The Influence of Leader-Follower Cognitive Style Similarity on Followers' Organizational Citizenship Behaviors

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Abstract

While cognitive style congruence has been highlighted as a potentially important variable influencing performance outcomes in work-related contexts, studies of its influence are scarce. This paper examines the influence of leader-follower cognitive style similarity on followers' organizational citizenship behaviors. Data from 430 leader-follower dyads were analyzed using polynomial regression and response surface analysis. Results demonstrate that congruence of leader/follower cognitive style is a predictor of follower organizational citizenship behaviors. Organizations may therefore benefit from considering issues of similarity of cognitive styles in their attempts to develop effective leader-follower

partnerships leading to increased organizational citizenship behaviors and concomitant

improvements in both individual and organizational level success.

1 Introduction

Organizations that rely solely on job roles to elicit work related behaviors are at a

distinct disadvantage compared with those that focus on eliciting extra role behaviors

(Bowler & Brass, 2006). Such assertions underpin the importance of a significant body of

research known as organizational citizenship behavior (OCB) that is concerned with

harnessing both social and intellectual capital of employees (Podsakoff, Podsakoff,

MacKenzie, Maynes & Spoelma, 2014). OCBs have emerged as one of the most important

constructs in the fields of Human Resource Management (Snape & Redman, 2010) and

Organizational Psychology (Miao, Humphrey & Qian, 2017).

Since previous research has revealed that OCBs contribute to significant

improvements in organizational-level performance and success (Podsakoff, Whiting,

Podsakoff, &Blume, 2009), it is important to understand the factors that lead employees to

perform these behaviors. Previous research in this area has focused on four major categories

of antecedents of OCB: individual characteristics; task characteristics; organizational

characteristics; and leadership behaviors (Ernhart, 2004). Our study seeks to extend the body

of literature associated with the former. Most previous research in this category has focused

on individual-level predictors of OCB such as personality, employee attitudes, employee role

perceptions, employee abilities, and dispositional variables (Son &Kim, 2016). However, as

Chung, Park, Moon, & Oh (2011) remind us, "OCBs are performed not by isolated actors but

by people in formal and informal social structures" (Lamertz, 2005, p2) where social

relationships and diversity of organizational members have been found to exert significant

influences on employees' helping behaviors (Bowler & Brass, 2006; Venkataramani & Dalal,

2007).

From this social perspective, differences among members in the workplace can lead to

a source of us-and-them distinctions resulting in a negative influence on social integration,

reduced cooperation & cohesion, and decreased performance of group members (Harrison,

Price & Bell, 1998; O'Reilly, Caldwell & Barnett, 1989). Conversely, similarity among

members is known to result in more of a willingness to collaborate, leading to smoother

interactions (McGrath, 1984), increased friendship (Antill, 1984), and higher levels of group

cohesion (Tsui & O'Reilly, 1989). The conceptual foundation that renders homogeneity as

being more conducive to group performance than diversity (Bell & Villado, 2011) has led to

a variety of similarity-attraction theories emerging from the fields of organizational behavior

(e.g. Schneider, 1987; Milliken & Martins, 1996) and social psychology (e.g. Byrne, 1971;

McGrath, 1984).

Early studies of diversity from an individual differences perspective (e.g. Pfeffer,

1983) focused on overt demographic differences among employees such as heterogeneity in

age, gender, ethnicity and organizational tenure. However, effects of heterogeneity using

these surface-level variables were inconsistent and weaker than expected. This led to a call

for more studies of deep-level diversity involving underlying attributes that cannot be easily

detected such as differences among members' knowledge, skills, values, beliefs and attitudes

(Jackson, May & Whitney, 1995; Milliken &Martins, 1996). Deep-level diversity of this

nature becomes apparent only after interaction with the particular person, and has been shown

to be particularly problematic for work-group cohesion (Harrison, Price & Bell, 1998). Our

study responds to recent calls for more research into these deep-level differences (van

Knippenberg & Schippers, 2007), especially in the context of cognitive diversity (Martins,

Schilpzand, Kirkman, Ivanaj & Ivanaj, 2012).

     Despite its high relevance, the growing body of literature on cognitive diversity has

been criticized for suffering from varied conceptual and operational definitions that restrict

theory development and comparisons of empirical results. In response, Mello &Rentsch

(2015) provide guidance for the systematic study of cognitive diversity and team functioning

by offering an organizing heuristic (of the literature) based on four levels of stability

associated with the cognitive diversity conceptualization. These are: *trait-like*;

developmental; *acquired*; *exposed* and were put forward to delineate the effects of cognitive

diversity on performance. Of these, *trait-like* represents the most stable cognitive variables

that are innate characteristics of the individual. Examples include personality, information

processing styles, cognitive ability, and cognitive styles. According to Mello & Rentsch

(2015), "trait-like cognitive diversity has broad explanatory power" (p. 638) and, in

particular, "cognitive style research yields the most consistent results, but overall there is

much more work needed to draw solid conclusions" (ibid.). We extend this line of inquiry by

examining the possibility that congruence of cognitive style between leaders and their

followers in the workplace may result in improved interpersonal relationships, and, on the

basis of social exchange theory, concomitant positive influences on follower OCB.

Our study provides a number of important contributions to the literature. First, we

examine the relationship between organizational citizenship behaviors and deep-level leader-

subordinate relations for which there are a dearth of previous studies (Matta & van Dyne,

2015). Second, we extend the literature on deep-level workplace diversity by incorporating

theory from a growing body of research into cognitive diversity (Martins, Schilpzand,

Kirkman, Ivanaj & Ivanaj, 2013). Third, whilst most previous studies of OCB have focused

on the perspective of either the follower or the leader (Muldoon, Keough & Liguori, 2017),

ours considers the role of individual differences and interactions between leaders and their

followers in the production of citizenship behaviors. Finally, whilst the influence of

cognitive style similarity has been studied in a number of different contexts (Armstrong,

Cools & Sadler-Smith, 2012), its influence on OCBs has never been examined.

As importantly, our study seeks to provide a number of important contributions to the

business world. Given that OCBs are widely recognized as being critical in organizations

where performance, flexibility, knowledge sharing, and the development of social capital to

underpin long-term success are important, our study seeks to provide practical ways in which

these bahaviors can be maximized. Our article sets out to demonstrate that this can be

achieved by demonstrating that: cognitive similarity in leader-subordinate dyads is a critically

important underpinning variable; cognitive style awareness needs to feature in leadership

development programs and recruitment & selection strategies; appropriate matching at the

leader-subordinate dyadic level is crucial. Through these means, we expect that enhanced

levels of organizational citizenship behaviors will contribute to organizational effectiveness

and therefore have a noticeable impact on the success and welfare of individuals and on

financial measures of an organization's success.

2 Theory Development and Hypotheses

2.1 Organizational Citizenship Behaviors (OCBs)

Defined as "individual behavior that is discretionary, not directly or explicitly

recognized by the formal reward system, and that in aggregate promotes the effective

functioning of the organization" (Organ, 1988, p4), OCB has emerged as one of the most

important constructs in organizational psychology (Miao, Humphrey &Qian, 2017) and has a

sizeable impact on the welfare and success of both individuals and organizations (Chin,

2015). Organ (1988) put forward a 5-factor model of OCB based on five types of citizenship

behavior referred to as: sportsmanship, civic virtue, conscientiousness, altruism and courtesy.

These five factors were later defined by Podsakoff, MacKenzie, Moorman & Fetter (1990,

p115) as follows:

Sportsmanship: willingness of the employee to tolerate less than ideal circumstances

without complaining.

Conscientiousness: discretionary behaviors on the part of the employee that go well

beyond the minimum role requirements of the organization, in the areas of attendance,

obeying rules and regulations, taking breaks, and so forth.

Civic virtue: behaviors that indicate employees take an active interest in the life of their organization.

Altruism: discretionary behaviors that have the effect of helping a specific other person with an organizationally relevant task or problem.

Courtesy: discretionary behavior on the part of an individual aimed at preventing work-related problems with others from occurring.

Managers have little difficulty in distinguishing between the *Sportsmanship, Conscientiousness,* and *Civic virtue* factors in terms of their consequences for the organization (Hui, Lee, &Rousseau, 2004). However, difficulties are experienced in making distinctions between the dimensions of *Altruism/Courtesy* and consequences for the organization because these tend to be viewed as part of an overall helping dimension (Bachrach, Bendoly & Podsakoff, 2001). This led to a categorization on the basis of a two-dimensional structure of OCB determined by the direction or target of the behaviors. Drawing on William and Anderson's (1991) earlier work, Podsakoff, Podsakoff, MacKenzie, Maynes & Spoelma (2014) referred to those behaviors directed toward helping other individuals that indirectly contribute to the organization (*Altruism & Courtesy*) as OCBI, and those behaviors directed toward the specific benefit of the organization (*Sportsmanship, Conscientiousness, & Civic virtue*) as OCBO.

Previous findings have revealed that overall OCBs are positively related to organizational effectiveness measures such as profitability, efficiency and productivity, as well as individual level effectiveness measures such as employee performance, appraisal

ratings, and reward allocation decisions (Podsakoff, Whiting, Podsakoff & Blume, 2009). In view of these findings, it is important that we continue in our quest to more fully understand the factors that lead employees to perform these behaviors. Of the four major categories of previous research on OCB antecedents identified by Ernhart (2004) as individual characteristics, task characteristics, organizational characteristics and leadership behaviors, our study seeks to extend the body of literature associated with the former. More specifically, we respond to calls for more studies that examine deep-level cognitive differences (van Knippenberg & Schippers, 2007) between individuals in the context of workplace diversity.

2.2 Workplace Diversity

Workplace diversity is reported to lead to problems with coordination and communication (Jackson, May & Whitney, 1995), negative effects on achieving strategic consensus (Aggarwal &Woolley, 2013), and negative consequences for affective reactions such as cohesion, satisfaction, and commitment (Jackson, Joshi & Erhardt, 2003). The two main traditions of research into work-group diversity have been identified as the *social categorization perspective* and the *information/decision making perspective* (Williams & O'Reilly, 1998). The latter points to the positive effects of diversity on the basis that individual differences will inspire flexible and divergent thinking that enables new patterns of thought and more creative outcomes (Homan, Buengeler, Eckhoff, van Ginkel & Voelpel, 2015). Differences may also be associated with valuable task relevant knowledge and expertise which expands the available information (Pieterse, van Kippenberg & Ginkel, 2011) and leads to conflicting viewpoints on the task at hand resulting in more thorough

8

processing of task-based information (van Knippenberg, De Dreu & Homan, 2007).

In contrast, the *social categorization perspective*, upon which the present study is focused, regards diversity as a source of us-and-them distinctions where dissimilar others are seen as belonging to an out-group leading to decreased cohesion, coordination, and cooperation among team members that ultimately leads to decreased performance (Milliken & Martins, 1996). This perspective draws on Byrne's (1997) similarity-attraction theory which suggests that individuals are more attracted to similar others. Consequently, members are more willing to collaborate with others similar to themselves resulting in smoother interactions and thus rendering homogeneity more conducive to group performance than diversity (Bell & Villado, 2011). This in-group/out-group distinction leads to members developing intergroup bias and in some circumstances to cooperate with, and favor in-group members more than out-group members (van Knippenberg, De Dreu & Homan, 2004).

Deep-level cognitive diversity. It will be recalled that deep-level diversity (e.g. skills, values, beliefs) becomes apparent only after interaction with the particular person, and can be problematic for work-group cohesion (Harrison, Price & Bell, 1998). Our study responds to calls for more research into deep-level differences (van Knippenberg & Schippers, 2007), particularly those related to cognitive diversity (Martins, Schilpzand, Kirkman, Ivanaj & Ivanaj, 2013). Our focus is at the dyad level (i.e. leader-follower) rather than teams which has been the focus of most previous research, although the degree to which members are psychologically linked or attracted toward interacting with one another in pursuit of a common objective are likely to be no different (Milliken & Martins, 1996; Tsui, Porter &

Egan, 2002). Indeed, basic processes such as potential for conflict and collaboration, influence attempts, and face-face communication characterize both teams and dyads alike (Harrison, Price &Bell, 1998).

Our thinking is based on the social categorization perspective of diversity (Williams & O'Reilly, 1998) and draws on the similarity-attraction paradigm (Byrne, 1971) whose effects on interpersonal interactions are one of the most robust phenomena in social psychology (Davendorf & Highhouse, 2008). The theory posits that dissimilarity in personal attributes tends to engender repulsion, whereas individuals are attracted to, and like others who are similar to themselves (Byrne, 1997). The similarity effect has been observed in a variety of situations and remains robust when set alongside a number of determining factors such as personality traits, attitudes, demographics and even physical attractiveness (Montoya, & Horton, 2004). In a work context it has been shown that followers who regard themselves as being similar to their supervisors are rated as being higher performers than others (Turban & Jones, 1988). Perceived similarity among leader-follower dyads also leads to increased liking (Turban, Jones & Rozelle, 1990), mutual trust and respect (Dienesch & Liden, 1986) and increased levels of rapport resulting in higher levels of interaction and higher quality exchange relationships (Deluga, 1998). Follower satisfaction also increases due to leaders increasing both tangible (e.g. career advancement) and intangible benefits such as having a trust-based relationship (Erdogan & Enders, 2007). Conversely, there is evidence to suggest that supervisors tend to perceive dissimilar followers less positively and tend to give them lower performance ratings (Milliken & Martins, 1996).

10

According to social exchange theory (Blau, 1964), when followers observe that they receive support, trust, and other tangible and intangible benefits from their leaders they feel more satisfied (Newman, Miao, Hofman, & Zhu, 2016) and feel obliged to reciprocate the positive treatment they have been granted by engaging in behavior that directly benefits the organization (Chin, 2015), including OCBs (Kabasakal, Dastmalchian & Imer, 2011).

2.3 Cognitive Style Congruence

It will be recalled that the majority of previous studies of OCB have focused on individual-level predictors such as personality, trust, equity and relationship quality (Son and Kim, 2016). However, a growing area of interest in the field of workplace diversity has revealed that trait-like cognitive diversity has broad explanatory power (Mello and Delise (2015) and that in particular "cognitive style research yields the most consistent results, but overall there is more work needed to draw solid conclusions" (Mello and Rentsch, 2015, p. 638). We seek to extend this line of inquiry within the context of OCB research. Cognitive style has been defined as consistent individual differences in how individuals perceive, think, process information, solve problems, learn, take decisions and relate to others (Armstrong, Cools and Sadler-Smith, 2012). A number of variables relevant to interpersonal relationships have been examined in relation to congruence between cognitive styles of individuals interacting with each other. For example congruent cognitive styles have been found to be associated with: satisfaction with the relationship (Cooper and Miller, 1991); effective interpersonal relations (Handley, 1982); mutually positive attitudes between parties in a relationship (Reninger and Snyder, 1983); and mutual understanding and liking (Myers,

1980). More recently, Suazo, Turnley & Mai-Dalton (2008) observed that "congruence of cognitive styles should result in increased levels of interpersonal attraction, greater communication, and reduced ambiguity in the leader-subordinate dyad" (p3). One prominent cognitive style dimension that has been shown to fundamentally affect the nature of interpersonal relationships in this way is the intuitive-analytic dimension (Armstrong, 1999).

Intuitive-Analytic Cognitive Styles. Due to the absence of a valid and reliable instrument suitable for use in large-scale management and organizational studies, Allinson & Hayes (1996) developed the Cognitive Style Index (CSI) for assessing individuals' positions on the generic intuition-analysis dimension of cognitive style (Agor, 1984; Simon, 1987; Hammond, Hamm, Grassia & Pearson, 1987). The CSI is a self-report, bi-polar, unidimensional questionnaire that measures individuals' cognitive styles on a range from highly intuitive to highly analytic. Intuition refers to immediate judgment based on feeling and the adoption of a global perspective. People with this cognitive style work best on unstructured problems. They prefer rapid and open-ended approaches to decision making, relying on random methods of exploration based on immediate judgement and feeling (Lynch, 1986). People with this style tend to adopt an 'interpersonal' approach to problem solving (Armstrong, Allinson & Hayes, 2004). Conversely, analysis refers to judgment based on mental reasoning and a focus on detail. Analytic individuals prefer a more structured approach to decision making, applying systematic methods of investigation using mental reasoning. They prefer to work on problems requiring a step-by-step solution and tend to adopt an 'impersonal' approach to problem solving (Pascual-Leone, 1989).

12

At this point we should note that there is some controversy over two incompatible perspectives on the relationship between intuition and analysis. This concerns the distinction between whether intuition and analysis are opposite poles of a single dimension (unitary perspective) or whether they are orthogonal constructs (complex perspective). For example, Wang, Highhouse, Lake, Petersen & Rada (2017) conducted a meta-analytic study of the relation between intuition and analysis and concluded that these are independent constructs. However, their analyses were based on a range of instruments that were designed to specifically assess intuition and analysis separately. It is unsurprising, therefore, that they found the two constructs to be uncorrelated. Other studies in the field of cognitive science express grave reservations for the existence of two distinct cognitive architectures. Keren & Schul (2009) offered a particularly detailed critique of the dual-systems theories concluding that, contrary to the dualistic premises, dimensions assumed to distinguish the two systems (e.g. intuitive versus analytic) are continuous rather than dichotomous. Kahneman (2011) also described dual cognitive systems as 'useful fictions' that help us explain quirks in decision making. On the basis of Keren & Schul's (2009) earlier work, Kruglanski & Gigerenzer (2011) provided convergent arguments and evidence for a unified theoretical approach to intuitive and analytic judgements.

These debates over the nature of intuition-analysis being a unitary or complex phenomenon have also been levelled at the construct validity of the cognitive style index. For example, Hodgkinson & Sadler-Smith (2003) assert that the uni-dimensional conception of the CSI adopted by Allinson & Hayes (1996) downplays the extant literature that depicts a

picture of higher complexity. They also provided some empirical evidence suggesting that a

two-factor model provides a better approximation of responses to the CSI. In their rebuttal,

Hayes, Allinson, Hudson & Keasey (2003) concluded that these authors had failed to present

a robust challenge to the construct validity of the CSI. Allinson & Hayes (2012) later asserted

that "to regard intuition and analysis as independent dimensions would be to deny a

centuries-old perception of individual thought processes that can be traced back at least to the

writings of Aristotle, as well as sacrificing the most parsimonious explanation of cognitive

style" (p.3). Further studies were undertaken in an attempt to either replicate or refute

Hodgkinson & Sadler-Smith (2003) earlier assertions. These studies (Hammad, 2012;

Armstrong & Qi, 2016; Cuneo, 2020) reported findings of a series of confirmatory factor

analyses suggesting that research using the CSI should continue on the basis of its original

uni-factorial structure.

Dyadic Influences of Cognitive Style Diversity. In terms of dyadic influences,

cognitive style diversity is based on the premise that members are likely to have different

cognitive styles. That is, in a given dyad, individual members are likely to occupy different

positions on the continuum that runs from a strong preference for an intuitive orientation to a

strong preference for an analytic orientation. The degree of difference in cognitive style

between members within a given dyad will determine the extent to which that dyad is

homogenous or heterogeneous – e.g. its level of congruence/diversity. In a work context an

analytic person would tend to focus on hard data, breaking problems down into their

constituent parts, and studying each part in detail. They tend to adopt a systematic search for

14

understanding via a logical step-by-step analysis and take an impersonal and structured

approach to decision making. Conversely, an intuitive person would be more receptive to soft

data, often experiencing an immediate sense of knowing which they cannot explain, and

adopt a more global approach to processing information. They tend to emphasize synthesis

and the simultaneous integration of many inputs at the same time, and prefer a more open,

interpersonal and rapid approach to decision making using random methods of exploration

(Armstrong, Cools & Sadler-Smith, 2012).

Whilst the influence of cognitive style similarity in dyads working within

organizations has been examined in a number of different contexts (e.g. Armstrong, 1999;

Allinson, Armstrong & Hayes, 2001; Armstrong, Allinson & Hayes, 2002; Van-derheyden &

De-Baets, 2015) its direct influence on OCBs has never been examined. Although previous

findings are mixed, there is evidence to suggest that cognitive style congruence not only

enhances the quality of dyadic relationships, but also works indirectly through its influence

on other variables to enhance mutual understanding and liking (Myers, 1980) and other

behavioral and attitudinal manifestations such as trust, admiration, empathy and respect

(Armstrong, Allinson & Hayes, 2002). Studies have also shown that similarities in cognitive

style result in reduced ambiguity, increased levels of interpersonal attraction, and better

communication in leader-follower dyads (Johlke & Duhan, 2001), resulting in fewer

misunderstandings and enhanced leader-follower relationships (Suazo, Turnley & Mai-

Dalton, 2008). Conversely, dissimilarities in cognitive styles accentuate the negative

characteristics of a dyadic relationship (Tsui, Porter & Egan, 2002) and can often result in

15

conflict (Leonard & Straus, 1997). This is unsurprising since it is known that people who are highly analytical do not readily combine with those who are highly intuitive - they often tend to be irritated by, and hold pejorative views of each other (Kirton, 1989). Furthermore, it is known that leaders tend to perceive dissimilar followers less positively and tend to give them lower performance ratings (Milliken & Martins, 1996).

It is clear then, that differences in cognitive style fundamentally affect interpersonal relationships and that interaction between people should proceed more harmoniously, when, "as a function of similarity in style, they perceive and process information in similar ways, and use similar modes of communication" (Armstrong, Cools & Sadler-Smith, 2012, p.244). The degree of harmony an employee perceives is known to be positively related to employees' displaying OCBs reciprocally toward the organization (Chin, 2015; Kabasakal, Dastmalchian & Imer, 2011; Chiu & Chen, 2005). This leads us to our first hypothesis:

H_1: Leader-follower cognitive style similarity positively predicts followers' overall organizational citizenship behaviors.

2.4 Dimensionality of OCBs

With regard to dimensionality of OCBs, consequences were categorized by Williams & Anderson (1991) on the basis of the direction of behavior toward either the benefit of individuals (OCBI) or toward the benefit of the organization (OCBO). According to Podsakoff, Whiting, Podsakoff & Blume (2009), factors associated with OCBI include: *Courtesy* – helping others to solve problems; and *Altruism* – voluntary behaviors to help other people in the organization. Helping in this context is a type of interpersonal, cooperative, and

16

affiliative extra-role behavior directed toward members of one's workgroup (Van Dyne &

Le-Pine, 1998). These behaviors occur without any external rewards and do not have punitive

consequences when not performed by the employee (Liao, Chuang & Joshi, 2008). Such

behaviors have been shown to result from good quality interpersonal relationships that

promote mutual concern and increased sensitivity to the needs of others (McAllister, 1995).

Leaders who recognize interpersonal citizenship behaviors in their followers such as altruism,

courtesy (Hoffman, Blair, Meriac & Woehr, 2007) and other helping behaviors are likely to

reciprocate (Homans, 1961) through increased liking and trust in those employees (Dienesch

& Liden, 1986). This has been found to positively influence leaders' performance evaluations

and reward distribution (Lefkowitz, 2000) that subsequently leads to reinforcement of

subordinates work-role behaviors and increased job satisfaction (Erdogan & Enders, 2007).

These helping behaviors associated with OCBIs are characteristic of those behaviors

associated with people whose cognitive styles are more intuitive than analytic. For example,

intuitive individuals are known to have a social orientation and encompass a strong interest in

people with a preference for being with and helping others – *e.g. Courtesy*– (Witkin &

Goodenough, 1977; Armstrong, Allinson & Hayes, 2002). Intuitive people also tend to

promote effective functioning in workplace settings by maintaining positive interpersonal

relationships – *e.g. Altruism* – and exhibiting warm and nurturing behavior (Armstrong,

1999). They are also more likely to shift their opinions to resolve conflicts while analytic

people tend to be less willing to adapt their views to those of others (Armstrong, Allinson &

Hayes, 2002).

17

Similarities in vertical dyads have revealed consistent and lasting positive effects on supervisor related performance, relationship quality, and the promotion opportunities of subordinates (Deluga, 1998), whereas dissimilarity leads to less favourable job attitudes and a lower willingness to help others (Schaubroeck&Lam, 2002). Suazo, Turnley & Mai-Dalton (2008) revealed that similarity in cognitive style in particular is associated with higher quality leader-subordinate relations. A later study of the analytic-intuitive dimension of cognitive style revealed that whilst congruence increases communication satisfaction between leaders and their subordinates, this was significantly higher when leaders and their subordinates were intuitive rather than analytic (Erdil & Tanova, 2015). Other studies (e.g. Liao, Chuang & Joshi, 2008) of the effect of deep-level similarity also revealed that working partners will be more committed and more satisfied with job experiences within a work-group and will more willingly engage in cooperative helping behaviors toward co-workers. Deep-level leader-subordinate similarity has also been shown by Huang & Iun (2006) to have significant effects on extra-role performance using Lee & Allen's (2002) OCB scale.

On the basis that OCBIs are about helping others within organizations through cooperative and affiliative extra-role behaviors, that such behaviors are more reflective of individuals with intuitive rather than analytic cognitive styles, and that deep level similarities in vertical dyads are known to lead to a greater willingness on the part of subordinates to engage in these sorts of behaviors, we hypothesise that:

18

H_2: Leader-follower congruence at the extreme intuitive end of the cognitive style continuum (intuitive follower-intuitive leader) will lead to higher levels of follower OCBIs being reported by their leaders.

According to Podsakoff, Whiting, Podsakoff & Blume (2009), factors associated with OCBO include: *Conscientiousness* – that refers to employees' acceptance and adherence to the rules and regulations of the organization; *Sportsmanship* – that refers to a willingness to tolerate less than ideal circumstances; *Civic Virtue* – that refers to employees taking an active interest in the life of the organization. OCBOs have been referred to as generalized compliance (Organ & Konovsky, 1989) and are viewed as behaviors that occur because of expected rewards or the avoidance of punishment (Williams & Anderson, 1991).

Behaviors associated with OCBOs are considered to be more aligned with behaviors that are more consistent with people whose cognitive styles are more analytic than intuitive. For example, analytical people are known to have a more impersonal nature compared with the more interpersonal nature of intuitive people. Their focus within organizations tends to be toward initiating a higher proportion of task-oriented acts compared with intuitive people who prefer to engage in more socio-emotional oriented behaviors (Armstrong & Priola, 2001; Priola, Smith & Armstrong, 2004). Analytic individuals also show greater skills in cognitive analysis with a focus on detail (Pascual-Leone, 1989) and tend to be more compliant, adhering to company rules and regulations (Kirton, 1976). Erdil & Tanova (2015) also observed that analytic people tend to become more rule oriented and dependent on formal procedures. Such behaviors are consistent with the OCBO definition of conscientiousness

(Podsakoff, Whiting, Podsakoff & Blume, 2009). According to Pascual-Leone (1989) analytic individuals are also more concerned about self-related benefits such as rewards and promotions than maintaining personal relationships. In the interest of generating self-related benefits, we would suggest that analytic people will therefore be more likely to tolerate less than ideal circumstances in their work endeavours (e.g. sportsmanship) and will be more inclined to take an active interest in the organization by, for example, attending functions that are considered important even though they may not be mandatory (e.g. C*ivic virtue*).

Again, on the basis that congruence of cognitive styles between leaders and their subordinates have revealed consistent and lasting positive effects for both dyadic partners (Deluga, 1998) including higher levels of communication satisfaction (Erdil & Tanova, 2015), and that deep-level similarities within vertical dyads will lead to partners being more committed and satisfied with their job experiences (Liau, Chuang & Joshi, 2008), we would further hypothesise that:

H_3: Leader-follower congruence at the extreme analytic end of the cognitive style continuum (analytic follower-analytic leader) will lead to higher levels of follower OCBOs being reported by their leaders.

3 Methods

3.1 Sample and Procedure

We analyzed data from 125 leaders and 430 followers from six manufacturing organizations in the Peoples' Republic of China. To limit common method bias (Podsakoff, MacKenzie & Podsakoff, 2012) we measured cognitive style based on leaders' and

followers' self-ratings at time T1. At time T2 (1-week later) we measured leaders' evaluations of followers' OCB. Participation in the research was voluntary and confidentiality was guaranteed. The average tenure of participants was 9.14 years and their average age was 36. In terms of gender, 41.2% of participants were female. To control for common method bias, we followed the procedure suggested by Podsakoff, MacKenzie, & Podsakoff (2012) to measure independent and dependent variables from different sources. Data concerning follower OCB were collected from leaders' rating. Both leaders and followers cognitive styles were measured using self-ratings.

3.2 Measures

Because the original version of the research instruments were designed in English and the native language of the participants was Chinese, all questionnaires were translated using a back-translation procedure (Brislin, 1980). Two professional translators, fluent in both Chinese and English, were independently assigned to work on the translation process. The first of these translated all research instruments from English to Chinese. The Chinese versions were then sent to the second translator for translation back into English. Both original and translated English versions were then compared to identify any inconsistencies. Any differences were discussed between the researchers and both translators to determine any further revisions. Changes were minimal, meaning that we had achieved translation equivalence (Douglas & Craig, 1983).

Cognitive Style. We used the Cognitive Style Index (CSI) to assess the analytic-intuitive dimension of cognitive style. The CSI (Allinson & Hayes, 1996) is a self-report

questionnaire comprising 38 items, each comprising a true-uncertain-false response mode.

Scores of 0, 1 or 2 are assigned to each response (Sample items: *In my experience, rational*

thought is the only realistic basis for making decisions (Analytic); I prefer chaotic action to

orderly inaction (Intuitive)). The nearer the total score (38 items) is to the theoretical

maximum of 76, the more analytic the respondent. The nearer the total score is to the

theoretical minimum of 0, the more intuitive the respondent. Whilst the CSI represents a

continuum, five notional styles associated with the CSI scores were defined as the 20th, 40th,

60th and 80th percentiles in the distribution obtained from a sample of 1180 managers and

professionals (Allinson & Hayes, 2015). Those are: *Intuitive* (score range 0-28); *Moderate*

Intuitive (29-38); *Adaptive* (39-45); *Moderate Analytic* (46-52); and *Analytic* (53-76).

Reliability of the CSI is excellent with a median Cronbach alpha coefficient (taken across 100

previous studies) being 0.84, and test-retest reliabilities ranging from 0.78 to 0.90 (Qi, 2011).

Internal consistency reliability estimate for the present study was also .84. Construct validity

is indicated by items loading on a single factor in many previous studies and significant

correlations with various personality dimensions, national culture, and job level (Armstrong,

Allinson & Hayes, 2002). Confirmation of its uni-factorial structure was recently reported by

Armstrong & Qi (2016).

Organizational Citizenship Behavior. We used the 24-item OCB scale developed

by Podsakoff, MacKenzie, Moorman, & Fetter (1990). Items were measured on a seven-point

Likert scale ranging from (1) "Strongly Disagree" to (7) "Strongly Agree". The scale

comprised the five factors of conscientiousness, sportsmanship, and civic virtue (OCBO), and

courtesy and altruism (OCBI) hypothesized by Organ (1988). Sample items from the sub-scales of OCBO and OCBI respectively were: *Obeys company rules and regulations even when no one is watching; is always ready to lend a helping hand to those around her/him.* Podsakoff et al's (1990) study revealed internal consistency reliabilities of all five subscales that exceeded .80 and evidenced an adequate level of discriminant validity. Cronbach alpha values for the present study were as follows: overall OCB, α =.95; OCBO, α =.95; OCBI, α =.90.

4 Data Analysis

First of all, one-way analysis of variance (ANOVA) was conducted to test whether there were differences across the six organizations on the tested variables. Results revealed that there were no significant differences for either OCB ($F_{5,409}$ = 1.78, p > .05) or cognitive style ($F_{5,409}$ = 2.05, p > .05). It was therefore unnecessary to consider organization as a control variable in our analyses.

4.1 Measurement of congruence

The obvious way to assess congruence is to calculate the differences between leaders and followers CSI scores (Edwards &Parry, 1993). However, whilst difference scores have been widely used in organizational research (Edwards & Parry, 1993), this method is known to suffer from numerous methodological problems in the areas of reliability, spurious correlations and variance restriction (Edwards, 2001). We therefore used polynomial regression with response surface analysis to more precisely examine the exact nature and extent to which congruence between our predictor variables relate to our outcome variable

(Edwards, 2009). This allowed us to analyse 3-dimensional surfaces relating to our

congruence of cognitive style hypotheses, facilitated a clearer interpretation of results, and

allowed us to see the effects of each of the component measures- leaders' cognitive styles

(LCS) and followers' cognitive styles (FCS) on the outcome variables (OCB; OCBI; OCBO).

We followed Shanock, Baran, Gentry, Pattison & Heggestad's (2010) procedure for

centring the predictor variables (LCS & FCS) about the midpoint of their respective scales.

Then we created three new variables: (1) the square of the centred FCS variable; (2) the

cross-product of the centred FCS and LCS variables; and (3) the square of the centred LCS

variable (Table 2). Next, we ran the polynomial regression analyses. Results of the

polynomial regressions were evaluated with regard to the four surface test values a_1, a_2, a_3 &

a_4, (refer to Table 2). The slope of the line of perfect agreement (LCS = FCS) as related to

overall OCB, OCBI and OCBO is given by a_1. Curvature along the line of perfect agreement

as related to overall OCB, OCBI and OCBO is given by a_2. The slope of the line of

incongruence (LCS = -FCS) is given by a_3. The curvature of the line of incongruence as

related to overall OCB, OCBI and OCBO, indicating the degree of discrepancy between LCS,

FCS, and the outcome variable is given by a_4.

5 Results

Descriptive statistics for means, standard deviations, and correlations among variables

are shown in Table 1. To aid interpretation of the results, three-dimensional response surface

graphs have been produced (see Figures 1, 2 and 3). From the graphs it should be noted that

the X and the Y axes represent our predictor variables (FCS and LCS respectively), whereas

the Z axis represents our outcome variables, follower OCBI, OCBO and overall OCB. A

value of +1 on both the X (FCS) and Y (LCS) axes represents an extreme preference for

Analysis using logical and linear processing with a focus on detail. A value of -1 on the X and

Y axes represents an extreme preference for *Intuition* using synthesis and simultaneous

processing with a focus on assessment of the whole.

Using these graphs we will firstly seek to determine whether congruence of follower

cognitive style and leader cognitive style relate to overall OCB, OCBI, and OCBO. Secondly,

we will analyze how the degree of discrepancy between follower cognitive style and leader

cognitive style relate to overall OCB, OCBI, and OCBO. Thirdly, we will determine how the

direction of the discrepancy between follower cognitive style and leader cognitive style

relates to overall OCB, OCBI, and OCBO.

With regard to whether congruence of cognitive style relates to overall OCB, OCBI,

and OCBO, the line of perfect agreement (congruence) is represented by the solid line

between the front corners and the back corners of the graphs. As explained by Shanock,

Baran, Gentry, Pattison & Heggestad (2010), a linear relationship along this line as it relates

to OCB, OCBI and OCBO is indicated by variables a_1 being significant (OCBa_1= -2.04, p=

.04: OCBI:a_1= -2.34, p= .04; OCBO:a_1= -2.05, p= .04) and a_2 being non-significant (OCBa_2=

3.00, p= .04: OCBI:a_2= 3.42, p= .04; OCBO:a_2= 3.30, p= .03). If a_1 is positive, OCB

increases as both LCS and FCS increase. As shown in Tables 2(OCB), 3 (OCBI) & 4

(OCBO), the surface tests resulted in both a_1 and a_2 being significant. This indicates a non-

linear relationship along the line of perfect agreement as it relates to overall OCB, OCBI and

25

OCBO. Since a_1 is negative in all three cases (Tables 2, 3 & 4), overall OCB, OCBI and OCBO decreases as both LCS and FCS increase (i.e. become more analytic). In Figures 1, 2 and 3, the highest level of OCB, OCBI and OCBO are at the front corners of the graphs where LCS and FCS are both low (more intuitive), and lower at the back corners of the graphs where LCS and FCS are higher (more analytic). An exception occurs when the extreme points of analysis are reached at the back corner where there is a small increase in OCB, OCBI and OCBO. Since a_2 is positive in all three cases, this suggests that the line of perfect agreement as it relates to OCB, OCBI and OCBO is positive and a convex surface (upward curving) indicating that OCB, OCBI and OCBO can increase more sharply as both LCS and FCS become lower or higher from some point.

To interpret how the degree of discrepancy between LCS and FCS relates to OCB, OCBI and OCBO we need to assess the curvature of the line of incongruence (LCS = -FCS) as it relates to OCB with a_4 (OCB:a_4= -5.80, p= .00; OCBI:a_4= -6.40, p= .00; OCBO:a_4= -4.43, p= .00). The line of incongruence is represented by the dotted line between the left corner and the right corner of the graphs (Figures 1, 2 and 3). A significant negative a_4 indicates a concave surface whereby OCB, OCBI and OCBO decreases more sharply as the degree of incongruence between LCS and FCS increases. This is shown on the graphs in Figures 1, 2 & 3 where it is indicated that as LCS and FCS become more dissimilar, OCB, OCBI and OCBO decrease sharply. These results demonstrate support for hypothesis 1.

Finally, determining how the direction of discrepancy between leader and follower cognitive styles is related to our outcome variable (indicated by the slope of the line of

incongruence (X = -Y) as it relates to OCB) is assessed by considering variable a_3. Table 2 (OCB), Table 3 (OCBI) and Table 4 (OCBO) all reveal a non-significant a_3 indicating a negative curvature along the line of incongruence as related to OCB. Figures 1, 2 & 3 depict these results indicating that OCB, OCBI and OCBO respectively are higher when the discrepancy between LCS and FCS are low. As the level of diversity between leader and follower increases such that LCS is higher than FCS and vice versa, OCB, OCBI and OCBO decrease sharply. This shows that either side of the centre of the graph, along the line of incongruence, OCB, OCBI and OCBO decrease similarly as the discrepancy between FCS and LCS increases in either direction. This lends further support for hypothesis 1. From Figure 2, it can be seen that the highest level of OCBI occurs for the condition where both leader and follower are highly intuitive, lending support to hypothesis 2. Figure 3 reveals that whilst OCBO for the analytic dyad condition increases from the conditions of moderately analytic dyads, and adaptive dyads, this does not reach the level of OCBO for the condition where both leader and follower are both highly intuitive. There is therefore only partial support for hypothesis 3.

6 Discussion

As hypothesized, results of our study are generally consistent with Byrne's (1971) similarity attraction paradigm and suggest that congruence of follower and leader cognitive style is a predictor of follower OCB. With regard to incongruence and how the degree of discrepancy between leader cognitive style and follower cognitive style relates to OCB, our results reveal that OCB, OCBI and OCBO are all highest for adaptive dyads where both

leader and follower cognitive styles are in the centre range of the cognitive style continuum.

This is the point at which diversity of cognitive styles is lowest. Considering the line of

incongruence in Figures 1, 2 and 3, it is clear that OCB, OCBI and OCBO all decrease

sharply with increases in the degree of diversity between leader and follower cognitive styles.

The lowest level of OCB occurs in situations where intuitive leaders are working with

analytic followers. Intuitive leaders who adopt a global approach to processing information

and feel comfortable acting and paying attention on the basis of gut feelings and hunches will

see the behaviors of their analytic followers in sharp contrast to their own as those followers

adopt more systematic approaches to investigation (Allinson & Hayes, 2015), thrive on

attention to detail, and adopt step-by step approaches to processing information (Armstrong,

2000). Intuitive leaders may therefore have a relative intolerance for analytic followers and

judge OCB more harshly. Conversely, analytic followers working with intuitive leaders may

wonder "where on earth is this leading"?

Moving along the incongruence continuum (Figures 1, 2 & 3) from the right hand

corner (intuitive leader-analytic follower) to the left hand corner of the graphs (analytic

leader-intuitive follower), OCB, OCBI and OCBO are seen to decrease sharply again,

although not to the same level as intuitive leader-analytic follower dyads. This difference

may be due to analytic leaders being more tolerant of their intuitive followers, placing value

on their ability to see links between unrelated ideas and experiences and to continually pursue

new ideas and different approaches to decision making and problem solving.

Referring to the congruence continuum of Figures 1, 2 & 3, our results revealed that the highest level of follower OCB, OCBI and OCBO occurs in dyads where both leader and follower are intuitive, which represents a rather unique contribution. Those with intuitive cognitive styles are more divergent in their thinking and continually pursue new ideas and different approaches to problem solving and decision making. It is conceivable therefore that those intuitive leaders see their intuitive followers in good ways and enjoy high quality social and informational exchanges with them, leading to increased benefits on the part of the follower and reciprocal behaviors that benefit the organization.

It is also known that intuitive individuals exhibit a strong interest in people, preferring to help and maintain positive interpersonal relationships and are more inclined to shift their opinions to resolve conflicts (Armstrong, Allinson & Hayes, 2002). These behaviors are reminiscent of the courtesy and altruism factors of the OBC construct. When there is similarity between leaders and their subordinates, this has revealed consistent and lasting positive effects on supervisor related performance, and the promotion opportunities of subordinates (Deluga, 1998). Communication satisfaction between leaders and their subordinates is also known to be higher when leaders and their subordinates are both intuitive (Erdil&Tanova, 2015), further reinforcing higher quality leader-subordinate relations (Suazo, Turnley & Mai-Dalton, 2008) and the likelihood of increased OCBs.

A further consideration is that since our outcome variable is based on leaders' perception, intuitive leaders may be better at judging OCB, seeing it in more subjective rather than objective terms which would be favored by analytic leaders. It is also noteworthy that

29

intuitive information processors tend to place a greater emphasis on feelings (Armstrong,

Cools & Sadler-Smith, 2012), are generally more nurturing (Allinson, Armstrong &Hayes,

2001) and adopt an interpersonal approach to problem solving (Armstrong et al, 2012).

According to Suazo, Turnley & Mai-Dalton (2008) these qualities associated with leader-

follower relationships may be powerful mechanisms through which similarity influences

followers' positive state of psychological contract. Moving further along the congruence

continuum (Figures 1, 2 & 3) from intuitive dyads, through moderately intuitive dyads,

adaptive dyads, and moderate analytic dyads, overall OCB, OCBI and OCBO decline

slightly, and then increases again for analytic dyads. However, this increase does not reach

the same level as for congruent intuitive dyads. This difference may be due to analytics'

tendencies to focus more on tasks and goals rather than people, and to not valuing

interpersonal relationships and human aspects as much as intuitive people. Analytic leaders

are also likely to place more emphasis on logical thinking and therefore judge followers

OCB, OCBI and OCBO in more objective terms than intuitive leaders.

Finally, our study has also demonstrated the benefits of using a sophisticated

statistical approach involving polynomial regression with response surface analysis in multi-

source feedback research (e.g. leader-follower discrepancy). This has allowed us to examine

the extent to which an outcome variable (OCB) is predicted by the two predictor variables

(leader and follower cognitive styles) where the difference between these two variables is a

central consideration. This approach is significantly more powerful and informative than

using difference scores (absolute, algebraic or squared differences between two component

measures) for analyzing discrepancies in ratings. Even though difference scores have been widely used in organizational research for studying congruence, methodological problems with using this approach are well known (e.g. Edwards & Parry, 1993; Edwards, 1994; Edwards, 1995). For example, combining two distinct measures into a single score confounds the effects and contribution of each component measure on the outcome variable (Edwards, 2001). Using polynomial regression allows the effects of each component measure to be retained, making it possible to examine the contribution of each component measure to outcome variance. Additionally, using response surface methodology corresponding to the polynomial regression equations allows us to rigorously evaluate three-dimensional surfaces relating the component measures to outcomes (Edwards, 2009). The present authors would encourage further use of polynomial regression and response surface methodology in future diversity studies associated with evaluating the role of congruence. An excellent resource for helping with the application of these methods is Shanock, Baran, Gentry, Pattison & Heggestad (2010).

7 Implications

Notwithstanding the finer details of the preceding analyses, our over-arching arguments for congruence hypotheses related to leader-follower cognitive styles were largely upheld. This raises important considerations and implications. Firstly, results of the present study indicate that organizations may benefit from considering issues of similarity in their attempts to develop effective leader-follower partnerships and teams. Cognitive style is clearly an important basis for matching followers and leaders in order to increase followers

OCB's and this, in turn, is likely to lead to improvements in both individual and organizational success. Another fertile area of investigation for future congruence studies of this nature would be formal mentoring systems, building for example on the earlier work of Armstrong, Allinson & Hayes (2002).

Secondly, some authors believe that cognitive strategies may be adopted to deal with a situation or perform particular tasks in the short term (Kirton, 1989). In this case, it may be possible through training for leaders to learn flexibility of style and adopt different approaches according to the styles of the followers with whom they are dealing in the interest of increasing followers OCB. To the authors' knowledge there has been no previous work in this area.

Thirdly, awareness of cognitive styles through training and development are also useful for developing effective working relationships because a poor understanding of others' styles can lead to frustration, disengagement or conflict. Intuitive members tend to get frustrated by analytic members' insistence on analyzing every aspect of a situation and spending too much time gathering facts and pondering over information before coming to a decision. Conversely, analysts may find intuitive approaches to tasks frustrating and chaotic and often remain unconvinced by their arguments because of a lack of facts and logical arguments to underpin their reasoning.

Finally, our findings have demonstrated that the degree of match between leaders' and followers' cognitive styles may account for improved organizational citizenship behaviors that are known to have a sizeable impact on the success and welfare of both organizations and

individuals (Chin, 2015; Podsakoff, Podsakoff, MacKenzie, Maynes & Spoelma, 2014).

Organizations may therefore benefit from considering cognitive style theory as one criterion

against which they may base their recruitment and selection criteria when choosing staff to

work with particular leaders.

8 Data Availability Statement

The datasets generated for this study are available on request to the corresponding author.

9 Author Contributions

The ordering of authors represents the contributions made by the respective authors. SA and

MQ were all instrumental in the development of the research project. MQ carried out the data

collection and ran the statistical analyses. SA and MQ made significant contributions to the

overall writing and theoretical development of the article.

10 Funding disclosure

11 Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Table 1. *Means, Standard Deviations, and Correlations among Variables*

Variable	SD	Mean	1	2	3	4	5	6	7	8
1. Employee Age	9.12	36.34								
2.Educational Background	3.87	4.36	.10*							
3. Employee tenure	9.69	9.14	.65**	.09						
4.Follower CS	.24	1.32	.01	.03	-.01	(.84)				
5.Leader CS	.20	1.33	--	--	--	.03	(.84)			
6.OCB	.99	5,21	-.08	-.02	.04	-.12*	.14*			
7.OCBI	1.09	5.27	-.07	.01	.06	-.03	.01	.78**		
8.OCBO	.93	5.16	-.11*	-.03*	.03	-.01	.01	.80**	.77**	

Note. Cronbach's alphas are provided in parentheses on the diagonal. FCS=followers' cognitive styles; LCS= leaders' cognitive styles; OCB= organizational citizenship behavior

* $p< 0.05$. ** $p< 0.01$. *** $P< 0.001$.

Table 2. *The relationship between cognitive similarity in leader-follower dyad and followers' overall OCB*

Data Entry Area				
Variable Name		Unstandardized Betas	Standard Errors	Covariances
	Constant	5.34		0.158
FCS	X (b1)	-2.05	0.579	0.024
LCS	Y (b2)	0.009	0.638	0.015
	X^2 (b3)	-0.065	0.533	0.04
	XY (b4)	4.402	1.164	
	Y^2 (b5)	-1.334	0.772	
	Sample size	352		
Testing Slopes and Curves				
Effect	Coefficient	Standard Error	Test Stat (t)	p-value
a1: Slope along x = y (as related to Z)	-2.04	1.03	-1.984	0.04
a2: Curvature along x = y (as related to Z)	3.00	1.55	1.941	0.06
a3: Slope along x = -y (as related to Z)	-2.04	0.65	-3.158	0.00
a4: Curvature along x = -y (as related to Z)	-5.80	1.50	-3.879	0.00

Table 3. *The relationship between cognitive similarity in leader-follower dyad and followers' OCBI*

Data Entry Area				
Variable Name		Unstandardized Betas	Standard Errors	Covariances
	Constant	5.72		0.19
FCS	X (b1)	-1.44	0.64	0.03
LCS	Y (b2)	-0.90	0.70	0.02
	X^2 (b3)	-0.49	0.59	0.05
	XY (b4)	4.91	1.28	
	Y^2 (b5)	-1.01	0.85	
	Sample size	352		
Testing Slopes and Curves				
Effect	Coefficient		Standard Error	Test Stat (t)	p-value
a1: Slope along x = y (as related to Z)	-2.34		1.13	-2.08	0.04
a2: Curvature along x = y (as related to Z)	3.42		1.72	2.01	0.04
a3: Slope along x = -y (as related to Z)	-0.54		0.72	-0.75	0.46
a4: Curvature along x = -y (as related to Z)	-6.40		1.65	-3.88	0.00

Table 4. *The relationship between cognitive similarity in leader-follower dyad and followers' OCBO*

Variable Name		Unstandardized Betas	Standard Errors		Covariances
		Data Entry Area			
	Constant	5.51			0.14
FCS	X (b1)	-0.90	0.55		0.02
LCS	Y (b2)	-1.15	0.61		0.02
	X^2 (b3)	-0.50	0.50		0.03
	XY (b4)	3.86	1.11		
	Y^2 (b5)	-0.07	0.74		
	Sample size	352			
		Testing Slopes and Curves			
Effect	Coefficient		Standard Error	Test Stat (t)	p-value
a1: Slope along x = y (as related to Z)	-2.05		0.98	-2.09	0.04
a2: Curvature along x = y (as related to Z)	3.30		1.47	2.24	0.03
a3: Slope along x = -y (as related to Z)	0.25		0.63	0.40	0.69
a4: Curvature along x = -y (as related to Z)	-4.43		1.42	-3.12	0.00

Figure 1 – Response Surface Graph of overall OCB
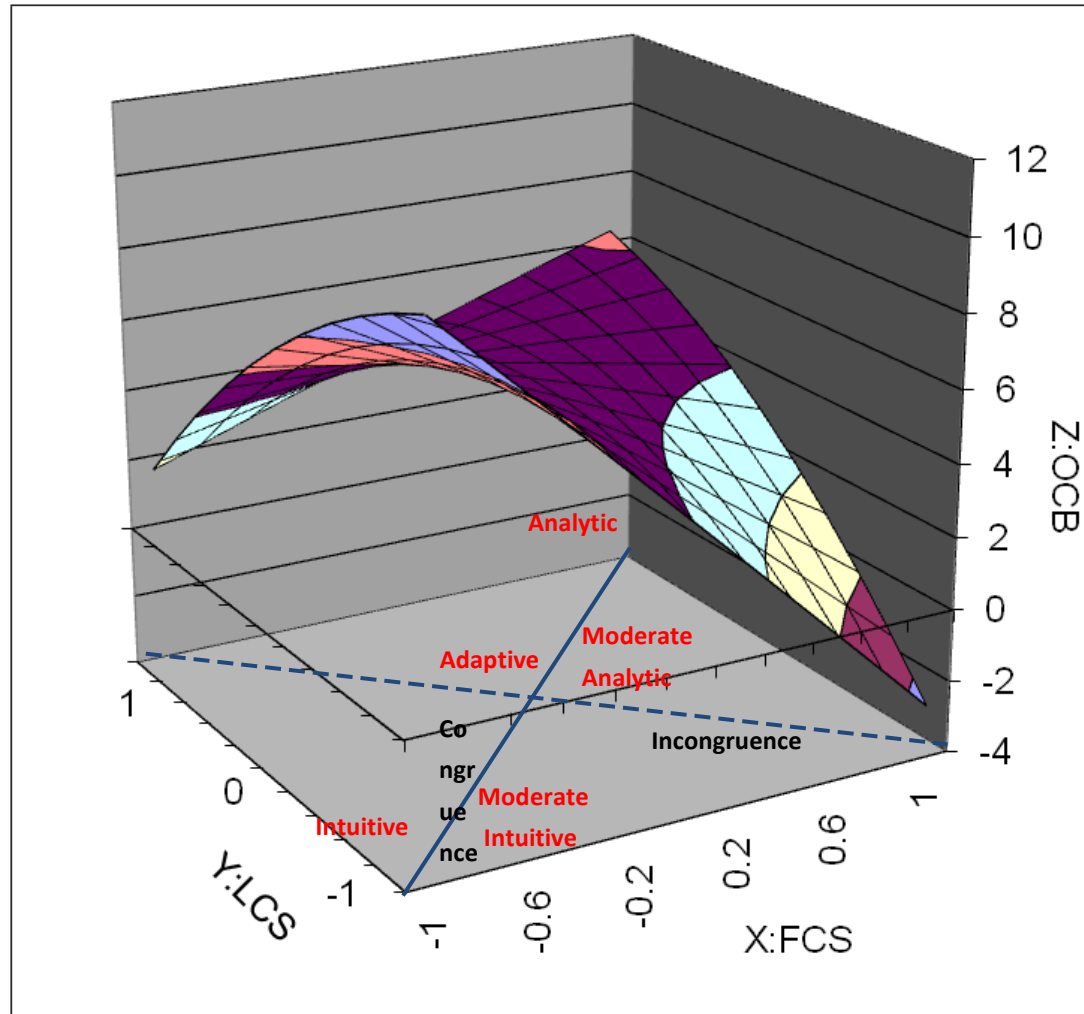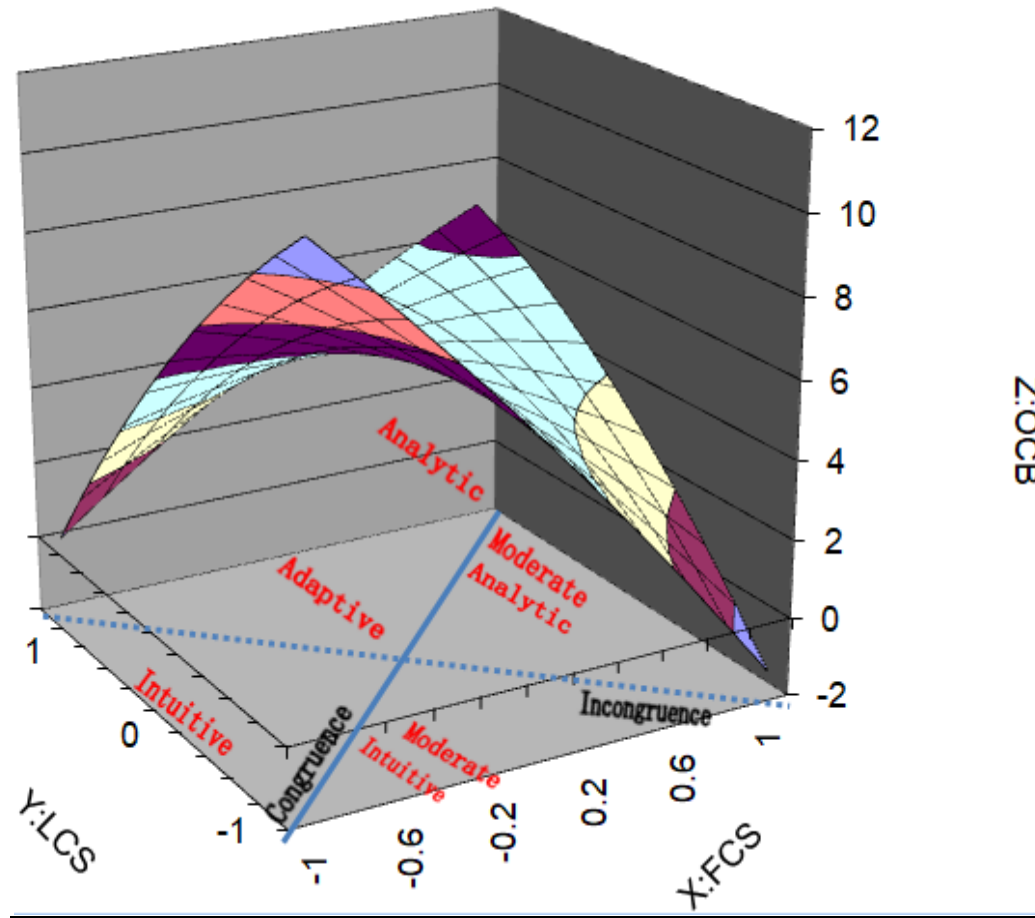
Figure 2 – Response Surface Graph of OCBI

Figure 3 – Response Surface Graph of OCBO