A final manuscript submitted to

Journal of Construction Engineering and Management, ASCE
(Specialty Areas: Contracting)
Manuscript #: COENG -95R2

How Do Personality Traits Affect Construction Dispute Negotiation? A Study of Big Five Personality Model

(The audience of the paper shall include both researchers and practitioners.)

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31 July 2010

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ABSTRACT

This paper provides some leads as to how *personality traits* affect *negotiating behaviors* and *negotiation outcomes* in construction dispute negotiation. To achieve this, a questionnaire survey was conducted. Big Five Personality Model was employed to measure the personality traits of construction negotiators. Factors of negotiating behaviors and negotiation outcomes were developed. By inter-relating these three elements, moderated multiple regression (MMR) was employed to examine how personality traits affect the relationships between negotiating behaviors and negotiation outcomes. The results suggest that 16 MMR models are of significant moderating effects on these relationships. Among them, top five MMR models with relatively strong moderating effects are identified. These models reveal that the personality traits of Extraversion, Openness and Conscientiousness can significantly moderate the relationships of negotiating behaviors and negotiation outcomes. In addition, their moderating effects are plotted to examine their natures. Effective zones of Extraversion, Openness and Conscientiousness are identified to show precisely how these personality traits can effective facilitate to the achievement of positive negotiation outcomes. These results provide construction organizations with indicators to which type of personality traits can help to improve negotiation outcomes and to optimize the overall performance of construction dispute negotiation.

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INTRODUCTION

Negotiation is one of the most cost-effective ways for construction practitioners to negotiate disputes with the joint efforts of disputing parties (Yiu et al. 2008; Cheung et al. 2004, 2005). However, not every negotiation is successful; negotiation with disputing parties who are stubborn, short-tempered or risk-averse may end in impasse (Gilkey and Greenhalgh 1986). When considering the factors that affect the achievement of desirable negotiation outcomes, habitual characteristics (i.e. personality traits) of negotiator are one of the critical factors. Different type of personality traits can make negotiations productive or unproductive (Gilkey and Greenhalgh 1986). Negotiators who are aware of their own personality traits can adjust their tactics, and they can also observe their disputing parties' personality traits in order to make tactical adjustments in dealing with them (Gilkey and Greenhalgh 1986). This can be supported by the majority of negotiation researchers that "*personality traits are stable and enduring characteristic of individuals that predispose negotiators to react to situations in particular ways*" (Reynolds 2006; Anderson and Thompson 2004). In this connection, negotiation success may be determined in large part by personality traits. This also implies that personality traits would influence negotiator behaviors, which in turn affects the negotiation outcomes (Reynolds 2006). In fact, these relationships have long been identified by literature in the field of psychology (Hermann and Kogan 1977; Rubin and Brown 1975; Walton and McKersie 1991). Personality traits may influence the initial orientation, the use of tactics and other process variables of negotiation. And the mix of personality traits between negotiating parties may affect the negotiation outcomes (Hermann and Kogan 1977).

Previous studies showed that personality trait with position emotion can facilitate negotiation outcomes. There are two main reasons: (1) it helps negotiators understanding the interests of other negotiating parties (Allred et al. 1997) and (2) it assists negotiators to plan their strategies (Forgas 1998). For example, negotiators with positive affect in their personality traits are the significant variables to predict integrative negotiation outcomes (Anderson and Thompson 2004). Personality traits can hence help in understanding the individual differences in negotiation. It provide an inherent sound basis that allows negotiators to know how their reactions in the course of negotiation (Gilkey and Greenhalgh 1986). Despite the importance of this topic, almost no comprehensive attention has been given to how personality traits of construction engineering management affect negotiating behavior and negotiation outcomes. In the past decade, construction-related researches of personality traits were only focused on studying team performance (Giritli and Civan 2008; Varvel et al. 2004; Culp and Smith 2001), interpersonal trust (Ding et al. 2007), job performance (Carr et al. 2002), price forecasting performance (Skitmore et al. 1994) and predominant personality profile of civil engineers (Johnson and Singh 1998). Likewise, this paper attempts to conduct a further research on personality traits that investigates the extent of which personality traits can affect the relationships between negotiating behaviors and negotiation outcomes. For optimization of negotiator's efforts, construction organizations shall look beyond cognitive abilities, experience and education background. They shall introduce personality traits as one of the recognized indicators to assess the performance of negotiator. By understanding how personality traits affect negotiating behaviors and negotiation outcomes, construction practitioners and academics could be able to: (1)

identify negotiators' personality traits differences as well as the determinants of negotiating behaviors; (2) assist in study the dynamics of construction negotiation (for example, the responses to negotiating partner's action can be further examined based on the findings of this paper), and (3) facilitate the research of behavioral changes of construction dispute negotiation.

To achieve this, Figure 1 shows the research model for this study of how personality traits affect construction dispute negotiation. The three elements underpinning this model are personality traits, negotiating behaviors and negotiation outcomes. In this study, the definition of personality trait extracted from Reynolds (2006) and Anderson and Thompson (2004) is applied. Personality traits are measured by the adoption of Big Five Personality Model (Goldberg 1990, 1992). For analysis purpose, factors for the negotiating behaviors and negotiation outcomes are first developed by categorization technique such as Principle Component Factor Analysis (PCFA). These factors are then subject to further analyses by MMR to examine the effects of personality traits on the relationships between negotiating behaviors and negotiation outcomes. In essence this paper first reports a study to explore (1) the personality traits; (2) the generic types of negotiating behaviors and (3) the typical negotiation outcomes of construction dispute negotiation. Next, the three elements are inter-related to test the effects of personality traits on the relationships between negotiating behaviors and negotiation outcomes.

< Figure 1 here >

DATA COLLECTION

A questionnaire survey was employed to collect case specific data for the completion of the aforementioned research objectives. The questionnaire has four sections. The respondents were first required to provide their background information and the particulars such as project nature, contract sum and parties involved of their completed negotiation cases. The next three sections sought to collect data for the three elements of the research model (Figure 1 refers): personality traits, negotiating behaviors and negotiation outcomes.

Personality Traits

A closer examination of the previous construction-related researches of Varvel et al. (2004), Carr et al. (2002), Culp and Smith (2001) and Johnson and Singh (1998) reveals that personality traits were measured by the Myers-Briggs Type Indicator (MBTI) of Myers et al. (1998) - a personality instrument developed to measure individual preferences on four scales: (1) Extraversion/Introversion; (2) Sensing/Intuition; (3) Thinking/Feeling and (4) Judgment/Perception. This personality instrument is employed from the field of psychology. This is because personality traits have been researched on a variety of theoretical perspectives, and at various levels of abstraction or breadth in this field (John and Srivastava 1999, John et al. 1991; McAdams 1995). As a result, thousands of characters that describe the uniqueness of each personality traits have been classified to different types of factor (Klages 1926; Baumgarten 1933; Allport and Odbert 1933). Based on the aforementioned construction-related researches, their success in implementing personality instrument from the field of psychology inspires the present study to adopt Big Five Personality Model (Goldberg 1990, 1992). This model is one of

the most popular personality instruments in the field of psychology. It measures the five personality dimensions: (1) **O**penness; (2) **C**onscientiousness; (3) **E**xtraversion (4) **A**greeableness and (5) **N**euroticism (OCEAN). Table 1 gives a brief description of each of these dimensions.

< Table 1 here >

As suggested by John & Srivastava (1999) and McCrae & Costa (1996), the Big Five Dimensions have become one of the most widely used and extensively researched models of personality traits. A variety of instruments are available to assess the Big Five Dimensions from literature reviews. These are: Big Five Inventory (BFI) (John and Srivastava 1999; John et al. 1991), Traits Descriptive Adjectives (TDA) (Goldberg 1992), NEO Personality Inventory (NEO-PI) (Costa and McCrae 1992b), NEO Personality Inventory-revised (NEO-PI-R) (Costa and McCrae 1992a) and NEO Five-factor Inventory (NEO-FFI) (Costa McCrae 1992b). A comprehensive study has been conducted by John and Srivastava (1999) to make a comparison among these five instruments.

Accordingly, Big Five Inventory (BFI) is chosen as the instrument to measure Big Five Dimensions in this study. This is because the BFI is efficient, and is easy to be administrated, when compares with the NEO-FFI and the TDA. The items in the BFI are shorter and easier to understand than the NEO-FFI items (Benet-Martinez and John 1998). These reasons were supported by John and Srivastava (1999) that the BFI can offer a measure of the core attributes of the Big Five Dimensions. In this connection, the items of BFI was adopted and modified so as to suit the context of construction dispute negotiation. Three items of the BFI, ‘values artistic, aesthetic experiences’, ‘has few

artistic interests' and 'is sophisticated in art, music, or literature' were considered as irreverent, and were discarded from this study. In the questionnaire survey, the respondents were asked to assess the degree of agreeableness with respect to the itemized personality traits on a seven-point Likert scale. A sample of the questions used is given in the Appendix.

Negotiating Behaviors and Negotiation Outcomes

Negotiating behaviors and negotiation outcomes were first identified from literature. In the questionnaire survey, respondents were asked to rate the degree of adoption of negotiating behaviors in relation to the negotiated case in a Likert scale of 1(not adopted disagree) to 7 (highly adopted). Similarly, the degree of achievement of negotiation outcomes was rated on a Likert scale of 1(not achieved) to 7 (highly achieved). The list of items for the negotiating behaviors and negotiation outcomes are shown in Tables 2 and 3.

< Table 2 here >
< Table 3 here >

Furthermore, stratified random sampling was used to separate the population into non-overlapping groups, called strata. Each stratum represents one of these contractors or consultants. In this connection, a total of 92 strata were identified. Simple random samples were then selected from each of the stratum. Similar approach was adopted by the previous studies of Love (2002) and Love et al. (2005). With the stratified random sampling method, a greater degree of representativeness of samples can be achieved (Love 2002; Love et al. 2005; Luck and Rubin 1987). Prior announcements were made to

the targeted firms and consultants. If they agreed to participate in the questionnaire survey, questionnaires were sent either by post, fax or email as preferred to the respondents. Respondents were asked to select one of the most recently completed negotiation cases as a reference for the completion of questionnaires. Before sending out the questionnaire, a list of prospective construction firms and consultants was first complied from the homepages of the Development Bureau and the Architectural Services Department (ASD) of the Government of the Hong Kong Special Administrative Region. A total of 58 approved (Group C) contractors, 18 architectural consultants (Band 1) and 9 quantity surveying consultants (Band 1) were selected. Furthermore, 5 private developers and 2 government departments were selected.

The Dataset

A total of 200 questionnaires were sent, and 80 of them were completed. The overall response rate is 40%. Among the respondents, 47.50% of the respondents work for consultants, 43.75% of the respondents work for contractors. 5.00% and 3.75% of the respondents work for private developers and public sectors respectively. According to Love (2002) and Love et al. (2005), '*data reliability is related to data source, and the identification of the position held by the person who completed the questionnaire*'. It was important that the respondents have extensive experience in construction negotiation. In this questionnaire survey, more than half of the respondents have a minimum of five-year experience in construction negotiation.

Data Analysis

As discussed previously, each respondent answered three major sets of questions for each of the three aforementioned elements: (1) personality traits, (2) negotiating behaviors and (3) negotiation outcomes. Based on the scoring system of John et al. (1991), every item of BFI represents a Big Five Dimension (Appendix refers). By averaging the scores obtained for each Big Five Dimension, the average score, known as personality score, can be computed. Table 4 summarizes the personality scores of the respondents.

< Table 4 here >

Furthermore, the underlying structure in the dataset for negotiating behaviors and negotiation outcomes were defined by developing their respective factors. To achieve this, Principle Component Factor Analysis (PCFA) was adopted to explore the structure on inter-relationships of the data to define a set of common underlying constructs (which is known as factors) (Hair et al. 1998), and to summarize the data for further analysis works.

Moderating Effects of Personality Traits

Based on the above results, moderating effects of personality traits can be examined. A statistical technique called Moderated Multiple Regression (MMR) is employed. MMR is well-established quantitative method to examine the effect of an independent variable on an independent-dependent variable relationship (Hair et al. 1998). The early applications of MMR in social science were included in the area of psychology (Cronbach 1987; Lim and Carnevale 1990) and marketing (Sharma et al. 1981). Mathematically, it is explained by the inclusion of a moderating term (XZ) to a multiple regression model (Jaccard et al. 1990; Cohen et al. 2003). The relationship suggests in MMR can be reduced to an equivalent form as follows: -

$$Y = b_0 + b_1X + b_2Z + b_3XZ + \varepsilon \quad \text{..(1)}$$

where,
Y = dependent variable; X and Z = independent variables; XZ = moderating term; a, b_1, b_2 = unknown constant and ε = random error for any given set of values for X and Z.

Moderating effect occurs when a moderator variable changes the form of the relationship between another independent variable and the dependent variable, i.e. the predictive power of X on Y depends on Z. In this study, MMR model was built up in similar manner. The dependent variable (Y) and independent variable (X) are negotiation outcomes and negotiating behavior respectively. This relationship is then hypothesized to be moderated by personality trait (Z) (Figure 2 refers).

< Figure 2 here >

To analyze each MMR models, a three-step approach suggested by Jaccard et al. (1990) and Cohen et al. (2003) was adopted: (1) testing for the presence of moderating effects of personality traits; (2) evaluating the strength of the moderating effects of personality traits, and (3) specifying the natures of the moderating effects of personality traits. A detailed description of the MMR can be found in the works of Cohen and Cohen (1983), Jaccard et al. (1990) and Sharma et al. (1981).

RESULTS AND DISCUSSIONS

Factors of negotiating behaviors and negotiation outcomes

For each PCFA, the suitability of data was first evaluated by examining the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The KMO values for the two PCFA are 0.607 and 0.659 for the factors of negotiating behaviors and negotiation outcomes respectively. These values are all above the threshold requirement of 0.5 (Holt 1997;

Cheung et al. 2000). Moreover, the low significances of the Bartlett test of sphericity suggest the adequacy of the data set to perform PCFA. Based on the commonly used criterion of eignvalue-greater-than-one principle and Varimax rotation, meaningful factor structures were obtained. The final factor matrices are given in Tables 5 and 6. Based on these factors, factor scales were computed for the use of next section – to examine the moderating effects of personality traits. According to Hair et al. (1998), these factor scales are the composite measures for each observation on each factor extracted in the PCFA. Therefore, five and four factor scales are computed for the factors of negotiating behaviors and negotiation outcomes respectively.

< Table 5 here >
< Table 6 here >

Generally, the factors of negotiating behaviors somehow match the theoretical constructs of Rahim (1983)'s conflict-handling behaviors. Similar to the previous study of Cheung et al. (2006), dysfunctional (e.g. Win-lose agreement_ and functional (e.g. Mutual, entirely satisfactory agreement, time-saving and conflict reduction) were identified for the factors of negotiation outcomes.

Moderated Multiple Regressions

To perform MMR, negotiating behaviors, negotiation outcomes, and personality traits were used as predictors, criteria, and the moderator variable respectively (Cohen et al. 2003; Jaccard et al. 1990). Based on the results obtained from previous section, a total of 100 (5 x 4 x 5) MMR models (which devised from the five, four and five factor scales for negotiating behaviors, negotiation outcomes and personality traits respectively).

(1)Testing for the presence of moderating effects

The presence of significant moderating effects can be identified if the inclusion of moderating term (i.e. XZ) produces a significant change in the R^2 value (Jaccard et al. 1990). F-tests are applied to each MMR model at different significance level ($\alpha = 0.10$, $\alpha = 0.05$ and $\alpha = 0.01$). Results of the MMR analyses showed that 16 out of 100 MMR models were found to be statistically significant (Table 7 refers).

< Table 7 here >

The significant moderating effects of personality traits reveal that the combination of personality traits and negotiating behaviors may be particularly advantageous or disadvantageous in producing certain negotiation outcomes (Pedhazur 1982). This nature of moderating effects is to be elaborated in this section.

(2) Evaluating the strength of the moderating effects

As suggested by Jaccard et al. (1990), strength of moderating effects can be measured by an "eta-squared-like" statistic. The ΔR^2 of the 16 significant MMR models are given in Table 7. Among the 16 significant MMR models, Model 3 yielded the largest ΔR^2 of 0.286, which accounts for 28.6% of the variance in the prediction of negotiation outcomes. With this method, Models 3, 13, 12, 9 and 8 are found to be the top five MMR models with relatively strong moderating effects of personality traits. The values of ΔR^2 yielded for each of these models are 0.286, 0.184, 0.165, 0.164 and 0.151 respectively. These top five MMR models are used to examine the natures of the moderating effects.

(3) Specifying the natures of the moderating effects

Of the top five MMR models with relatively strong moderating effects, it is of interest to specify the nature of moderating effects of personality traits. To achieve this, the coefficient of the moderating term, b_3, shall be examined (Jaccard et al. 1990; Cohen et al. 2003; Pedhazur 1982). These coefficients are given in Table 7. It represents the number of units that the slope of Y (i.e. negotiation outcomes) on X (i.e. negotiating behaviors) changes, given a one-unit change in Z (i.e. personality traits) (Jaccard et al. 1990). To give a clear presentation, regression lines have been plotted for the regression of Y and X for any given value of Z. The value of Z is commonly defined as 'low' and 'high' values. The 'low' and 'high' values are defined as one standard deviation below and above the mean respectively Jaccard et al. (1990). Taking Model 3 as an example, the regression lines can be obtained:-

$Y_{NO(low)} = 1.151 + 0.767X_{DA(low)} + \varepsilon$ ……..…….(2)

$Y_{NO(high)} = 4.264 + 0.143X_{DA(high)} + \varepsilon$ …….(3)

where $Y_{NO(low)}$ and $Y_{NO(high)}$ are the 'low' and 'high' values of negotiation outcome - mutual entirely satisfactory agreement respectively; $X_{DA(low)}$ and $X_{DA(high)}$ are the 'low' and 'high' values of negotiating behavior – distributive approach.

With the above approach, the regression equations for the Models 13, 12, 9 and 8 can also be computed. Due to the limitation of the manuscript length, theses equations were not reported. Instead, all of the regression equations were depicted in graphic presentation (Figures 3-7 refer). When there is no moderating effect between the variables, the regression line would all be parallel. As shown in Figures 3 – 7, all regression lines are not parallel, this is expected since the existence of moderating effects of personality traits

have been shown in the previous section. Furthermore, it is observed that the regression line for one group intersects with the corresponding regression line for the other group within the range being studied. Theoretically, this is called disordinal interaction (and also called crossover interaction) (Pedhazur 1982). It suggests that a discontinuity in the moderating effects of personality traits is present on the relationships between negotiating behaviors and negotiation outcomes, i.e. the moderating effect of personality trait is not constant. The rank order of moderating effect changes depending on specific pairings. With the use of Figures 3-7, the followings are the further elaborations:-

Moderating Effects of Extraversion:

As discussed previously, a relatively strong moderating effect of extraversion is detected in the Model 3. The nature of its moderating effect can be demonstrated by the Figure 3. In this figure, a demarcation line is assigned on the intersection point of the regression lines. The left of this line is described as the 'effective zone of extraversion'. Within this zone, the moderating effect of the personality trait – extraversion can effectively facilitate to the achievement of positive negotiation outcome. When the degree of adopting dominating approach corresponds to the score of the intersection point, the level of achieving mutual entirely satisfactory agreement is predicted to be the same for low or high degree of extraversion. If this score falls, i.e. reaches the effective zone of extraversion, the degree of achieving mutual entirely satisfactory agreement is predicted to be higher under a high degree of extraversion than low degree of extraversion. When the degree of adopting dominating approach decreases, negotiators tend to concern the needs and expectations of their negotiating parties. Extraverts, who are more outgoings

and sociable, would help to facilitate better communication and interaction (John and Srivastava 1999).

< Figure 3 here>

Moderating Effects of Openness

The natures of moderating effect of the personality trait - openness can be discerned by Figure 4 (Model 13) and Figure 5 (Model 12). Similarly, demarcation lines are assigned on the intersection point of the regression lines. In Figure 4, the right of this line is described as the 'effective zone of openness'. This means that the moderating effect of the personality – openness can effectively facilitate to the achievement of mutual entirely satisfactory agreement within this effective zone. When the degree of adopting integrative approach increases, the degree of achieving mutual entirely satisfactory agreement is predicted to be higher under a high degree of openness than low degree of openness. This is due to the fact that integrating approach involves active collaboration between the negotiating parties (Rahim and Shapiro 2000). This approach has two distinctive elements: confrontation and problem solving (Prein 1976). Confrontation involves open and direct communication that should make way for problem solving, which may lead to creative solutions to problems (Rahim and Shapiro 2000). The personality traits of openness involves active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety and intellectual curiosity (Costa and McCrae 1992), this type of negotiator would help to create a creative, and mutual satisfactory agreement.

As distributive approach contrasts with integrative bargaining (Fisher and Ury 1991), the result obtained from model 12 (Figure 5 refers) is similar to model 13 (Figure 4 refers).

In model 12, the effective zone of openness shows that when the degree of adopting distributive approach decreases, a high degree of openness can effectively facilitate the achievement of time-saving negotiation outcome. In this situation, negotiators would tend to adopt an integrative approach by abandoning the 'fixed-pie' view, and avoiding win-lose situation.

< Figure 4 here >
< Figure 5 here >

Moderating Effects of Conscientiousness

Figures 6 and 7 specify the nature of moderating effects of the personality trait – conscientiousness for Models 9 and 8 respectively. Demarcation lines and effective zone of conscientiousness are assigned for both models. In these Figures, the effective zone suggests that the degree of reaching win-lose agreement is predicted to be lower under high degree of conscientiousness than low degree of conscientiousness. Specifically, when the degree of compromising approach increases, negotiators with high degree of conscientiousness would help to lower the chance of achieving win-lose agreement (Figure 6 refers), In fact, this finding is rather self-explanatory. Negotiators with personality trait of conscientiousness are self-discipline, carefulness, thoroughness, organization and deliberation (John and Srivastava 1999; Goldberg 1992). Those adopt compromising approach would be benefited because this personality trait can help to splitting the difference, and to make a smart decision to mitigate win-lose agreement, and offer concessions resulting in middle-ground positions (Hammock et al. 1990). Moreover, the degree of reaching win-lose agreement is predicted much lower under a high degree of conscientiousness than low degree of conscientiousness for a given degree of adopting dominating approach (Figure 7 refers). This means that negotiators with high degree of

conscientiousness would substantially reduce the likelihood of reaching win-lose agreement during negotiation, and attempts to rebut the traditional view that dominating approach is a win-lose orientation (Rahim and Shapiro 2000).

< Figure 6 here >
< Figure 7 here >

CONTRIBUTIONS TO THEORY AND PRACTICE

In construction, negotiation is a non-technical survival skill. It is seldom learnt by construction practitioners as a formal education process but rather through hard experience. This study aims at improving our understanding on this skill from a behavioral perspective that specifically examines how personality traits of negotiators affect their behavior and outcomes. The results obtained from this study provide construction organizations with indicators to which type of personality traits can help to improve negotiation outcomes and to optimize the overall performance of construction dispute negotiation. Generally, this study has two main contributions to extant theory. First, this study provides an in-depth analysis of how personality traits affect negotiating behaviors and negotiation outcomes in the field of construction dispute negotiation. It adds depth to the study of construction negotiation, and adds breadth to the study of Varvel et al. (2004), Carr et al. (2002), Culp and Smith (2001) and Johnson and Singh (1998). Based on the results obtained from the previous and current studies, construction practitioners and academics are expected to draw attention to the implications of personality traits on team effectiveness and performances and negotiation outcomes. In this study, the findings show that the personality traits of extraversion, openness and conscientiousness can have positive effect to the prediction of positive negotiation

outcomes at their respective effective zones. Future researchers can conduct a series of comparative studies that particularly explore differences in negotiation outcomes among negotiators with these three personality traits. Specifically, hypothetical cases or real negotiation situations can be used to differentiate what they get in negotiation table. To help construction negotiators to improve their skill, the entire negotiation process can be recorded. The styles, tactics and behaviors used by the negotiators with each of these three personality traits shall be able to present a detailed analysis of these personality traits for construction professionals. Moreover, further research of personality can cover a wide range of topic in the field of construction engineering and management. Particularly, with the dynamic nature of construction dispute negotiation, one of the new directions in current research would be focused on studying the interactions of mixed personality traits within a negotiation team through dyadic analysis.

Furthermore, the top five significant MMR models (Figures 3-7 refer) can act as guidelines for the construction practitioners. They can apply them to their daily negotiation tasks. For instance, these models advised the construction practitioners with similar personality traits to improve themselves through appropriate adjustment in negotiating behaviors. These guidelines are summarized as below:-

(1) To facilitate the achievement of mutual entirely satisfactory agreement, this study provides two advice to construction practitioners:

    (a) negotiators with a high degree of extraversion were advised not to adopt a dominating approach during negotiation (Figure 3 refers), and

    (b) negotiators with a high degree of openness shall adopt an integrative approach (Figure 4 refers).

(2) To facilitate the achievement of time-saving in negotiation:

(a) negotiators with a high degree of openness were advised to adopt an appropriate degree of distributive approach (Figure 5 refers).

(3) To minimize the chance of reaching win-lose agreement:-

(a) negotiators with a high degree of conscientiousness were advised to adopt a high degree of compromising approach (Figure 6 refers) or a low degree of dominating approach (Figure 7 refers).

Furthermore, as shown in Table 7, the most versatile moderating variables are found to be the personality traits of extraversion and openness. This is supported by the number of significant moderating effect displaying in the relationships between negotiating behaviors and positive negotiation outcomes (i.e. Mutual Entirely Satisfactory Agreement, Time-saving and Conflict Reduction). As such they appear to be the most effective personality traits which can potentially facilitate the achievement of positive outcomes in construction negotiation. Interestingly, one of the reviewers suggested that any personality traits can be effective in any situation. Perhaps this may be easily achieved by the experienced construction negotiators who are able to change their own habitual characteristics to improve the effectiveness of negotiation. This shall offer fruitful direction for further research to clarify and extend this proposition in the field of construction negotiation. A sound reference can be found from the 'contingency models of leadership' of Fiedler (1964).

Second, there is also a contribution to methodology in this study. Follow to the adoptions of Myers-Briggs Type Indicator (MBTI) for the four major studies of Varvel et al. (2004), Carr et al. (2002), Culp and Smith (2001) and Johnson and Singh (1998), this study

introduced the Big Five Personality Model that offers a unique tool to measure five major personality traits in the field of construction dispute negotiation. This helped to theorize the role of personality on negotiation, and to make widespread interpretation of research findings (Carr et al. 2002).

ACKNOWLEDGEMENT

The authors would like to acknowledge the efforts of editor and reviewers to review this manuscript. The work described in this paper was fully supported by a grant from City University of Hong Kong (Project No. 7200105).

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Appendix: Sample of Questions for Measuring Personality Traits (Modified from Big Five Inventory of John et al. (1991)

Consider a recent completed negotiation case, evaluate the degree of agreeableness of the following statements:

During negotiation, I see myself as Someone Who…

PT1 Is talkative[E].
PT2 Tends to find fault with your counterparts[A-R].
PT3 Does a thorough preparation[C].
PT4 Is depressed and sad when your negotiation goal cannot be achieved[N].
PT5 Is original, comes up with new ideas to reach desired negotiation outcomes[O].
PT6 Is reserved[E-R].
PT7 Is helpful and unselfish with your team member and your counterparts[A].
PT8 Can be somewhat careless in negotiation process[C-R].
PT9 Is relaxed, handles stress well[N-R].
PT10 Is curious about many different things during negotiation[O].
PT11 Is full of energy to carry out the negotiation[E].
PT12 Starts quarrels with your counterparts when they are having different point of view[A-R].
PT13 Is a reliable negotiator[C].
PT14 Can be tense[N].
PT15 Is ingenious, a deep thinker to deal with conflict[O].
PT16 Generates a lot of enthusiasm to settle the dispute[E].
PT17 Has a forgiving nature to your counterparts under conflict situation[A].
PT18 Tends to be disorganized the negotiation process[C-R].
PT19 Worries a lot about negotiation outcomes[N].
PT20 Has an active imagination to think about alternatives[O].
PT21 Tends to be quiet[E-R].
PT22 Is generally trust your counterparts[A].
PT23 Tends to be lazy to response and conduct the negotiation[C-R].
PT24 Is emotionally stable, not easily upset for the negotiation outcomes[N-R].
PT25 Is inventive to create alternatives to the settlement[O].
PT26 Is assertive[E].
PT27 Can be cold to the your counterparts[A-R].
PT28 Perseveres until the negotiation is finished[C].
PT29 Can be moody during negotiation[N].
PT30 Is sometimes shy, inhibited to your counterparts[E-R].
PT31 Is considerate and kind to almost everyone in a negotiation[A].
PT32 Conduct a negotiation efficiently[C].
PT33 Remains calm in tense situations[N-R].
PT34 Prefers negotiations that are always similar without tricks[O-R].
PT35 Is outgoing, sociable during negotiation[E].
PT36 Is sometimes rude to your counterparts[A-R].
PT37 Makes plans and follows through with your counterparts[C].
PT38 Gets nervous easily during negotiation[N].
PT39 Likes to reflect, play with ideas when negotiating[O].
PT40 Likes to cooperate with your counterparts[A].
PT41 Is easily distracted when negotiating[C-R].

Remark:-
E = Extraversion
A = Agreeableness
C = Conscientiousness
N = Neurotocism
O = Openness
"R = reverse-scored items for scoring"

Figures and Tables

Table 1. Brief descriptions of Big Five Dimensions (John and Srivastava 1999; Costa and McCrae 1992; Boele and Marco 2002; Matthews and Deary 1998)

Big Five Dimensions	Brief Descriptions
1. Openness	Intellectual, imaginative, independent-minded, attentiveness to inner feelings, preference for variety and intellectual curiosity.
2. Conscientiousness	Painstaking, careful, orderly, responsible and dependable (includes the element of self-discipline, dutifulness, thoroughness, organization, deliberation and need for achievement.
3. Extraversion	Talkative, assertive and energetic
4. Agreeableness	Good-natured, cooperative (concern with interpersonal relationships) and trustful.
5. Neuroticism	Enduring negative emotional states (anxiety, anger, guilt and clinical depression).

Table 2. List of negotiating behaviors

Code	Negotiating Behaviors*	References
NB1	Try to insist on agreeing and accepting your demands	Katz and Kochan (2000); Walton and McKersie (1965); Carrell and Heavrin (1998); Hartley and Stephenson (1992)
NB2	Try to take some works to identify both parties interest.	
NB3	Try to change the minds of your counterparts when facing different points of view.	
NB4	Try to influence your counterpart's own decision.	
NB5	Try not to care the negotiation outcomes which may harm the relationship	
NB6	Try to seek internal consensus before weighing external consensus from your counterpart.	
NB7	Try to avoid argument in the future.	
NB8	Try to spend much time to seek internal consensus.	
NB9	Try to sacrifice some goals in order to satisfy both parties.	
NB10	Try to use trick to get an agreement when deadline is approaching.	
NB11	Try to reach an agreement that can enhance level of trust and respect between both parties.	
NB12	Try to tell about your own interest to your counterparts.	
NB13	Try to estimate the bottom line of your counterparts before negotiation.	
NB14	Try to create some conflicts.	
NB15	Try to solve conflict with your counterparts.	
NB16	Try to organize some social activities to create friendliness before negotiation.	
NB17	Try to avoid making decision.	
NB18	Try to cater for and cooperate with your counterpart's interest.	
NB19	Try not to care what the counterpart's benefits at the end of the negotiation.	
NB20	Try to disturb the negotiation process.	
*Negotiating behaviors were rated on a scale from (1) not adopted to (7) highly adopted		

Table 3. List of Negotiation Outcomes

Code	Negotiating Outcomes*	References
NO1	Innovation, creativity and growth in negotiation team were	Friedman et al. (2000); Gross and Guerrero (2000); Carnevale and Pruitt (1993); Rahim (2002); Rahim et al. (2000)
NO2	Stress and dissatisfaction cause negotiator felt defeat.	
NO3	Communications between both negotiating parties were	
NO4	Hostility, distrust and suspicion were developed.	
NO5	Negotiating teams' ability of decision making was	
NO6	A beneficial negotiation outcome was created.	
NO7	Waste of resources (e.g. time and labour force) due to the	
NO8	Creative ideas or proposals were stimulated.	
NO9	Information exchange was reduced due to mistrust and fake	
NO10	Win-win negotiation outcomes were not achieved.	
NO11	The conflict level was reduced.	
NO12	Stalemate, deadlock or impasses was resulted.	
NO13	The time spent on generating the solutions was reduced.	
NO14	Some of the negotiation issues were postponed until a better	
NO15	Less future disputes were likely to be made.	
NO16	Trust was developed between the negotiating parties was achieved.	
*Negotiation outcomes were rated on a scale from (1) not achieved to (7) highly achieved		

Table 4. Personality scores of the respondents

Big Five Dimensions	**Personality Scores***
Openness	4.52
Conscientiousness	4.53
Extraversion	4.59
Agreeableness	4.39
Neuroticism	4.21

*Maximum score = 7.00

Table 5. Factor of negotiating behaviors

Factor 1: Distributive Approach		**Factor Loadings**				
		1	**2**	**3**	**4**	**5**
NB3	Try to change the minds of your counterparts when facing different points of view.	.781	.153	.197	-.076	.048
NB1	Try to insist on agreeing and accepting your demands	.757	-.137	-.118	-.033	.041
NB5	Try not to care the negotiation outcomes which may harm the relationship between	.747	-.087	-.016	.061	-.083
NB2	Try to take some works to identify both parties interest.	.710	.066	.167	.209	.190
NB10	Try to use trick to get an agreement when deadline is approaching.	.441	.293	.139	.272	.403
NB19	Try not to care what the counterpart's benefits at the end of the negotiation.	.418	-.383	.211	-.375	.393
NB15	Try to solve conflict with your counterparts.	.379	-.044	.251	.142	.336
Factor 2: Dominating Approach						
NB4	Try to influence your counterpart's own decision.	.086	.775	.104	-.127	-.004
NB14	Try to create some conflicts.	.224	-.686	.150	.008	.196
NB7	Try to avoid argument in the future.	.094	.671	-.048	.050	.196
NB11	Try to reach an agreement that can enhance level of trust and respect between both parties.	.176	.594	.333	-.027	.086
NB20	Try to disturb the negotiation process.	.144	-.493	-.115	-.019	.339
Factor 3: Integrative Approach						
NB13	Try to estimate the bottom line of your counterparts before negotiation.	.174	-.009	.764	-.009	.191
NB12	Try to tell about your own interest to your counterparts.	.059	.121	.603	.151	-.100
NB17	Try to avoid making decision.	.082	-.097	-.591	.520	.067
Factor 4: Compromising Approach						
NB18	Try to cater for and cooperate with your counterpart's interest.	-.089	-.197	-.007	.811	.163
NB9	Try to sacrifice some goals in order to satisfy both parties.	.357	.128	.184	.710	-080
Factor 5: Postponing						
NB8	Try to spend much time to seek internal consensus.	-.014	-.058	-.028	.035	.751
NB6	Try to seek internal consensus before weighing external consensus from your counterparts.	.435	.277	-.413	-.090	.471
NB16	Try to organize some social activities to create friendliness before negotiation.	-.005	-.400	.273	.350	.444

Table 6. Factor of negotiation outcomes

		Factor Loadings			
Factor 1: Win-lose agreement		**1**	**2**	**3**	**4**
NO3	Communications between both negotiating parties were reduced.	.736	-.189	.303	.123
NO10	Win-win negotiation outcomes were not achieved.	.715	.082	-.033	-.010
NO7	Waste of resources (e.g. time and labour force) due to the poor performance of negotiators.	.696	-.045	-.121	.106
NO4	Hostility, distrust and suspicion were developed.	.689	-.151	.090	-.227
NO2	Stress and dissatisfaction cause negotiator felt defeat.	.601	.262	.397	.277
NO9	Information exchange was reduced due to mistrust and fake information.	.558	.463	.077	-.256
NO12	Stalemate, deadlock or impasses was resulted.	.481	.168	-.474	.238
Factor 2: Mutual, entirely satisfactory Agreement					
NO16	Trust was developed between the negotiating parties was achieved.	-.129	.743	-.231	.203
NO5	Negotiating teams' ability of decision making was improved.	-.132	.680	.211	.028
NO8	Creative ideas or proposals were stimulated.	.103	.680	.204	-.263
NO1	Innovation, creativity and growth in negotiation team were stimulated.	.331	.675	.160	.227
NO6	A beneficial negotiation outcome was created.	.004	.526	.349	.487
NO15	Less future disputes were likely to be made.	-.011	.449	.040	-.074
Factor 3: Time-saving					
NO14	Some of the negotiation issues were postponed until a better time.	.235	.090	.729	.043
NO13	The time spent on generating the solutions was reduced.	-.065	.390	.675	.013
Factor 4: Conflict Reduction					
NO11	The conflict level was reduced.	.035	-.089	-.023	.825

Table 7 The 16 significant MMR model

		Negotiation Outcomes											
		Win-lose Agreement (NO_{NA})			Mutual Entirely Satisfactory Agreement (NO_{SA})			Time-saving (NO_{TS})			Conflict Reduction (NO_{CR})		
		b_3	ΔR^2	*F*	b_3	ΔR^2	*F*	b_3	ΔR^2	*F*	b_3	ΔR^2	*F*
Model(s)	**Negotiating Behaviors**												
	Distributive Approach												
1,2	**× Extraversion**							-.286	.087	.032**	.298	.149	.018**
5	**× Agreeableness**										-.620	.131	.044**
11,12	**× Openness**	.234	.108	.023**				-.451	.165	.001***			
	Dominating Approach												
3	**× Extraversion**				-.418	.286	.030**						
8	**× Conscientiousness**	.883	.151	.014**									
	Integrative Approach												
10	**× Neuroticism**										-.602	.033	.036**
13	**× Openness**				.313	.184	.047**						
	Compromising Approach												
7	**× Agreeableness**							.669	.090	.009***			
9	**× Conscientiousness**	-.261	.164	.040**									
14	**× Openness**							-.490	.110	.007***			
	Postponing												
4,5	**× Extraversion**	.306	.051	.039**				-.471	.087	.014**			
15,16	**× Openness**	.326	.058	.048**				-.536	.084	.012**			

p< .100*, p< .050** and p< .010***.

How do personality traits affect construction dispute negotiation? Study of Big Five Personality Model

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2011-03-01