information important to their self-concept or general life adjustment. Leaders' encouragement and positive emotions may meet followers' expectations of a positive interpersonal relationship; they may exhibit organisational citizenship behaviours as responses to a positive relationship.

In relation to the theory of complementary needs, a successful relationship can be considered as the product of reciprocal need gratification (Winch, Ktsanes and Ktsanes, 1954). In other words, the dissimilarities in cognitive styles may facilitate interpersonal relationships. As mentioned in section 6.2.1, analytic workers are not good at developing interpersonal relationships and less willing to exhibit interpersonal help, so they need more interpersonal motivation and interpersonal help from intuitive leaders than do intuitive followers. A similar conclusion is drawn by Allinson et al. (2001), whereby analytic leaders with intuitive followers are less respected and liked than intuitive leaders with analytic followers.

However, although the theories of dominance-nuturance and complementary needs may explain the mediating role of leaders' perceived quality of LMX, both theories are insufficient to explain results from followers' perceived quality of LMX in which the followers' LMX does not take a mediating role in the relationship.

As pointed out by certain scholars, the different results are caused by leaders' perceptions of LMX being different from followers' perceptions of LMX (Gerstener and Day, 1997; Sin Nahrgang and Morgeson, 2009). In other words, followers' LMX and leaders' LMX are considered as two separate but correlated sources of constructs. Thus, it is possible that, sometimes, one partner's LMX does not give rise to the reciprocation of another partner (this is also called LMX agreement). For example, a leader's trust may not definitely improve group members' trust. In empirical tests, Graen and Cashman (1975) discovered that there is a 0.5 correlation between followers' LMX and leaders' LMX, but other scholars assert that there is only a 0.24 correlation between followers' LMX and leaders' LMX (Scandura, Graen, and Novak, 1986). As tested in this study, the correlation between followers' LMX and leaders' LMX is 0.1 ($p = 0.045$). The low correlation is consistent with the low level of follower-leader agreement. This research first explains the findings related to LMX agreement. They are discussed here from two perspectives: the agreement of LMX items and leaders' response inflation.

First, it is possible that not all factors of LMX may yield higher levels of agreement. Sin Nahrgang and Morgeson (2009) test four factors of LMX according to an LMX-MDM instrument, in which affect (mutual liking of both parties), loyalty (both parties supporting each other's behaviours and actions) and contribution (as a type of task-rated behaviour that both parties use to aim to complete mutual goals) may match the overall construct of LMX and obtain higher agreement in terms of the frequency and length of time of both parties working together. The more time or the greater the frequency individuals work together, the more opportunities they have to support each other's behaviours and make correct judgements of each other's values.

However, professional respect may yield a low level of agreement. This can be explained by the nature of professional respect. It is defined as both parties' respect for each other's professional abilities. Specifically, one party (particularly for leaders) may already have obtained professional respect before working together with another party. Thus, the factors of affect, loyalty and contribution may rely on interpersonal relationships, but not for professional respect. Sin Nahrgang and Morgeson (2009) stress that professional respect relies more on reputation than dyadic relationships. In an organisation, a leader may have a more established reputation (either good or bad) than a follower. Before the follower develops a dyadic relationship with a leader, he or she may already respect or not respect the leader according to his or her reputation. In other words, a follower may make an evaluation depending on existing knowledge rather than on what he or she actually feels. In addition, according to empirical evidence, there is no relationship between the frequency and length of time of both parties working together and professional respect. However, these studies mainly focus on the LMX-MDM model, rather than LMX7. LMX7 as an instrument is more commonly used in research (Gerstner and Day, 1997) because it has higher internal consistency than other instruments and may predict some variables, such as task-related behaviours and interpersonal conflicts, more strongly than other instruments. Although both instruments include the item of respect, they have different content. Therefore, it is suggested that further studies consider whether items of respect in LMX7 are independent of a dyadic relationship.

Second, different evaluations between leaders and followers can be attributed to leaders' inflated ratings. Sin Nahrgang and Morgeson (2009) stress that the item wording of LMX mainly depends on leaders' perceptions of followers. For instance, six items in LMX7 (Graen and Uhl-Bien, 1995) focus on "*leaders' attitudes (e.g., satisfaction with a member), cognitions (e.g., understanding a member's job problems and needs or recognising a member's potential), and actions (e.g., helping a member solve work-related problems)*" (Sin Nahrgang and Morgeson, 2009, p. 1049). Therefore, according to the construct, leaders may consider these items in terms of evaluating themselves rather than evaluating followers. As a result, the range of leaders' responses would be limited by inflated ratings. In other words, leaders will give a high assessment for the quality of LMX, which will lead to the low agreement of followers' responses. Although Sin Nahrgang and Morgeson's (2009) empirical test overturns their assumption that inflated leaders' evaluation does not influence LMX agreement and lacks empirical support for leaders' inflating LMX appraisal, their study mainly focuses on an LMX-MDM construct rather than LMX7. Therefore, future studies need to consider whether leaders' responses influence LMX agreement according to LMX7.

Moreover, the results of leaders' perception can be influenced by common method bias. Specifically, the measurement of leaders' cognitive styles, followers' OCB and leaders' perceived LMX is undertaken according to leaders' perception. This may limit respondents' responses/answers at the higher level, which may in turn decrease the reliability of the data (Podsakoff et al., 2012)

6.2.4 The relationship between group leaders' EI, the quality of LMX and followers' OCB

After testing the mediating role of leaders' EI, the results indicate that leaders' emotional intelligence has both a direct and an indirect (through the quality of leader-member exchange) influence on followers' organisational citizenship behaviours. In other words, the quality of LMX partly mediates the relationship between leaders' EI and followers' OCB. The findings support previous studies on the positive influence of the quality of LMX on performance. One possible reason for leaders' EI both directly and indirectly affecting followers' OCB is that both leader-member exchange and emotional intelligence are considered to be types of exchange. Specifically, the more benefits leaders give, the more likely it is that followers reciprocate.

Clearly, emotional intelligence could encourage leaders to give benefits to followers. In the process of performing non-task-related behaviours, individuals developing interpersonal relationships may rely on respect, trust and obligation between the leaders and followers involved. The four dimensions of EI may encourage group leaders to transfer respect, trust and obligation to followers. First, evaluating and understanding one's own and others' emotions may help leaders to become aware of followers' perceptions of OCB and reactions (either good or bad) to performing it. For example, leaders who have high EI may perceive followers to have positive emotions when they are given a rise for their commitment, while they may perceive followers to have negative feelings when they are reprimanded.

Second, when leaders correctly perceive their own and others' emotions, they may facilitate their behaviour through UOE (regulation of self-emotion) and ROE (use of emotion to facilitate performance) to meet followers' requirements. Martin et al. (1993) point out that followers presumably perceive leaders' revealed emotions or behaviours as cues for goal attainment in a behavioural context. If followers obtain leaders' emotional engagement or perceive they are receiving the type of support they need, they may have positive feelings and may possibly exhibit organisational citizenship behaviours.

However, although both leaders' and followers' perceived quality of LMX have a significant relationship with leaders' EI and followers' OCB (both OCBI and OCBO), they have different predicting power for the two variables. In other words, leaders' perceived quality of LMX has a stronger positive relationship with leaders' EI and followers' OCB than followers' perceived quality of LMX. Two reasons to explain the results are the agreement of LMX items and leaders' response inflation, which were discussed above.

Furthermore, apart from LMX agreement and leaders' response inflation, the results may also be affected by common method bias. Specifically, EI data and followers' LMX are collected from the same source. This may limit respondents' responses/answers at the higher level, which may in turn decrease the reliability of the data (Podsakoff et al., 2012).

6.2.5 The relationship between group EI and group-level OCB

There were two opposite results in testing the relationship between group EI and group-level OCB because the group-level OCB data were collected from different sources. When leaders' rating is regarded as a criterion for assessing group-level OCB, there is no significant relationship between group EI and group-level OCB. However, when peer rating is considered as a criterion for assessing group-level OCB, group EI positively relates to group-level OCB ($p < 0.001$).

When group-level OCB is assessed by peers, there is a positive relationship between group-level OCB and group-level EI. First, the finding can be explained by social exchange theory. In group interaction, social exchange may go beyond the dyadic limitation and extend to the whole group by "*indirect chains exchange*". In other words, group members may create a group-level exchange cycle (Blau, 1964). For example, in this cycle, group member A may receive support from group member B, who may be indirectly reciprocated by group member C. Similarly, group member C may also receive help from group member A. Moreover, Druskat and Wolff (2001) point out that those individuals who have high EI are good at facilitating an affective environment, so groups may direct their attentions to different group activities. For instance, groups that have a great number of high EI members may use members' emotions in a functional way to facilitate cognitive process. Mayer et al. (2000) stress that individuals who have a high level of EI may be enthusiastic in promoting interaction between group members and may be willing to discover and manage feelings among group members. Therefore, according to the group-level exchange cycle theory, when most group members with high levels of EI pay attention to developing positive interpersonal relationships, their positive emotions and activities may elicit positive responses from other members. Therefore, it is expected that group members may participate in group-level organisational citizenship behaviours.

Second, group-level EI may positively influence group-level OCB through effective coordination. Clarke (2009) stresses that in the link between EI and group-level effectiveness, it has been recognised that many behaviours thought to underpin group processes, such as cooperation and conflict resolve, are supported by emotional management. Furthermore, group members who have high EI are likely to be reliable and dependable, as they may be good at managing different emotionally taxing organisational events (Huy, 1999). If a group consists of members with high EI, group members may regard each other as trustworthy and dependable, and they commit to organisational development and exhibit helping behaviours.

Third, group members' EI may promote group-level OCB because of effective communication. As pointed out by some scholars (e.g., Keltner and Haidt, 1999; van Kleef, 2010; van Kleef, DeDreu and Manstead, 2010; Wolff et al., 2006), emotions are considered as an adaptive mechanism to facilitate not only group members' interactions and relationships, but also group-level commitment and interaction. Individuals who have high EI are good at deciphering the emotions and behaviours of other group members (Elfenbein, Polzer, and Ambady, 2007), so they have abilities to harmonise interpersonal processes.

In relation to the above, the four aspects of EI are regarded as helping group members in several respects. For instance, an awareness of other group members' emotions may help them to be aware of the others' needs and develop close interpersonal ties. Such interpersonal ties may enhance trust between group members and helping behaviours (Larkey, 1996; McAllister, 1995). This is also supported by Jordan et al. (2002), who found that an understanding of how events in groups lead to specific emotional responses will then affect behaviours and help group members in their work. In addition, group members who are good at managing and controlling their own or others' emotions may also be good at motivating others and resolving conflicts (Prati et al., 2003; Van Rooy and Viswesvaran, 2004; Wolff et al., 2002).

However, when group-level OCB data are assessed based on leaders' rating, the relationship between group-level EI and group-level OCB is not significant. Despite these findings being in contradiction to the hypotheses, they are not without theoretical and empirical evidence. The absence of significant relationships may be moderated by a number of factors. For instance, group-level OCB may be influenced by group type. Devine (2002) stresses that group type is affected by a number of factors, such as the task structure of the group, temporal duration and work cycle. For example, if some groups only exist for a short period of time, even if most of the group members have a high level of EI, they may have less opportunity to influence other members to engage in organisational citizenship behaviours. They may also have less expectation of working together in the future, which may reduce the opportunities for social exchange (Blau, 1964).

In addition, the relationship between EI and OCB may be influenced by the data source. In order to choose an adequate measurement method, the selection of a reviewer is important, as leaders and peers may have different perceptions or definitions of organisational citizenship behaviours and may, therefore, give different evaluations for OCB (Lam et al., 1999). There is no doubt that both peer rating and leader rating have disadvantages and advantages. Leaders may be sensitive to followers' conscientiousness and compliance, while peers may be better at predicting behaviours of courtesy and interpersonal help than leaders (Organ et al., 2006). It is necessary to choose an appropriate rating according to research content. Although, according to CFA analysis, both the peer-rating model and the leader-rating model are reliable, some indexes of peer-rating models are considerably superior. This study employed peer rating to explain group-level OCB. Further reasons for this decision are given below.

First, peer rating supports the theoretical assumption of group-level OCB, as discussed in the literature review. Group-level OCB refers to the dynamics of a whole group (Bommer et al., 2007; Ehrhart et al., 2006; Yun et al., 2007). Peer rating is consistent with the nature of GOCB, reflecting the situations of all the group members. In comparison, leader rating reflects average OCB and it is impossible to consider the group environment as a criterion.

Another reason for adopting peer rating is that when followers' behaviours are monitored by leaders, they may perform in a more discreet way and monitor their behaviours more carefully than would peers (Murphy and Cleveland, 1995). Therefore, peers may have more opportunities to discover other followers' behaviours than do leaders. This argument is also supported by Organ and Konovsky (1989), thus suggesting the use of peer rating to evaluate group-level OCB.

Therefore, as discussed above, the results from peer rating were adopted: there is a positive relationship between group-level EI and group-level OCB.

6.2.6 The influence of group-level cognitive style diversity

In order to examine the role of group-level cognitive style diversity, this study tested whether different levels of cognitive style diversity may exhibit different degrees of group-level OCB and LMX differentiation. First, in view of group-level cognitive style diversity and group-level OCB, there is no significant relationship between the two variables. The results contradict the original expectation, and it can be concluded that the theory behind the similarity-attraction paradigm (Byrne, 1971) and the theory of complementary needs (Winch, Ktsanes and Ktsanes, 1954) are not appropriate for explaining the relationship between the two variables.

Second, in view of group-level cognitive style diversity and LMX differentiation, the result has shown that there is no significant relationship between the two variables.

Despite these findings, which are in contradiction with the original expectation, they are not without theoretical and empirical precedence. First, in order to explain the finding, three moderating variables (leaders' EI, group-level EI and group size) should be taken into account. On the one hand, when leaders' EI is low or at the mean value, there are no significant relationships between group-level cognitive style diversity and LMX differentiation; whilst, when leaders' EI is high, there is a significant negative relationship between group-level cognitive style diversity and LMX differentiation. This can be explained as the influence of emotional intelligence and leadership. Groups or team leaders have normally been acknowledged as playing an important role in group or team traits, processes and outcomes (Zaccaro and Klimoski, 2002). For instance, leaders with high EI tend to treat group members appropriately in an emotional manner. As such, according to different situations, they may help subordinates to eliminate the negative influences of negative emotions, while improving the positive effects of emotions (Bono et al., 2007). The positive affective tone shared between group members may improve their trust and commitment towards the group leader (Jones and George, 1998).

In addition, leaders with high EI may attempt to discover the needs of all group members through the process of communication and empathy. When they identify the needs of all group members, they will offer support or mentoring to the group members. As demonstrated above, leaders' EI has a positive influence on the quality of LMX. When related to the group level, leaders who have high EI attempt to concentrate on all group members and they may overcome reciprocal transactional exchanges. They develop a high quality of LMX with all members. As a result, there is less differentiation in the LMX at the group level overall.

On the other hand, when group-level EI is low or at the mean value, there is no significant relationship between group-level cognitive style diversity and LMX differentiation; while, when group-level EI is high, there is a significant and negative relationship between group-level cognitive style diversity and LMX differentiation. One possible reason for this is that emotional intelligence enables members to perceive and understand leaders' feelings and decisions effectively, and allows them to support leaders' decisions at any time, regardless of how many resources have been distributed to them.

Last, when group size is taken into account in the relationship between LMX differentiation and cognitive diversity, it has no moderating effect on the two variables. A further means of explaining the result is the influence of the nature of the task. As has been noted, the nature of tasks can be categorised into two aspects: mechanistic and organic. Mechanistic tasks are defined by standardised procedures and well-defined roles (Weber, 1924/1927). Standardised procedures and well-defined roles use some types of organisational designs to limit the bias of group leaders because these procedures and roles may stipulate which kind of resource can be accessed by one specific person and how many resources can be received by one person. These stipulations may limit leaders' right to treat each group member differently (Henderson et al., 2009). In comparison, organic tasks lack defined rules and procedures to specify the distribution of resources. In this situation, leaders play an important role in distributing resources. Their decisions are influenced by social exchange needs. If individuals' cognitive style satisfies their mission perceptions or requirements, they may be considered as in-group members. Otherwise, they may be considered as out-group members. Priola et al. (2004) stress that individuals with an intuitive style may exhibit both emotional and task-related behaviours in organic tasks. Therefore, they would be considered as in-group members and obtain more trust and support from their leaders. Therefore, an assumption is made that there is no relationship between group-level cognitive style diversity and LMX differentiation in mechanistic tasks, while, in organic tasks, groups which consist of different cognitive styles are more negatively related to LMX differentiation than homogeneous groups. In this study, the target organisations needed to complete different manufacturing tasks in their daily work, so most of the groups were required to follow designed procedures to make products. These groups can be categorised as mechanistic. Therefore, it is possible that even though most of the group members had different cognitive styles, the group leaders may still not treat them differently.

Group culture is another factor that may contribute to explaining the finding. At the group level, a considerable number of culture dimensions, such as trust, aggressiveness and innovation, were revealed as being related to the group process (O'Reilly, Chatman and Caldwell, 1991). Erdogan et al. (2006) found that when group culture supports members' emotions and behaviours, group culture may positively influence leader-member exchange. For instance, when group norms relate to respect for each other, concern for individuals' needs and identifying accomplishments, leaders may do their best to maintain or produce high-quality relationships with all or most of the group members (Henderson et al., 2009). In comparison, when group norms have little concern for individuals' needs, trust and respect, leaders discriminate between group members and only build high-quality relationships with those followers who meet their personal needs. Moreover, they may be less likely to focus on all group members' needs and desires. Therefore, there is an assumption that group culture may moderate the relationship between group-level cognitive style diversity and LMX differentiation.

6.2.7 The relationship between group-level cognitive styles and group-level organisational citizenship behaviours

The finding indicates that both analytic and intuitive style are positively related to group-level OCBI, while groups with an intuitive style may exhibit a higher level of group-level OCBI than those with an analytic style. The result supports the idea that homogeneous intuitive groups may perform more social-emotional-related behaviours (Armstrong and Priola, 2001). Consistent with the discussion above, group members whose dominant cognitive style is intuitive may maintain a good relationship with others, and are very likely to exhibit a higher level of organisational citizenship behaviours than individuals whose dominant cognitive style is analytic.

7. Conclusion

This thesis has contributed to the existing literature by reporting the effects that different levels of variables (emotional intelligence, cognitive styles, leader-member exchange and leader-member exchange differentiation) have upon the likelihood of organisational citizenship behaviours in Chinese manufacturing organisations. This section indicates some of the core theoretical and practical implications of the findings of this thesis, as well as taking account of the limitations of the work. Finally, it gives direction for future research based on the findings of this study.

7.1 Summary of findings

The present study explored OCB literature in terms of the relationship between organisational citizenship behaviour and a variety of antecedent variables. The model emphasises three types of signal that affect OCB: cognitive styles, emotional intelligence and leader-member exchange. The results show that, at the individual level, individuals with an intuitive style are likely to exhibit organisational citizenship behaviour. In addition, LMX may take a mediating role in the relationship between leaders' EI and followers' OCB. At the group level, both group-level cognitive style and group-level emotional intelligence affect the level of group-level OCB. Further detail is given below that relates to the research questions and literature.

In view of the relationship between cognitive styles and organisational citizenship behaviour, some scholars (e.g., Allinson and Hayes, 1996; Armstrong, 2000) indicate that individuals or groups tending towards an intuitive style may exhibit higher levels of social-emotional behaviours than individuals or groups tending towards an analytic style.

Consistent with these studies, the overall findings of this research suggest that individuals and groups tending towards being intuitive may have a higher level of OCBI than individuals or groups tending to have analytic cognitive styles. Based on these findings, it can be concluded that cognitive styles may determine individuals' and groups' tendencies to exhibit helping behaviours. This also goes some way towards providing evidence that the influence of intuitive style on organisational citizenship behaviour is not only at the individual level, but also influences group-level effects.

In addition, the relationship between cognitive style diversity and group-level OCB was tested based on the theories of complementary needs and similarity-attraction. The research compared both to establish which is more appropriate to exploring the group difference in organisational citizenship behaviour. The empirical findings indicate that there is no relationship between groups with a diversity of cognitive styles and group-level organisational citizenship behaviour. Therefore, neither complementary needs theory or similarity-attraction theory can capture the full phenomenon of group diversity in OCB.

Considering the relationship between cognitive styles and emotional intelligence, empirical evidence shows different results according to different ways of measuring. On the one hand, when a median split is used to measure different types of cognitive style, neither the intuitive nor the analytic style is significantly related to emotional intelligence. The results support some studies in the non-intersect of theoretical implications between cognitive style and EI (Hayes and Allinson, 1994; Riding and Pearson, 1994). For instance, personality is highly related to cognitive style, but this is not the case for the ability model of EI. Other evidence suggests that emotional intelligence can be considered a cognitive ability which is not relevant to cognitive styles (Hayes and Allinson, 1994). On the other hand, the results, by reviewing both intuitive style and analytic style as a whole (the CSI scores ranged from 0 to 76), show that those individuals at the intuitive end of the continuum are inclined to develop a lower level of emotional intelligence than those at the analytic end. However, this finding is contrary to most relevant theories about emotional intelligence and cognitive styles.

Moreover, the relationship between group-level EI and group-level OCB was measured according to the nature of emotional intelligence (Ciarocchi et al., 2000; Ilies et al., 2007; Mayer, Caruso, and Salovey, 1999, 2000) and organisational citizenship behaviours (LePine et al., 2002; Organ et al., 1988; Podsakoff et al., 2014). A position suggested by some studies (Ayoko et al., 2008; Carmeli and Josman, 2006; Mayer and Salovey, 1997) is that individuals with a higher level of emotional intelligence may exhibit a higher level of altruistic behaviour and organisational commitment than individuals with a lower level of EI.

Similar to most of the empirical studies on the effects of an individual's level of EI on organisational behaviours (Carmeli and Josman, 2006; Charbonneau and Nicol, 2002; Ilies et al., 2007), the conclusion can also be drawn at the group level. The overall findings of this research suggest that groups with a higher level of EI may exhibit a higher degree of group-level OCB than those with lower levels of EI.

In relation to the mediating role of LMX in the relationship between leaders' cognitive styles and followers' OCB, the different degree of congruence between leaders' and followers' cognitive styles may lead to different conclusions. When analytic leaders are assigned to intuitive leaders or both leaders and followers have the same cognitive style, there is no mediating role of LMX on the relationship between leaders' cognitive styles and followers' OCB. However, when intuitive leaders are assigned to a group to manage analytic followers, leaders' perceived quality of LMX may mediate the effect of leaders' intuitive style on followers' OCB. This result supports Pincus and Wiggin's (1992) theory about 'dominance' and 'nurturance' in interpersonal relationships, which is that behaviours on the nurturance side (more positively related to intuitive style than analytic style) concentrate on the degree of closeness between individuals in the relationship, while behaviours at the end of the dominance side (more positively related to analytic style than intuitive style) tend to take the dominant role in an interaction. In relation to the theory of complementary needs (Winch, Ktsanes and Ktsanes, 1954), dissimilar cognitive styles may lead to a positive interpersonal relationship. However, when the congruence between leaders' and followers' cognitive styles is not taken into account, there is no mediating role of LMX on the effect of leaders' cognitive styles on followers' OCB.

Moreover, this study investigated the antecedents of LMX differentiation from a cognitive perspective. Contrary to the theories of complementary needs and similarity-attraction, there is no relationship between group diversity in cognitive styles and LMX differentiation. A possible reason underlying this result is the influence of moderating variables, such as the nature of the task (mechanistic vs. organic) and group-level culture (such as trust, aggressiveness and innovation) (O'Reilly, Chatman, and Caldwell, 1991). However, this assumption is only at the theoretical level, and further empirical studies are required.

Further analysis identified some moderating variables in the relationship between group diversity in cognitive styles and LMX differentiation. It was reported in the group-level analyses chapter that a high level of group emotional intelligence was related to a negative relationship between the two constructs. In addition, a high level of leaders' emotional intelligence was shown to relate to a negative relationship between cognitive style diversity and LMX differentiation. These findings go some way towards supporting the moderating role of EI (Keltner and Haidt, 1999; van Kleef, 2010; van Kleef, DeDreu, and Manstead, 2010) and leadership (Jones and George, 1998; Zaccaro and Klimoski, 2002) in group process and group outcomes.

Finally, in line with studies of the role of EI in interpersonal relationship variables (Ashforth and Humphrey, 1995; Ashkanasy and Tse, 2000; George, 2000; Rosete and Ciarrochi, 2005), the finding indicates that group-level emotional intelligence is positively linked to group-level organisational citizenship behaviour.

In conclusion, this paper has developed a theoretical framework which both combines and goes beyond relevant theories in the field of the antecedents of OCB at different levels. The findings provide empirical support for the influence of both EI and cognitive styles and the mediating role of LMX on OCB by using different levels of data from a field setting in seven organisations. This research was conducted in order to provide researchers and practitioners with a better understanding of how to achieve OCB and the intricate interactions between interpersonal characteristics and group composition with OCB.

7.3 Implications of cognitive styles theory

This study makes several theoretical contributions to the literature on organisational citizenship behaviour and cognitive styles. Firstly, although some studies have suggested that the future trend of cognitive styles may move toward to multi-dimension conception (Armstrong, Cools and Sadler- Smith, 2012; Hodgkinson and Sadler-Smith, 2003), this does not mean that uni-factorial conceptualisations of style are not worth exploring. This study supports Allinson and Hayes (1996) original unitary dimension and contradicts studies on the multi-dimension conception of styles (Hodgkinson and Sadler-Smith, 2003) because the two-factor model not always provide a good model fit, and thus convergent validity tend to be untrustworthy. In response to the argument that a multi-dimensional construct is more suitable than a single dimension construct in predicting the cognitive profiles of entrepreneurs and business venturers (Armstrong et al., 2012), this study suggests that an equal opportunity should be given to both a single-factor model and a two-factor model to drive the empirical and theoretical studies.

Secondly, the processes by which cognitive styles affect extra-role behaviour have seldom been examined, although a deeper understanding of these processes is essential for the development of theories (Armstrong, Cools and Sadler-Smith, 2012). By the extension of theoretical line of work, the present study provided confirmation for the principal effects of cognitive styles on organisational citizenship behaviour.

Next, prior studies on cognitive styles theory demonstrated that leaders with an analytic style are more positively related to followers' perceived quality of supervision than leaders with an intuitive style (Armstrong, 2004). However, his study was conducted in the context of students and supervisors in a higher educational context. The context of the present study was manufacturing and has shown different results. These differences in findings are attributed to the different research contexts. In higher education, many students appreciate step-by-step logical guidance, and find extensive reading to be important for them in their process of analysing problems in search of solutions (Armstrong, 2004). It is therefore not surprising that students prefer analytic supervisors who take a logical and serial approach to their supervision. The context of work organisations is quite different. In Chinese culture, workers have a higher concern for overall harmony through interpersonal relations rather than logical and sequential connections of a more impersonal nature (Redding, 1980). This study found that both leaders' and followers' perceived quality of LMX does not mediate the influence of leaders' cognitive style on followers' OCB. However, the results are different when considering the congruence of cognitive styles. when intuitive leaders are assigned to a group to manage analytic followers leaders' perceived quality of LMX may mediate the effect of leaders' intuitive style on followers' OCB, otherwise, the quality of LMX does not mediate the relationship between leaders' cognitive style and followers' OCB. According to cognitive style theory, leaders who have an intuitive cognitive style tend to be relationship-oriented and keep positive interpersonal relationship with followers, while, analytic followers are task-oriented and less focus on interpersonal behaviours. Therefore, they need more motivation and interpersonal help from intuitive leaders than intuitive followers which is consistent with the theory of complementary needs. Additionally, the findings are consistent with prior research in LMX theory holding that there is a significant relationship between LMX and OCB.

Thirdly, although it provides a good understanding of how cognitive styles drive group members to exhibit different types of performance (Armstrong and Priola, 2001), the processes underlying the effects of group-level cognitive styles on group-level organisational citizenship behaviours are unexplored (Armstrong, Cools and Sadler-Smith, 2012). Theorising and findings in this study have demonstrated that there is a significant relationship between groups with members with a predominantly intuitive style and group-level organisational citizenship behaviour.

Finally, this study provides empirical evidence for the idea that different ways of treating cognitive style as an independent variable (median split or considering cognitive style as continum) has different predictive power on dependent organisational variables.

7.4 Implications of the LMX differentiation

Although some studies have predicted that LMX differentiation might be related to group composition theory, there is no empirical test to explore the relationship (Henderson, Liden, Glibkowski and Chaudhry, 2009). In the original predictions, this study overrated the influence of group-level cognitive style diversity on LMX differentiation. The unexpected finding suggests that there is no significant relationship between these two variables. This might be because of the influence of standardised procedures and well-defined roles. The obligations, personal behaviours and distribution of resources between leaders and followers are strictly specified according to organisational rules. Both partners cannot modify them randomly. Another reason might be the influence of unpredicted moderating variables (e.g. group-level EI and leaders' EI). Prior studies propose that leadership theory, personal characteristics (e.g. organisational tenure) and organisational characteristics (e.g. group composition) may have implications for LMX differentiation (Henderson, Liden, Glibkowski and Chaudhry, 2009; Liden, Wayne and Stilwell, 1993). Future research needs to consider the role of different moderating variables in the relationship between the diversity of cognitive styles and LMX differentiation.

7.5 Implications for emotional intelligence theory

Prior research mainly focuses on the relationship between EI and OCB at the individual level, but seldom takes the group levels into account. The current research applies a new group-level EI instrument (based on WLEIS) to explore the relationship between group-level EI and group-level OCB. Law, Wong, Huang, and Li (2008) assert that the norm-referenced criteria of EI differ in different cultural settings, and that WLEIS is more appropriate for predicting Chinese performance than other instruments (e.g. MSCEIT) that have been developed according to 'Western' culture. For example, in some MSCEIT items, participants from Asia and U.S. are asked to rate a variety of emotions shown in pictures of many faces. However, some Asian participants may not 'read' the faces correctly because of unfamiliarity with U.S. culture. Allied with WLEIS, this study can confirm that group- level EI can be considered an antecedent of OCB in the Chinese context.

7.6 Implications of organisational citizenship behaviour theory

The present study broadens the range of antecedent variables. It not only explicit antecedents from individual- level and group- level, but also adds a mediating variable- LMX- to predict OCB.

Additionally, in the original predictions, this study overrated the influence of group-level cognitive style diversity on group-level OCB. This unexpected finding suggesting that there is no significant relationship between these two variables and this is not consistent with studies which find group composition diversity to have a significant influence on group performance (Guzzo and Dickson, 1996; Milliken and Martins, 1996; Williams and O'Reilly, 1998). The reason might be the influence of unpredicted moderating variables. Future research needs to consider the effects of different moderating variables on the relationship between cognitive styles diversity and group-level OCB. For instance, van Knippenberg and Schippers (2007) report that interdependence plays potentially moderating role on the relationship between group diversity and group outcomes.

Finally, this study provides empirical evidences to understand that both leaders' rating of group-level OCB and peers' rating of group-level OCB have different relationships with other variables (e.g. group-level EI). Specifically, there is a positive relationship between peers' rating of group-level OCB and group-level EI, while, there is no relationship between leaders' rating of group-level OCB and group-level EI.

7.7 Implications for practice

This study shows that for organisations interested in enhancing individual or group OCB, it is important to take group members' emotional intelligence and cognitive styles into account. In organising or designing groups, a large number of individuals who have a high level of emotional intelligence and an intuitive style should be allocated to daily work because, according to the group-level exchange cycle, a high level of EI may facilitate effective interpersonal relationships and coordination, and individuals whose styles tend to be intuitive are likely to exhibit higher levels of organisational citizenship behaviour.

Another practical implication of this research is that leaders' cognitive style and EI are important criteria for recruitment or training practice. The findings suggest that group members are more likely to respect leaders who higher levels of EI in interpersonal relationships, and analytic group members are more likely to keep a positive interpersonal relationship with intuitive leaders. Therefore, it is recommended that group leaders with an intuitive style and high levels of EI be recruited.

Finally, managing practice does not need to be over-concerned that group-level organisational citizenship behaviour would be hampered by mixed groups of individuals with different types of cognitive style.

7.8 Limitations and directions for future research

Although the findings make a significant contribution, in terms of theory and practice, this study has a number of limitations which could be overcome in future research. First, the study relied on self-reported data (EI and cognitive styles), which may lead to common-method variance. However, self- reports are more appropriate for describing private events (Chan, 2009; Conway and Lance, 2010； Skinner, 1957) than other types of measurements (e.g., other- report data). On the basis of this argument, it is possible to propose that the use of self-reported cognitive style was appropriate in this study because the target individuals were aware of the subtleties of their methods of carrying out their daily tasks.

In addition, participants' EI was reflected by self-reported data, rather than other-reported data, because there were more than 100 items in the booklet which was reported by group members. It would have been too taxing for them to evaluate other members' emotional intelligence. As mentioned above, self-reported data may be easy to 'fake'. Therefore, it is suggested that future researchers use other-reported data to measure EI.

Although WLEIS (EI construct) cannot completely eradicate methodological bias, it may reduce it as far as possible according to its methodological design. In the beginning, clues are given in the assessment to guide respondents to give the right answers, as the WLEIS construct encourages respondents to make direct judgements (Law, Wong, Huang and Li, 2008). In addition, some items were designed in such a way as to evaluate others, so it was possible to avoid self-bias (Law, Wong and Song, 2004). Furthermore, this construct was developed a long time ago and there is empirical evidence to show its high reliability and validity (Wong and Law, 2002; Law, Wong and Song, 2004). Moreover, whether people deploy their EI source is determined by their own perceptions of emotional abilities and their usual actions (Antonakis, Ashkanasy and Dasborough, 2009). Last but not least, feedback about one's ability to deal with emotions occurs frequently in social interactions and thus one's evaluation of this type of ability may be more accurate than evaluations of other types of abilities, such as reasoning and logical deduction (Law, Wong, Huang and Li, 2008).

Second, the measurement of group-level emotional intelligence and group- level cognitive styles involves individual perceptions related to the group level, which leads to the risk of mitigating perception – perception inflation (Liao and Rupp, 2005).

Third, although relevant theories and empirical findings informed the specified relationships between variables, the causality of the relationships is not completely definitive. For instance, Zeidner et al. (2004) stress that longitudinal methods are required to remove uncertainty in the causal role of EI in occupational success. High levels of emotional intelligence are likely to be associated with types of working that include the issues of others, but professional success can also be affected by other elements, such as advanced or specific skills. For example, the scores of judges and doctors may be high in the field of EI, but individuals who score high on EI may not make good judges or doctors. On the other hand, scoring low for EI (e.g., low emotional regulation), "*may constitute grounds for exclusion from certain occupations (e.g. social work, police work, clinicians, and teachers), provided it can be demonstrated that low EI is meaningfully associated with unacceptable performance in these occupations*." (Zeidner et al., 2004, p.392) Zeidner et al. (2004) suggest that it is necessary for future studies to establish cut-off points which can be applied for exclusion. Therefore, although some reasonable suggestions have been made forconducting cross-sectional research in this study, longitudinal research is also recommended to test the causal direction of this dynamic process.

Fourth, the low level of agreement in LMX7 may fail to reflect the 'real situation' of LMX quality and influence on causal relationships between variables. Therefore, one option for future studies is to develop a new instrument (e.g., LMX-MDM), which could involve a high level of LMX agreement to consider the relationship with other variables. Another option is that before applying LMX7 to measuring leader-member exchange, the lengths of relationship tenure, the intensity of the interaction and the frequency of the interactions should be taken into account. In a leader-member exchange relationship, when leaders give support to group members, the group members need to take a period of time to think about whether the leaders' support meets their requirements and whether they need to give a response to the leaders' support. Similarly, when group members give a response or show performances to their leaders, leaders also need to make judgements as to whether group members' behaviours fit their expectations. Only after a period involving several interactions are both partners likely to be able to determine whether there is mutual respect or loyalty. In other words, with an increase in interactions, both partners may have more similar exchange experiences, and may then give the same assessment of their relationship quality and obtain high LMX agreement (Sin Nahrgang and Morgeson, 2009).

Fifth, test-retest reliability was not conducted in the Chinese sample. Further studies are suggested to conduct this.

Finally, the conceptual level of the research focused on generalised patterns that describe the direct relationships between variables. It is suggested that future studies could be carried out to extend this research by introducing some moderating and mediating variables in a multilevel setting, such as the degree of interaction, group culture and the nature of the task (Anderson and Williams, 1996; Henderson, Liden, Glibkowski and Chaudhry, 2009; van Knippenberg and Schippers, 2007).

8. References

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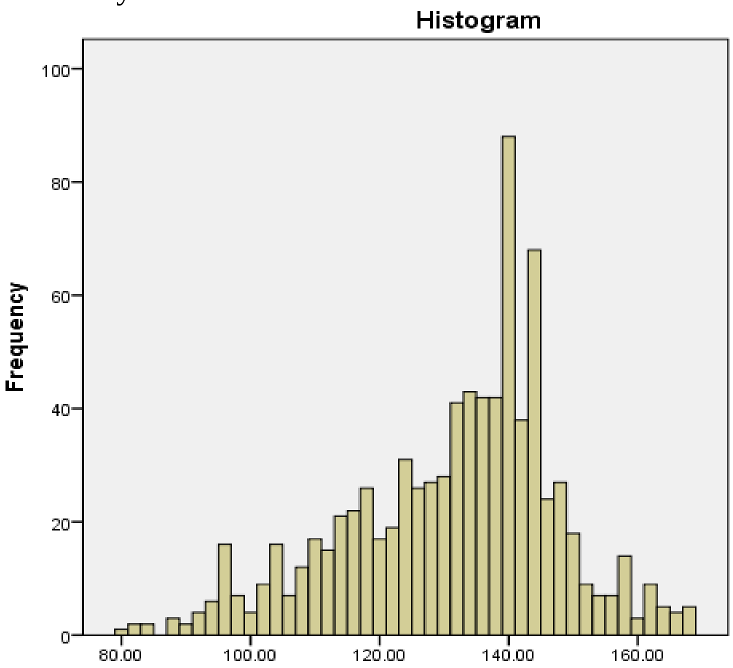
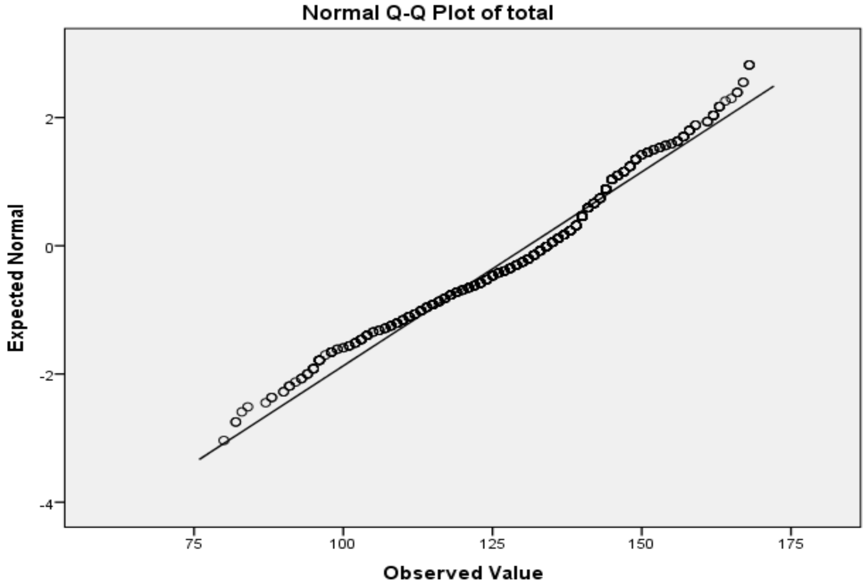
9. Appendix A:

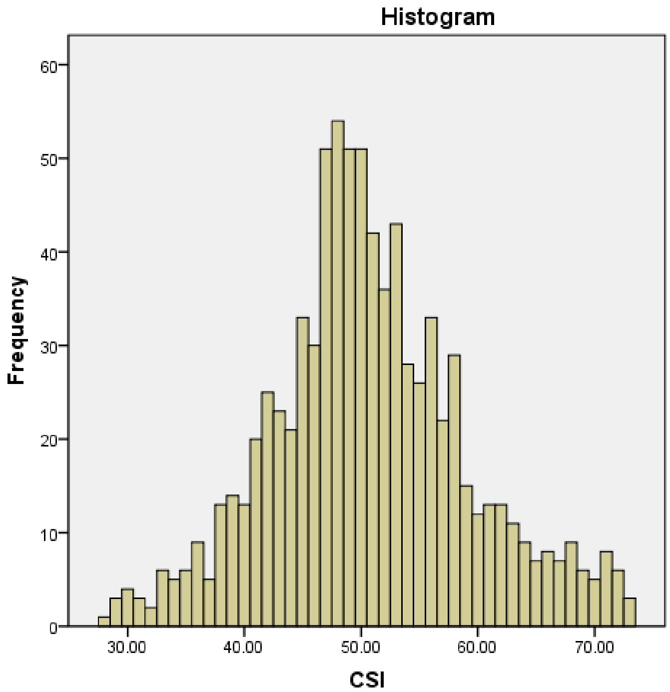
Appendix A1: Normality test

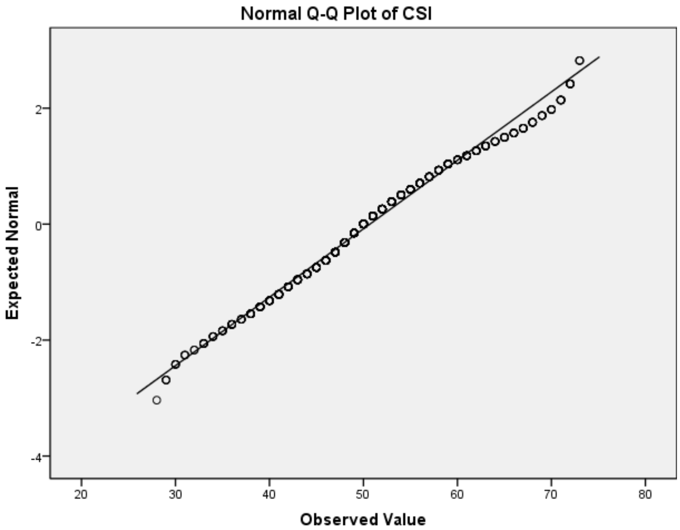
Normality of GOCB



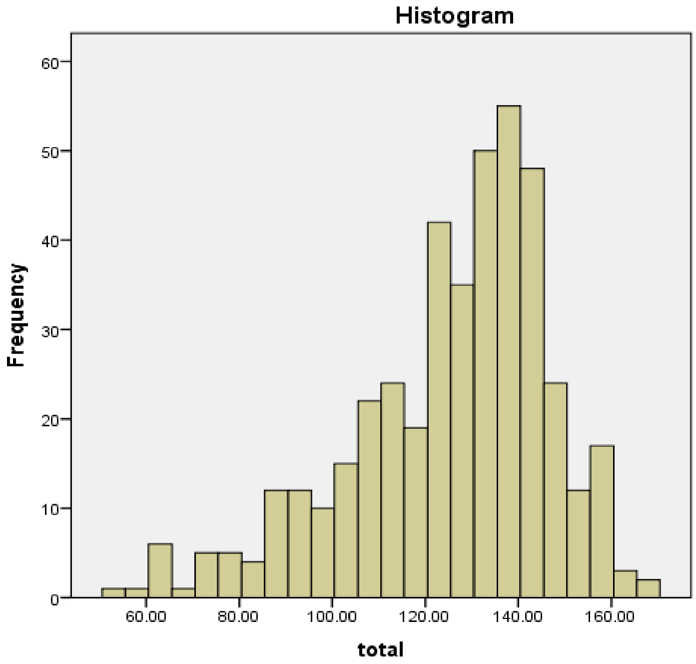


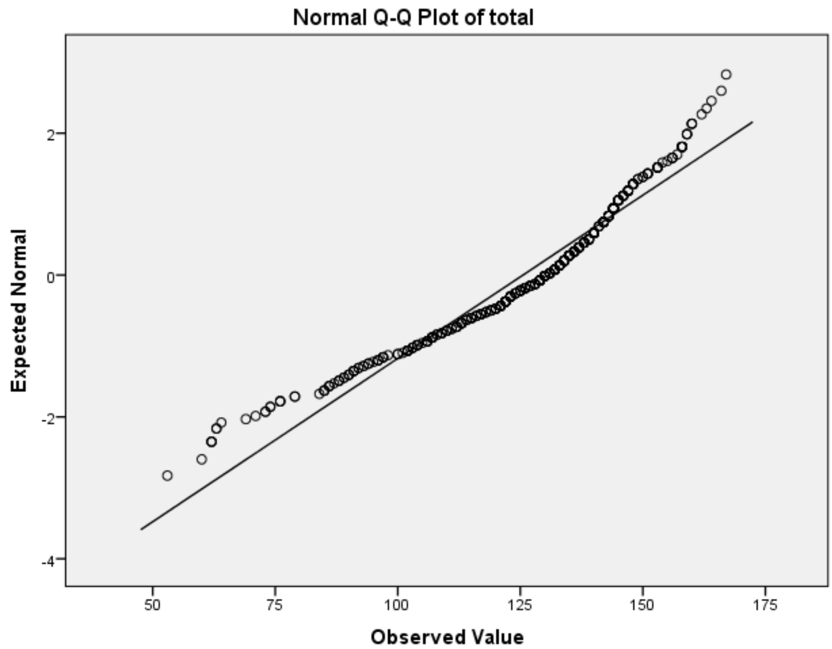
Normality of CSI



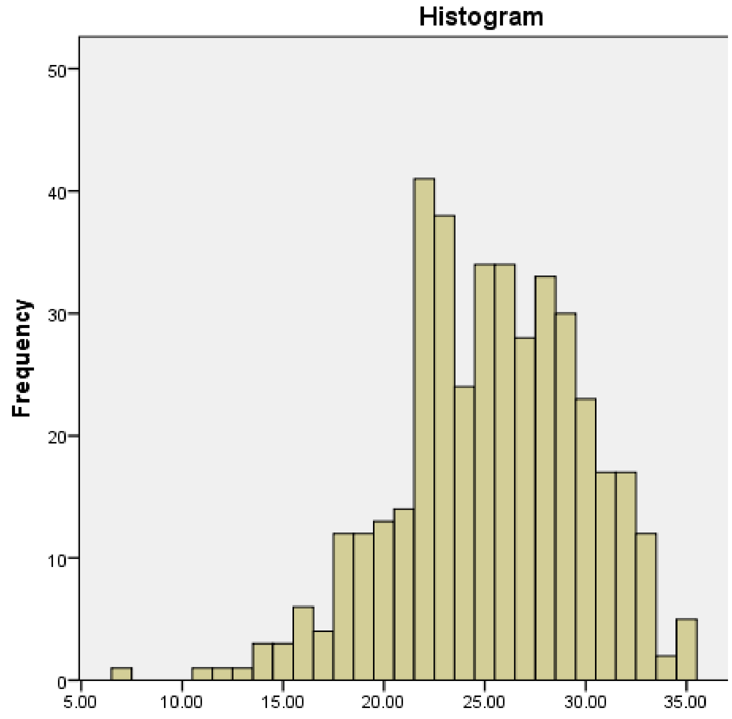


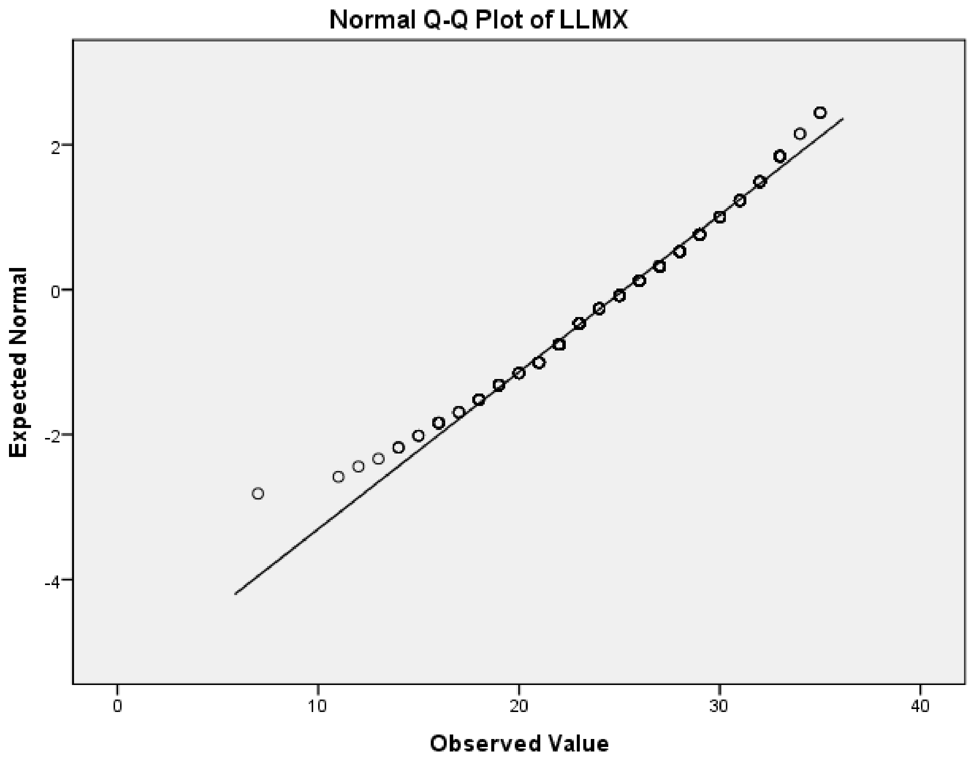
Normality of FOCB



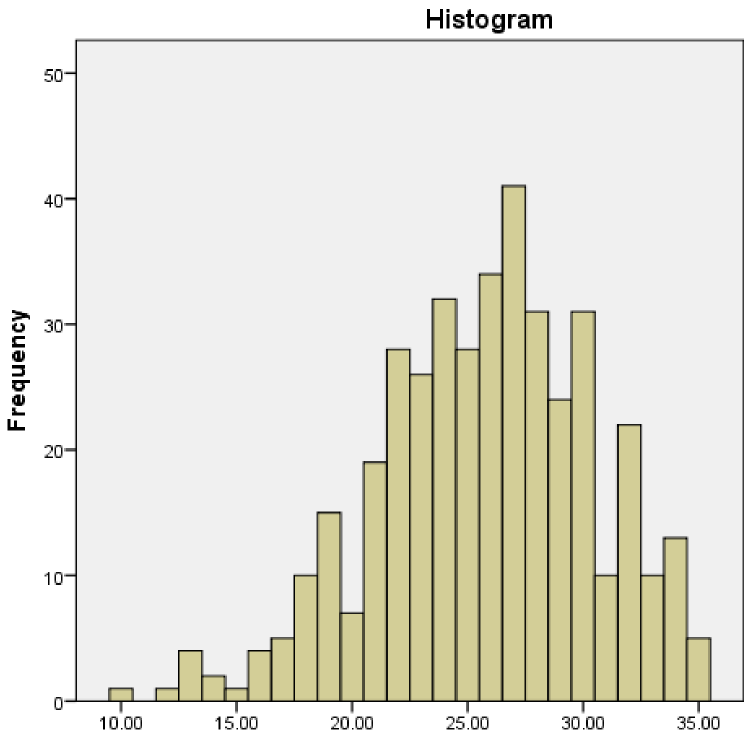


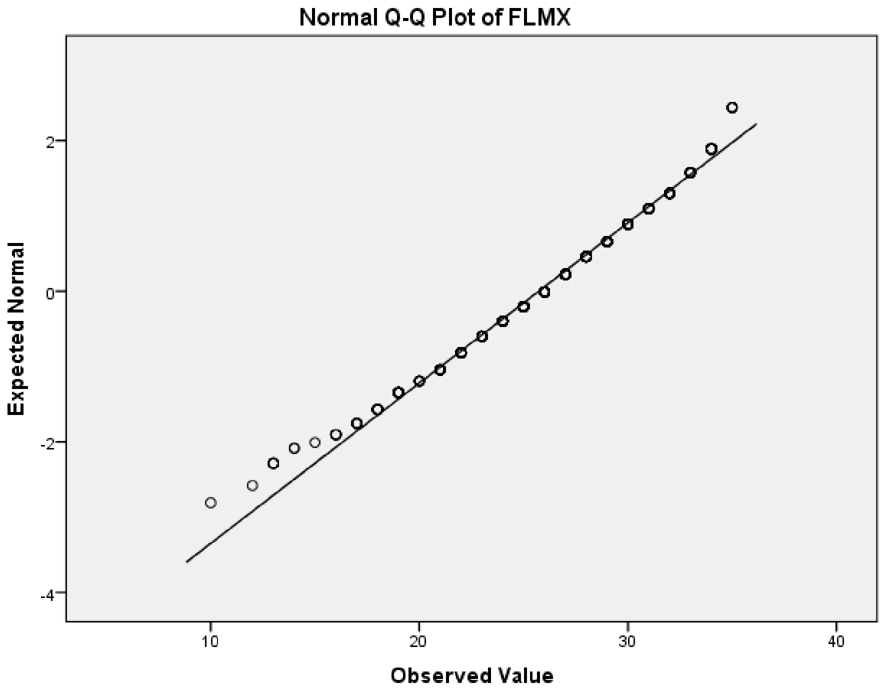
Normality of leaders' perceived LMX (LLMX)



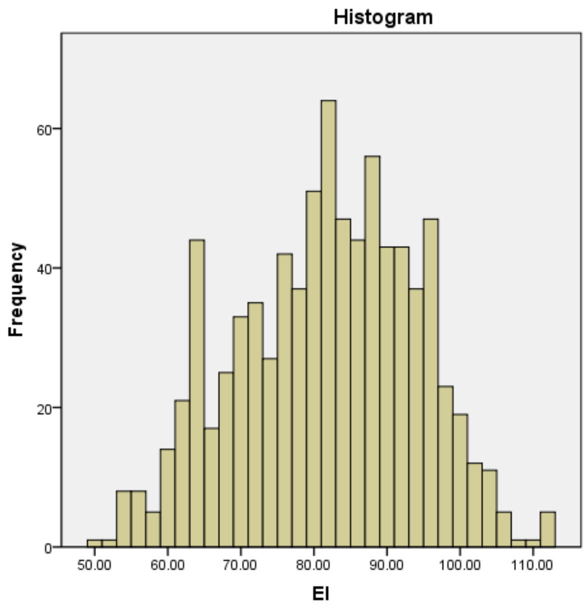


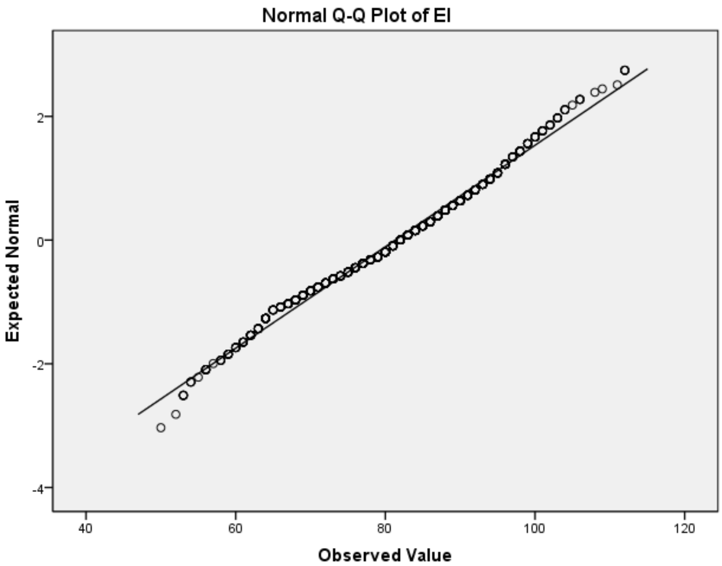
Normality of followers' perceived LMX (FLMX)





Normality of EI


Histogram
Frequency
60
40
20
0
50.00
60.00
70.00
80.00
90.00
100.00
110.00
EI


Normal Q-Q Plot of EI
Expected Normal
2
0
-2
-4
40
60
80
100
120
Observed Value

Appendix A2: Standardized regression

Standardized Regression Weights of EI (First order)

			Estimate
Q1	<---	SEA	.626
Q2	<---	SEA	.883
Q3	<---	SEA	.873
Q4	<---	SEA	.737
Q5	<---	OEA	.781
Q6	<---	OEA	.892
Q7	<---	OEA	.954
Q8	<---	OEA	.889
Q9	<---	UOE	.776
Q10	<---	UOE	.816
Q11	<---	UOE	.917
Q12	<---	UOE	.844
Q13	<---	ROE	.905
Q14	<---	ROE	.928
Q15	<---	ROE	.881
Q16	<---	ROE	.909

Standardized Regression Weights of followers' LMX: (With modification)

			Estimate
FLMX1	<---	FLMX	.503
FLMX2	<---	FLMX	.655
FLMX3	<---	FLMX	.709
FLMX4	<---	FLMX	.784
FLMX5	<---	FLMX	.818
FLMX6	<---	FLMX	.670
FLMX7	<---	FLMX	.690

Standardized Regression Weights of leaders' LMX: (With modification)

			Estimate
LLMX1	<---	LLMX	.647
LLMX2	<---	LLMX	.687
LLMX3	<---	LLMX	.666
LLMX4	<---	LLMX	.769
LLMX5	<---	LLMX	.838
LLMX6	<---	LLMX	.628
LLMX7	<---	LLMX	.831

Standardized Regression Weights of IOCB: (First order)

			Estimate
Q1	<---	conscientious	.815
Q2	<---	conscientious	.887
Q3	<---	conscientious	.923
Q4	<---	conscientious	.858
Q5	<---	conscientious	.411
Q6	<---	sportsmanship	.731
Q7	<---	sportsmanship	.836
Q8	<---	sportsmanship	.877
Q9	<---	sportsmanship	.810
Q10	<---	sportsmanship	.227
Q11	<---	virtue	.410
Q12	<---	virtue	.731
Q13	<---	virtue	.892
Q14	<---	virtue	.844
Q15	<---	courtesy	.780
Q16	<---	courtesy	.840
Q17	<---	courtesy	.860
Q18	<---	courtesy	.888
Q19	<---	courtesy	.867
Q20	<---	altruism	.780
Q21	<---	altruism	.871
Q22	<---	altruism	.923
Q23	<---	altruism	.941
Q24	<---	altruism	.870

Standardized Regression Weights of IOCB: (First order- modification)

			Estimate
Q1	<---	conscientious	.819
Q2	<---	conscientious	.890
Q3	<---	conscientious	.926
Q4	<---	conscientious	.852
Q6	<---	sportsmanship	.725
Q7	<---	sportsmanship	.836
Q8	<---	sportsmanship	.881
Q9	<---	sportsmanship	.807
Q11	<---	virtue	.534
Q13	<---	virtue	.895
Q14	<---	virtue	.855
Q15	<---	courtesy	.780
Q16	<---	courtesy	.840
Q17	<---	courtesy	.860
Q18	<---	courtesy	.888
Q19	<---	courtesy	.867
Q20	<---	altruism	.780
Q21	<---	altruism	.871

			Estimate
Q22	<---	altruism	.923
Q23	<---	altruism	.941
Q24	<---	altruism	.870

Standardized Regression Weights of OCBI and OCBO (second order):

			Estimate
altruism	<---	OCBI	.865
courtesy	<---	OCBI	.920
conscientious	<---	OCBO	.851
sportsmanship	<---	OCBO	.694
virtue	<---	OCBO	.890
Q1	<---	conscientious	.819
Q2	<---	conscientious	.891
Q3	<---	conscientious	.926
Q4	<---	conscientious	.852
Q6	<---	sportsmanship	.724
Q7	<---	sportsmanship	.838
Q8	<---	sportsmanship	.881
Q9	<---	sportsmanship	.806
Q15	<---	courtesy	.779
Q16	<---	courtesy	.840
Q17	<---	courtesy	.860
Q18	<---	courtesy	.889
Q19	<---	courtesy	.867
Q24	<---	altruism	.870
Q23	<---	altruism	.940
Q22	<---	altruism	.923
Q21	<---	altruism	.871
Q20	<---	altruism	.780
Q12	<---	virtue	.703
Q13	<---	virtue	.910
Q14	<---	virtue	.845

Standardized Regression Weights of GOCB: (second order)

			Estimate
conscientious	<---	FOCB	.838
sportsmanship	<---	FOCB	.688
altruism	<---	FOCB	.856
courtesy	<---	FOCB	.907
virtue	<---	FOCB	.881
Q1	<---	conscientious	.818
Q2	<---	conscientious	.891
Q3	<---	conscientious	.926

			Estimate
Q4	<---	conscientious	.852
Q6	<---	sportsmanship	.724
Q7	<---	sportsmanship	.838
Q8	<---	sportsmanship	.881
Q9	<---	sportsmanship	.806
Q15	<---	courtesy	.781
Q16	<---	courtesy	.839
Q17	<---	courtesy	.862
Q18	<---	courtesy	.888
Q19	<---	courtesy	.865
Q24	<---	altruism	.870
Q23	<---	altruism	.940
Q22	<---	altruism	.924
Q21	<---	altruism	.871
Q20	<---	altruism	.779
Q12	<---	virtue	.704
Q13	<---	virtue	.908
Q14	<---	virtue	.846

Standardized Regression Weights of GOCBI and GOCBO (second order):

			Estimate
courtesy	<---	GOCBI	.932
altruism	<---	GOCBI	.799
conscientious	<---	GOCBO	.743
sportmanship	<---	GOCBO	.392
virtue	<---	GOCBO	.889
Q2	<---	conscientious	.819
Q3	<---	conscientious	.901
Q4	<---	conscientious	.834
Q6	<---	sportmanship	.780
Q7	<---	sportmanship	.899
Q8	<---	sportmanship	.867
Q13	<---	virtue	.869
Q14	<---	virtue	.881
Q15	<---	courtesy	.807
Q16	<---	courtesy	.842
Q17	<---	courtesy	.835
Q18	<---	courtesy	.841
Q19	<---	courtesy	.839
Q9	<---	sportmanship	.785
Q24	<---	altruism	.846
Q23	<---	altruism	.919
Q22	<---	altruism	.847
Q21	<---	altruism	.626

	Estimate
Q20 <--- altruism	.722

Standardized Regression Weights of the uni-factorial CSI

			Estimate
Q1	<---	CSI	.307
Q2	<---	CSI	.408
Q3	<---	CSI	.445
Q4	<---	CSI	.163
Q5	<---	CSI	.374
Q6	<---	CSI	.388
Q7	<---	CSI	.128
Q8	<---	CSI	.380
Q9	<---	CSI	.423
Q10	<---	CSI	.460
Q11	<---	CSI	.281
Q12	<---	CSI	.255
Q13	<---	CSI	.441
Q14	<---	CSI	.394
Q15	<---	CSI	.447
Q16	<---	CSI	.237
Q17	<---	CSI	.301
Q18	<---	CSI	.178
Q19	<---	CSI	.412
Q20	<---	CSI	.186
Q21	<---	CSI	.321
Q22	<---	CSI	.495
Q23	<---	CSI	.421
Q24	<---	CSI	.226
Q25	<---	CSI	.363
Q26	<---	CSI	.435
Q27	<---	CSI	.364
Q28	<---	CSI	.393
Q29	<---	CSI	.235
Q30	<---	CSI	.354
Q31	<---	CSI	.219
Q32	<---	CSI	.312
Q33	<---	CSI	.196
Q34	<---	CSI	.224
Q35	<---	CSI	.269
Q36	<---	CSI	.203
Q37	<---	CSI	.262
Q38	<---	CSI	.215

Standardized Regression Weights of six parcels of CSI

			Estimate
CSI1	<---	CSI	.567
CSI2	<---	CSI	.623
CSI3	<---	CSI	.610
CSI4	<---	CSI	.614
CSI5	<---	CSI	.518
CSI6	<---	CSI	.614

Standardized Regression Weights of two-factor CSI (time 1)

			Estimate
A5	<---	analytic	.620
A4	<---	analytic	.348
A3	<---	analytic	.625
A2	<---	analytic	.717
A1	<---	analytic	.626
I1	<---	intuitive	.679
I2	<---	intuitive	.688
I3	<---	intuitive	.679
I4	<---	intuitive	.660

Standardized Regression Weights of two-factor CSI (time 2)

			Estimate
A5	<---	analytic	.702
A4	<---	analytic	.675
A3	<---	analytic	.679
A2	<---	analytic	.608
A1	<---	analytic	.306
I1	<---	intuitive	.394
I2	<---	intuitive	.598
I3	<---	intuitive	.672
I4	<---	intuitive	.714

Standardized Regression Weights of two-factor CSI (time 3)

			Estimate
A5	<---	analytic	.630
A4	<---	analytic	.687
A3	<---	analytic	.658
A2	<---	analytic	.636

			Estimate
A1	<---	analytic	.573
I1	<---	intuitive	.540
I2	<---	intuitive	.554
I3	<---	intuitive	.655
I4	<---	intuitive	.746

Standardized Regression Weights of two-factor CSI (time 4)

			Estimate
A5	<---	analytic	.618
A4	<---	analytic	.712
A3	<---	analytic	.608
A2	<---	analytic	.603
A1	<---	analytic	.539
I1	<---	intuitive	.731
I2	<---	intuitive	.699
I3	<---	intuitive	.561
I4	<---	intuitive	.485

Appendix A3: Mederating Effect of LMX

The relationship between leaders' cognitive styles, the quality of LMX and followers' OCB (analytic leaders and intuitive members)

	Effect	SE	t	P
Direct effect of x on m	-.13	.11	-1.06	.29
Direct effect of x on y	.46	.44	1.05	.30
Direct effect of m on y	.33	.40	.82	.41

Note: Y= followers' OCB; X= leaders' analytic style; mediator= followers' perceived quality of LMX

	Effect	SE	t	P
Direct effect of x on m	.04	.10	.38	.71
Direct effect of x on y	.32	.36	.90	.37
Direct effect of m on y	2.55	.40	6.44	.00

Note: Y= followers' OCB; X= leaders' analytic style; mediator= leaders' perceived quality of LMX

The relationship between leaders' cognitive styles, the quality of LMX and followers' OCB (intuitive leaders and analytic members)

	Effect	SE	t	P
Direct effect of x on m	.15	.09	1.59	.12
Direct effect of x on y	.35	.44	.79	.43
Direct effect of m on y	-.04	.55	-.07	.94

Note: Y= followers' OCB; X= leaders' analytic style; mediator= followers' perceived quality of LMX

	Effect	SE	t	P
Direct effect of x on m	.19	.09	2.26	.03
Direct effect of x on y	.06	.33	.19	.85
Direct effect of m on y	2.51	.43	5.80	.00

Note: Y= followers' OCB; X= leaders' intuitive style; mediator= leaders' perceived quality of LMX

The relationship between leaders' cognitive styles, the quality of LMX and followers' OCB (intuitive leaders and intuitive members)

	Effect	SE	t	P
Direct effect of x on m	.02	.10	.19	.85
Direct effect of x on y	.33	.44	.75	.45
Direct effect of m on y	.39	.42	.93	.36

Note: Y= followers' OCB; X= leaders' analytic style; mediator= followers' perceived quality of LMX

	Effect	SE	t	P
Direct effect of x on m	-.03	.11	-.28	.79
Direct effect of x on y	.36	.32	1.14	.25
Direct effect of m on y	2.88	.27	10.39	.00

Note: Y= followers' OCB; X= leaders' intuitive style; mediator= leaders' perceived quality of LMX

The relationship between leaders' cognitive styles, the quality of LMX and followers' OCB (analytic leaders and analytic members)

	Effect	SE	t	P
Direct effect of x on m	-.07	.14	-.44	.66
Direct effect of x on y	.73	.44	.75	.45
Direct effect of m on y	-.39	.69	1.05	.29

Note: Y= followers' OCB; X= leaders' analytic style; mediator= followers' perceived quality of LMX

	Effect	SE	t	P
Direct effect of x on m	.19	.12	1.53	.13
Direct effect of x on y	3.02	.58	.20	.84
Direct effect of m on y	.12	.57	5.32	.00

Note: Y= followers' OCB; X= leaders' analytic style; mediator= leaders' perceived quality of LMX

Appendix B

<u>THIS RESEARCH IS FOR MY DOCTORAL (PhD) THESIS</u>

THE RESEARCH SEEKS TO STUDY THE INFLUENCE OF INTERPERSONAL RELATIONSHIP VARIABLES ON ORGANZATIONAL CITIZENSHIP BEHAVIOURS

Dear Sir/Madam,

I am pursuing a PhD degree at the University of Hull's Business School in the United Kingdom. I am doing a survey and I seek your kind assistance in completing this questionnaire. The study examines the influence of interpersonal relationship variables on organisational citizenship behaviours and their implications for learning design in Chinese organisations. Please complete the questionnaire labelled M (Low Level Manager) and please distribute the questionnaires labelled S to your appointed subordinates.

There is no right or wrong answer. All your answers will be kept **<u>CONFIDENTIAL</u>** and participants will only be identified by assigned code names.

The survey will take about 30 minutes to complete. In exchange for your time, I will send an executive summary of my findings to those returning completed surveys. I would also be happy to present my findings to your organisation upon request. If you would like to receive a copy of the executive summary, please provide your email address below (or attach a business card).

Email address:...

I am aware of your job commitments but your participation is very important to the study and is highly appreciated. Thank you for your valuable time.

Yours faithfully,

Meng Qi

E-mail: sdlgqm@163.com

Mobile: 0086-15301088088 (CHINA)

07407091290 (UK)

Please do not hesitate to contact me if you have any queries.

APPENDIX B1: RESPONDENT PROFILE

Please fill in the blanks or tick ☑ in the appropriate fields.

1. Age (years)_______________

2. Gender

1	Male	
2	Female	

3. Current department's name: _______________________________

4. Status of employment

1	Full-time	
2	Part-time	

5. Highest Level of Education

1	PhD	
2	Masters	
3	Bachelor	
4	College	
5	Others (Please Specify)	

6. Working Experience

No	Working Experience in	Number of years
1	Current division/unit	
2	Current organisation	
3	Total work experience in manufacturing sector	

7. Number of subordinates under your direct supervision__________

APPENDIX B2:LEADER-SUBORDINATE RELATIONS(FOR FOLLOWERS)

This section requires you to explain the relationship between you and your direct leader. Please tick ☑ the appropriate scale.

	STATEMENT	EVALUATION				
1	Do you know where you stand with your leader do you usually know how satisfied your leader is which what you do?	Rarely ☐	Occasionally ☐	Sometimes ☐	Fairly often ☐	Very often ☐
2	How well does your leader understand your job problems and needs?	Not a bit ☐	A little ☐	A fair amount ☐	Quite a bit ☐	A great deal ☐
3	How well does your leader recognize your potential?	Not at all ☐	A little ☐	Moderately ☐	Mostly ☐	Fully ☐
4	What are the chances that your leader world uses his or her power to help you solve problems in your work?	None ☐	Small ☐	Moderate ☐	High ☐	Very high ☐
5	Regardless of the amount of formal authority your leader has, what are the chances that he or she would "bail you out" at his or her expense?	None ☐	Small ☐	Moderate ☐	High ☐	Very high ☐
6	I have enough confidence in my leader that I would defend and justify his or her decision if he or she were not present to do so.	Strongly disagree ☐	Disagree ☐	Neutral ☐	Agree ☐	Strongly agree ☐
7	How would you characterize your working relationship with your leader?	Extremely ineffective ☐	Worse than average ☐	Average ☐	Better than average ☐	Extremely effective ☐

APPENDIX B2: LEADER-SUBORDINATE RELATIONS (FOR LEADERS)

This section requires you to explain the relationship between you and your direct followers. Please evaluate **four** direct followers whom two of them are considered as the good subordinates (marked as **SG**) and other two are considered as the poor subordinates (marked as **SP**).Please tick ☑ in the appropriate scale.

(SG1)

	STATEMENT	EVALUATION				
1	Do you know where you stand with your follower (SG1) do you usually know how satisfied your follower (SG1) is which what you do?	Rarely ☐	Occasionally ☐	Sometimes ☐	Fairly often ☐	Very often ☐
2	How well does your follower (SG1) understand your job problems and needs?	Not a bit ☐	A little ☐	A fair amount ☐	Quite a bit ☐	A great deal ☐
3	How well does your follower (SG1) recognize your potential?	Not at all ☐	A little ☐	Moderately ☐	Mostly ☐	Fully ☐
4	What are the chances that your follower (SG1) world uses his or her power to help you solve problems in your work?	None ☐	Small ☐	Moderate ☐	High ☐	Very high ☐
5	Regardless of the amount of formal authority your follower (SG1) has, what are the chances that he or she would "bail you out" at his or her expense?	None ☐	Small ☐	Moderate ☐	High ☐	Very high ☐
6	I have enough confidence in my follower (SG1) that I would defend and justify his or her decision if he or she were not present to do so.	Strongly disagree ☐	Disagree ☐	Neutral ☐	Agree ☐	Strongly agree ☐

7	How would you characterize your working relationship with your follower (SG1)?	Extremely ineffective	Worse than average	Average	Better than average	Extremely effective
		☐	☐	☐	☐	☐

APPENDIX B3: EMOTIONAL INTELLIGENCE

Each of the following items asks you about your emotions or reactions associated with emotions. Briefly scan all of the items and then rate the quality of each item on the 1 to 7 scale provided. Try to use the entire scale when you respond. There are, of course, no "correct" answers.
Please respond to every item, and when you have finished, check to be sure you have not inadvertently omitted a response.

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
1	I have a good sense of why I have certain feelings most of the time							
2	I have good understanding of my own emotions							
3	I really understand what I feel							
4	I always know whether or not I am happy							
5	I always know my friends' emotions from their behavior							
6	I am a good observer of others' emotions							
7	I am sensitive to the feelings and emotions of others							
8	I have good understanding of the emotions of people around me							
9	I always set goals for myself and then try my best to achieve them							
10	I always tell myself I am a competent person							

	STATEMENT	Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
11	I am a self-motivated person							
12	I would always encourage myself to try my best							
13	I am able to control my temper and handle difficulties rationally							
14	I am quite capable of controlling my own emotions							
15	I can always calm down quickly when I am very angry							
16	I have good control of my own emotions							

APPENDIX B4:COGNITIVE STYLE INDEX

People differ in the way they think about problems. Below are 38 statements designed to identify your own approach. If you believe that a statement is true about you, answer **T**. If you believe that it is false about you, answer **F**. If you are uncertain whether it is true or false answer ? . This is not a test of your ability, and there are no right or wrong answers. Simply choose the one response which comes closest to your opinion. Work quickly, giving your first reaction in each case, and make sure that your respond to every statement. Indicate your answer by completing filling in appropriate scale opposite the statement:

T True	**?** Uncertain	**F** False

	STATEMENT	T	?	F
1	In my experience, rational thought is the only realistic basis for making decisions.			
2	To solve a problem, I have to study each part of it in detail.			
3	I am most effective when my work involves a clear sequence of tasks to be performed.			
4	I have difficulty working with people who ‘dive in at the deep end’ without considering the finer aspects of the problem.			
5	I am careful to follow rules and regulations at work.			
6	I avoid taking course of action if the odds are against its success.			
7	I am inclined to scan through reports rather than read them in detail.			
8	My understanding of a problem tends to come more from thorough analysis than flashes of insight.			
9	I try to keep regular routine in my work.			
10	The kind of work I like best is that which requires a logical, step-by-step approach.			
11	I rarely make ‘off the top of the head’ decisions.			
12	I prefer chaotic action to orderly inaction.			
13	Given enough time, I would consider every situation from all angles.			
14	To be successful in my work, I find that it is important to avoid hurting other people’s feelings.			
15	The best way for me to understand a problem is to break it down into its constituent parts.			
16	I find that to adopt a careful, analytical approach to making decisions takes too long.			
17	I make most progress when I take calculated risk.			

	STATEMENT	T	?	F
18	I find that it is possible to be too organised when performing certain kinds of task.			
19	I always pay attention to detail before I reach a conclusion.			
20	I make many of my decisions on the basis of intuition.			
21	My philosophy is that it is better to be safe than risk being sorry.			
22	When making a decision, I take my time thoroughly consider all relevant factors.			
23	I get on best with quiet, thoughtful people.			
24	I would rather that my life was unpredictable than that it followed a regular pattern.			
25	Most people regard me as a logical thinker.			
26	To fully understand the facts I need a good theory			
27	I work best with people who are spontaneous			
28	I find detailed, methodological work satisfying.			
29	My approach to solving a problem is to focus on one part at a time			
30	I am constantly on the lookout for new experiences.			
31	In meetings, I have more to say than most.			
32	My 'gut feeling' is just as good a basis for decision making as careful analysis.			
33	I am the kind of person who casts caution to the wind.			
34	I make decisions and get on with things rather than analyse every last detail.			
35	I am always prepared to take a gamble.			
36	Formal plans are more of hindrance than a help in my work.			
37	I am more at home with ideas rather than facts and figures.			
38	I find that 'too much analysis results in paralysis'.			

APPENDIX B5: ORGANISATIONAL CITIZENSHIP BEHAVIOURS- INDIVIDUAL LEVEL

The following descriptive items are an attempt to assess your followers' work-related behaviours toward the organisation. Please evaluate selected **four** direct followers and briefly scan all of the items and then rate the quality of each item on the 1 to 7 scale provided. Try to use the entire scale when you respond. There are, of course, no "correct" answers.

Please respond to every item, and when you have finished, check to be sure you have not inadvertently omitted a response.

(SG1)

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
1	The employee (SG1) has work attendance that is above the norm							
2	The employee (SG1) does not take extra breaks							
3	The employee (SG1) obeys company rules and regulations even when no one is watching							
4	The employee (SG1) is one of my most conscientious employees							
5	The employee (SG1) believes in giving an honest day's work for an honest day's pay							
6	The employee (SG1) consumes a lot of time complaining about trivial matters							
7	The employee (SG1) always focuses on what's wrong, rather than the positive side							

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
8	The employee (SG1) tends to make “mountains out of molehills”							
9	The employee (SG1) always find fault with what the organisation is doing							
10	The employee (SG1) is the classic “squeaky wheel” that always needs greasing							
11	The employee (SG1) attends meetings that are not mandatory, but are considered important							
12	The employee (SG1) attends functions that are not required, but help the company image							
13	The employee (SG1) keeps abreast of changes in the organisation							
14	The employee (SG1) reads and keeps up with organisation announcements, memos, and so on							
15	The employee (SG1) takes steps to try and prevent problems with other workers							
16	The employee (SG1) is mindful of how his/her behaviour affects other people’s jobs							
17	The employee (SG1) does not abuse the rights of others							

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
18	The employee (SG1) tries to avoid creating problems for coworkers							
19	The employee (SG1) considers the impact of his/her actions on co-workers							
20	The employee (SG1) helps others who have been absent							
21	The employee (SG1) helps orient new people even though it is not required							
22	The employee (SG1) helps others who have heavy workloads							
23	The employee (SG1) willingly helps others who have work-related problems							
24	The employee (SG1) is always ready to lend a helping hand to those around him/her							

APPENDIX B6: ORGANISATIONAL CITIZENSHIP BEHAVIOURS- GROUP LEVEL

The following descriptive items are an attempt to assess **your group members**' work-related behaviours toward the organisation. Please briefly scan all of the items and then rate the quality of each item on the 1 to 7 scale provided. Try to use the entire scale when you respond. There are, of course, no "correct" answers.

Please respond to every item, and when you have finished, check to be sure you have not inadvertently omitted a response.

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
1	Group members have work attendance that is above the norm							
2	Group members do not take extra breaks							
3	Group members obey company rules and regulations even when no one is watching							
4	Group members think themselves as conscientious employees							
5	Group members believe in giving an honest day's work for an honest day's pay							
6	Group members consume a lot of time complaining about trivial matters							
7	Group members always focus on what's wrong, rather than the positive side							

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
8	Group members tend to make “mountains out of molehills”							
9	Group members always find fault with what the organisation is doing							
10	Group members are the classic “squeaky wheel” that always needs greasing							
11	Group members attend meetings that are not mandatory, but are considered important							
12	Group members attend functions that are not required, but help the company image							
13	Group members keep abreast of changes in the organisation							
14	Group members read and keep up with organisation announcements, memos, and so on							
15	Group members take steps to try and prevent problems with other workers							
16	Group members are mindful of how their behaviour affects other people’s jobs							
17	Group members do not abuse the rights of others							

STATEMENT		Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree
18	Group members Try to avoid creating problems for other members							
19	Group members consider the impact of their actions on each other							
20	Group members help others who have been absent							
21	Group members help orient new people even though it is not required							
22	Group members help others who have heavy workloads							
23	Group members willingly helps others who have work-related problems							
24	Group members always ready to lend a helping hand to those around him/her							

If you have further comments that you feel would be of interest to this research, please add them here:

THANK YOU
FOR YOUR KIND PARTICIPATION
IN THIS SURVEY.
YOUR ANSWER WILL BE KEPT CONFIDENTIAL.

M	

The sequence number will be used for data validation purposes only.