Personality and cognitive style as predictors of preference for working in virtual teams

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ABSTRACT

This study tests the effects of personality and cognitive style on preference of individuals for working in virtual teams. The results support the use of both personality and cognitive style as predictor variables with each uniquely contributing to two facets of virtual team preference, namely preference for virtual teams over working alone and preference for virtual teams over traditional groups. Results are discussed regarding the impact of cognitive style and personality for corporate implementation of virtual teams.

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1. Introduction

A virtual team is defined as a group of people with unique skills who work interdependently but are separated geographically which necessitates their interacting using technology (Lipnack & Stamps, 2000). Thus, virtual teams allow members to accomplish specific tasks while transcending traditional restrictions of time and proximity (Montoya, Massey, & Lockwood, 2011; Townsend, DeMarie, & Hendrickson, 1998). Consequently, virtual teams differ from face-to-face teams in that members are physically separated from one another and they rely on technological devices for communication and information exchange (D'Souza and Colarelli, 2010). Virtual teams have become commonplace in large organizations, with one study reporting that 50% of all companies with more than 5000 employees incorporate virtual teams as vehicles for conducting work (Martins, Gilson, & Maynard, 2004). Various issues related to virtual teams have been investigated including effectiveness (Furst, Blackburn, & Rosen, 1999; Maznevski & Chudoba, 2000), trust (Jarvenpaa, Knoll, & Leidner, 1998; Sarker, Valacich, & Sarker, 2003), and adaptation (Majchrzak, Rice, Malhotra, King, & Ba, 2000).

Recent research has begun to examine issues surrounding the selection of virtual team members. A study by D'Souza and Colarelli (2010) found that the skills one brings to a team are a more important selection criteria for virtual team membership than for face-to-face team membership, but that personal characteristics

(attractiveness, race, gender, and attitudinal similarity) are more important criteria for selecting face-to-face teams members, as self-reported by team members. What remain unexplored are the factors that predict why someone would want to be a member of a virtual team. The purpose of this study is to fill this gap in the literature on virtual teams.

The two major differences between virtual and face-to-face teams offer insight into this question. Traditional explanations for why people would want to work in a team focus around personal characteristics. Simply put, we prefer working with those who are physically attractive (Patzer, 2006) and/or who are similar to ourselves in terms of race (Wade & Okesola, 2002), gender (Colarelli, Spranger, & Hechanova, 2006) and attitudes (Byrne, 1971). However, since virtual teams do not meet face-to-face, we must look elsewhere for predictors of virtual team preference. The fact that virtual teams rely on computer mediated communication suggests that how one feels about using technology to communicate may play a role in virtual team preference.

Early research on information systems identified personal factors as important determinants of successful IS implementation and adoption (Lucas, 1981). These personal factors were of a dispositional nature and included personality and decision (cognitive) style. Research has looked at the effects of personality (Landers & Lounsbury, 2006; Zmud, 1979) and cognitive style (see Huber (1983) and Robey (1983), for a debate on the role of cognitive style.) as well as on their comparative effects (McElroy, Hendrickson, Townsend, & DeMarie, 2007) on one form of computer mediated communication, Internet use. We build off of this literature by examining the respective roles played by personality and cognitive style as determinants of preference for working in virtual teams.

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Personality and cognitive style have already been shown to be important predictors of team member attitudes within the virtual team environment. For example, personality traits have been argued to affect individual trust among team members and willingness to collaborate in virtual teams (Brown, Poole, & Rodgers, 2004) as well as readiness to adopt collaboration technology (Vreede, Vreede, Ashley, & Reiter-Palmon, 2012). Moreover, cognitive style has also been argued to be a significant predictor of the effectiveness of computer-mediated knowledge sharing among team members (Taylor, 2004).

One avenue which has not yet been explored is the connection between personality and cognitive style, and the relative contribution of both factors towards *preference* for participating in virtual teams. Our purpose is not to delineate how specific components of personality or cognitive style influence virtual team preference, but rather the collective role played by each of these dispositional factors. Understanding individual preferences for participating in virtual teams is important in that by preemptively selecting or assigning those individuals who prefer working in such teams organizations can minimize resistance and other problems that may occur after virtual team implementation.

2. Background

2.1. Personality

Personality is a stable pattern of psychological processes, characteristics, and tendencies arising from motives, feelings, and cognitions which can be used to determine individual commonalities and differences in thoughts, feelings and actions (Maddi, 1989; Mayer, 2005). One way in which personality has been described is in terms of traits. These traits serve as measures of individual dispositions as well as comparative mechanisms of individual differences (Allport, 1966). Various instruments have been developed to measure individuals based on certain specified trait dimensions. Recently, research has shown that several of these measures are related hierarchically with each providing a varying degree of abstractness (Markon, Krueger, & Watson, 2005).

Among the contemporary measures of personality, the Big Five model has proven to be a robust and useful tool for understanding personality among individuals. The Big Five is based on the lexical hypothesis, which posits that socially relevant and salient personality characteristics are embedded in natural language (Allport, 1937; John, Angleitner, & Ostendorf, 1988; Saucier & Goldberg, 1996). The Big Five structure has been extensively tested using disparate samples in various contexts for a number of years, providing substantial evidence of its merits as a measure of individual personality and personality differences (see John, Naumann, & Soto (2008) for an extensive review of the history of the Big Five factor model).

Within the Big Five, *extraversion* represents sociability, cheerfulness, and optimism with extraverts seeking out new opportunities and excitement. *Neuroticism* represents a lack of psychological adjustment with high negative emotional stability. Neurotic individuals are typically fearful, sad, embarrassed, distrustful, and have a difficult time managing stress. *Agreeableness* represents a tendency to be sympathetic, good-natured, cooperative, and forgiving with highly agreeable people tending to help others more readily. *Conscientiousness* represents the tendency to be self-disciplined, strong-willed, reliable, and deliberate with conscientious people actively planning, organizing, and carrying out tasks. *Openness* represents curiosity and willingness to explore new ideas with open individuals tending to devise novel ideas, hold unconventional values, and question authority (Costa & McCrae, 1992).

Recent research has linked personality traits to socio-technical characteristics of virtual teams. For example, personality traits have been argued to affect individual disposition to trust (as it does in face to face teams) and willingness to collaborate in the computer-mediated communication environment used by virtual teams. Research finds that individuals high in affiliation exhibit higher levels of trust in virtual collaboration (Brown et al., 2004). Also, four of the five Big Five measures (minus neuroticism) were found to correlate with subjects' ease of transition to collaboration technologies, with extroversion negatively correlated, while agreeableness, openness, and conscientiousness had a positive correlation with the ease of transition construct (Vreede et al., 2012). Extraversion (from the Big Five instrument) was found to be related to both the nature of group interactions and to the actual performance of virtual teams. Virtual teams with either high levels of extraversion or high variation in extraversion between team members had less constructive interaction styles within teams (Balthazard, Potter, & Warren, 2004). Personality-based trust was also found to affect overall trusting motives in a virtual team environment (Sarker et al., 2003). Higher levels of extraversion and agreeableness were found to lead to shorter pauses, and therefore greater trust, among virtual team members in technology assisted communication (Kalman, Scissors, & Gergle, 2010). Furthermore, using meta-analysis techniques, team performance was found to be positively affected by all five dimensions in the Big Five model (where emotional stability is utilized as opposed to neuroticism) (Bell, 2007; Mathieu, Maynard, Rapp, & Gilson, 2008).

While none of these studies juxtapose the personality differences between successful face to face and virtual team members, they do underscore that the socio-technical environment of the virtual team is distinct from the face to face team, and that there are personalities that perform better within this distinct environment. Since the personality requirements for a virtual team are demonstrably distinct, an examination of the impact of personality on individual preference for the virtual environment allows us to assess if an individual's personality profile also directs their disposition toward the virtual work environment. Therefore, we hypothesize:

H1. Personality will explain variation in preference for working in virtual teams.

2.2. Cognitive style

Cognitive style refers to a broad range of theory related to information processing and decision-making among individuals (Armstrong, Peterson, & Rayner, 2011; Ausburn & Ausburn, 1978; McElroy et al., 2007; Messick, 1976). There are a number of measures of cognitive style, such as the Kirton Adaption Innovation (KAI) instrument (Kirton, 1989), the Cognitive Style Index (CSI) (Allinson & Hayes, 1996), and the Kolb Learning Style Inventory (KLS) (Smith & Kolb, 1986). The Myers-Briggs Type Indicator (MBTI) is an omnibus instrument used to capture Jung's (1921) conceptual cognitive style dimensions (Wheeler, Hunton, & Bryant, 2004) and is a (at least partial) theoretical antecedent to the CSI (Allinson & Hayes, 1996), the KAI (Kozhevnikov, 2007), and the KLS (Isaksen, Lauer, & Wilson, 2003). Despite criticism on its psychometric properties (Boyle, 1995; Gardner & Martinko, 1996) and length (Allinson & Hayes, 1996), the MBTI has undergone extensive validity and reliability assessments (Harvey, 1996) and is widely used. The MBTI is designed to measure individual preferences in how people apprehend and process information (Myers, 1995), which lends itself nicely to business environments including decision-based environments such as team-work.

The MBTI consists of four dimensional pairs combining to form 16 possible psychological types. The *extraversion/introversion* dimension refers to the outward or inward attitudes of the individual with extroverts drawing energy from action while introverts prefer reflection and time alone to reenergize.[1] The *sensing/intuition* dimension refers to how new information is understood and interpreted with sensing individuals preferring concrete, tangible facts while individuals prone towards intuition trust information that is more abstract or theoretical. The *thinking/feeling* dimension refers to how decisions are made with thinkers employing a more detached, logical perspective while feelers tend to associate or empathize with the situation. Finally, the *judging/perception* dimension refers to individual preference when relating to decision making and the external world with judgers preferring matters to be settled while perceivers prefer to keep decisions open (Myers & McCaulley, 1985).

Substantial research has linked MBTI measures of cognitive style to decision-making and organizational processes. For example, the MBTI was found to influence the type of ideas in group idea generation (Garfield, Taylor, Dennis, & Satzinger, 2001). The MBTI has also been shown to have a significant impact on overall team project results with extroverted, thinking, judging members showing better overall results (Peslak, 2006). With regards to virtual teams, cognitive style has been shown to have a significant impact on learning effectiveness in virtual environments (Chen & Macredie, 2002). Also, cognitive style has been shown to impact computer-mediated knowledge sharing among organizational team members with analytical thinkers showing higher use of data mining software and knowledge management systems (Taylor, 2004). Finally, in a test of MBTI factors on performance among teams in face to face or computer-mediated communication scenarios Barkhi (2002), different cognitive styles were associated with different reactions to the two communication environments.

The above studies suggest that cognitive style has utility as a determinant of various aspects of preferences and abilities relevant to virtual teams, and thus those preferences may affect an individual's preference for virtual teamwork. Therefore, we hypothesize:

H2. Cognitive style will explain variation in preference for working in virtual teams.

Huber's (1983) debate with Robey (1983) pertaining to the role of cognitive style in the context of technology called for abandoning cognitive style as a determinant of IS design due to the lack of explanatory power. While no research has compared the predictive power of both personality and cognitive style in the context of virtual teams, McElroy et al. (2007) compared the relative contribution of each in the context of on-line shopping behavior, finding personality to have greater explanatory power as compared to cognitive style. In this research we do not examine the specific role of each personality trait or cognitive style type, but instead seek to determine the relative contribution of personality versus cognitive style as antecedents of virtual team preference. Since we are examining subjects' thoughts and feelings about the virtual team envi-

ronment, we expect that personality will predict more variance in preference than cognitive style given personality's usefulness in gauging thoughts, motives, and feelings (Maddi, 1989; Mayer, 2005) as compared to cognitive style which focuses on information processing and decision-making (Armstrong et al., 2011; Ausburn & Ausburn, 1978; Messick, 1976). Thus, we hypothesize:

H3. Personality will explain more variation in preference for working in virtual teams as compared to cognitive style.

3. Data collection

Participants for this research included 153 business students from a variety of majors. Students received a packet containing the questionnaire and were offered a small amount of extra credit for the completion of the survey. Students were asked to complete the questionnaire on their own time outside of class and return it the next week. Those electing not to participate were simply asked to return the questionnaire blank, and were rewarded the same extra credit as the other students. Of the 153 subjects, 132 answered every question and offered useful data for analysis. Participants were evenly distributed among genders with 52% male and 48% female.

4. Measures

4.1. Control variable

Given the technological nature of virtual teams, one's technological background could potentially have a confounding effect on the results of this study. To control for previous individual technological knowledge, a control variable measuring technological background was used. This control variable consisted of one item asking subjects about previous technology courses they had taken, which was used as a proxy for prior technological knowledge.

4.2. Personality

Personality was measured in this study using Costa and McCrae's Revised NEO Personality Inventory (Costa & McCrae, 1992). This instrument includes the full 240-item questionnaire which describes the individual's personality according to the Big Five factors. The NEO-PI-R is a widely used instrument whose validity and reliability have been well documented (Costa & McCrae, 1992). Reliability estimates of the items in this study ranged from 0.89 (Agreeableness) to 0.93 (Neuroticism).

4.3. Cognitive style

Cognitive style was measured using the MBTI Form M (Myers & Myers, 1998). We chose the MBTI for this research for several reasons. First, the MBTI focuses on how one makes judgments and arrives at conclusions, which is an important aspect of corporate life and teamwork. Second, other scales such as the CAI, have been shown to correlate highly with the MBTI (Allinson & Hayes, 1996). Third, the MBTI is popular in industry, and researchers have argued that its wide use by corporations provides more relevance for organizational research (Garfield et al., 2001).

This 93-item instrument uses a forced-choice format where subjects select which of two statements for each item is most applicable. Difference scores were calculated for each subject on the four dimensions of extraversion/introversion, sensing/intuition, thinking/feeling, and judgment/perception, with higher scores indicating preferences for extraversion, sensing, thinking, and judgment. KR-20 estimates of reliability were used, given the

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[1] Extraversion/introversion as measured by the MBTI is related to the extraversion dimension of the Big Five, but is theoretically distinct. The *E/I* dimension of the MBTI deals with the degree to which individuals look externally or turn inwardly in seeking out and processing information, while the extraversion factor of the Big Five is a measure of one's disposition to behave. Note that in the MBTI the construct is Extraversion/Introversion, not extraversion alone as in the Big Five. Costa and McCrae note: "Users familiar with Jungian psychology should note that the conceptualization of extraversion embodied in the NEO PI-R differs in many respects from Jung's ...theory" Costa and McCrae (1992, p. 15). In the NEO PI-R, introversion is characterized as a *lack* of extraversion, rather than as an end of a dialectic preference set. Moreover, extraversion in the NEO PI-R is a broader concept than the extraversion/introversion dimension of the MBTI. It includes not only gregariousness but also warmth, assertiveness, activity, excitement seeking and positive emotions.

dichotomous nature of the scoring, with values ranging from 0.73 for extraversion/introversion to 0.92 for judgment/perception.

4.4. Preference for working in virtual teams

Given the novelty of the construct, preference for working in virtual teams has not been operationalized in the literature. Traditional measures of group work have involved several measures including preference for group work, group-member satisfaction, and group-member performance (Shaw, Duffy, & Stark, 2000). Preference for group work, however, is the only construct which occurs prior to group work and, as such, has utility in terms of the selection of virtual team members.

In an attempt to measure preference for working in virtual teams, we first looked at the literature for existing measures. We found none but did discover an existing instrument measuring preference for group work over working alone (Shaw et al., 2000). Four items from this scale were adapted to capture preference for working in virtual teams versus working alone and included "When I have a choice, I would rather work in virtual teams than by myself," "I prefer to work on a virtual team task than on individual tasks," "Working in a virtual group is better than working alone," and "Given the choice, I would rather do a job where I can work alone rather than do a job where I have to work with others in a virtual team" (reverse coded). While these items measure one's preference for working in virtual teams over working alone, they do not address the degree to which one would prefer working in virtual versus face-to-face teams. Consequently, four additional items were developed contrasting the degree to which individuals preferred virtual to face-to-face teams and included "I would be as comfortable working on a virtual team as I would a face-to-face team," "If given the appropriate technology, I can be just as effective working on a virtual team as I can on a face-to-face team," "I could not feel a part of a team that did not meet face-to-face," (reverse coded) and "I would participate as easily on a team that used chat rooms, e-mail and conference calls to communicate with my fellow team members as I could in face-to-face discussions." Preference for working in virtual teams was, therefore, operationalized as a two-faceted construct; preference for virtual teams over working alone and preference for virtual teamwork over face-to-face group work. The model being tested is shown in Fig. 1.

5. Results

5.1. Measurement model

Given the novelty of the proposed virtual team preference construct and the fact that the preference items contrast preference for
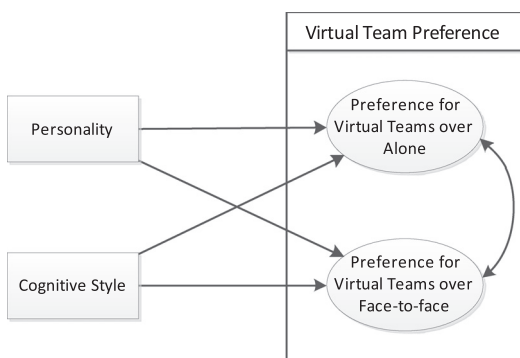
working in virtual teams to two different alternatives (i.e., working alone and working in face-to-face teams), a full confirmatory factor analysis (CFA) was used to evaluate the psychometric properties of the purported construct. Multiple fit criteria were used to evaluate the measurement model including the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Acceptable levels for each included CFI $\geqslant 0.95$, TLI $\geqslant 0.95$, RMSEA $\leqslant 0.06$, and SRMR $\leqslant 0.08$ (Bearden, Netemeyer, & Mobley, 1993; Browne & Cudeck, 1993; Gefen, Straub, & Boudreau, 2000; L. Hu & Bentler, 1999; Kim & Son, 2009; MacCallum, Browne, & Sugawara, 1996).

The measurement model included the two latent factors measuring the two facets of virtual team preference used in the model. The results from the measurement model revealed excellent fit [$\chi^2(19) = 17.52$, $p = 0.55$, CFI = 1.00, TLI = 1.00, RMSEA = 0.000, SRMR = 0.028]. This analysis confirms the existence of two separate dimensions of preference for working in virtual teams. Numerous tests of reliability and validity were used to evaluate the quality of the latent constructs in the measurement model (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). Reliability was examined by employing construct reliability using Cronbach's coefficient alpha and composite reliability. Values for Cronbach's alpha are above the recommended level of 0.7 with the lowest value being 0.82 (Nunnally, 1978). Composite reliability, a reflection of the impact of error on the measurement scale, is widely utilized in the evaluation of latent variable measurement models (Raykov & Grayson, 2003). All constructs within the measurement model were found to have a composite reliability well above the recommended cutoff of 0.7, indicating high composite reliability (Bagozzi & Yi, 1988; Bearden et al., 1993; Fornell & Larcker, 1981).

Both convergent and discriminant construct validity were tested using the measurement model. Convergent validity is evaluated using the composite reliability (described above), AVE, and factor loadings of items on their respective latent variables. The AVE measures the amount of variance that a construct captures from its indicators and is recommended to be above 0.5 (Chin, 1998; Hu, Lin, Whinston, & Zhang, 2004). In the measurement model, the lowest AVE value is 0.55, which is above the recommended cutoff point. Convergent validity is also assessed by item loadings on latent constructs, with each item loading on their respective latent variable at least 0.6 and ideally 0.7 or above. This indicates that each measure is accounting for 50% or more of the variance in the underlying latent variable (Chin, 1998; Hu et al., 2004). All factor loadings were found to be above the 0.6 cutoff, with only two items (0.69 and 0.66 respectively) falling below the ideal 0.7 mark, indicating good convergent validity (Hair, Black, Babin, Anderson, & Tatham, 2006). Discriminant validity was assessed using a derivation of the AVE, namely, the square root of the AVE. The square root value represents the average association of each latent construct to its respective item measures while the corresponding correlation between the constructs indicates the overlap of associations among the latent variables. Thus, if the square root of the AVE is higher than the correlation of that latent construct with the other construct in the measurement model, this indicates that the construct is more closely related to its own measure than to the measures of the other latent construct (Chin, 1998; Gefen & Straub, 2005; Majchrzak, Beath, Lim, & Chin, 2005). The square roots of the AVE values are both much higher than the correlation between the two latent constructs. In summary, the results from the measurement model demonstrate high reliability as well as high convergent and discriminate construct validity for both preference constructs. Descriptive statistics, along with the validity and reliability measures are shown in Appendix A.

Fig. 1. Proposed research model.

5.2. Research model

Two hierarchically nested structural analyses were used to test the three hypotheses, with each of the two analyses containing three nested models. Step one in each of the two analyses consisted of entering the control variable of technological background, providing a baseline from which to test the hypotheses. In step two, either the Big Five personality factors or cognitive style dimensions were entered separately. Finally, the third step added both the Big Five factors and cognitive style dimensions to create an omnibus model. Table 1 shows the results.

The first model with only the covariate of technical background freely estimated was initially run and the model was found to have very good fit [$\chi^2(97) = 116.58$, $p = 0.09$, CFI = 0.97, TLI = 0.97, RMSEA = 0.039, SRMR = 0.076]. Next, allowing personality to be freely estimated revealed an excellent fitting model [$\chi^2(87) = 96.69$, $p = 0.22$, CFI = 0.99, TLI = 0.98, RMSEA = 0.029, SRMR = 0.051] which fit significantly better than the initial covariate only model [$\Delta\chi^2(10) = 19.89$, $p < 0.05$]. In this model, personality explained a significant amount of variance in virtual team preference over face-to-face teamwork ($R^2 = 0.13$, $p < 0.05$), but was not a significant predictor of preference for working in virtual teams over working alone. Consequently, H1 received only partial support. Allowing cognitive style to be freely estimated in the second model also produced an excellent fitting model [$\chi^2(89) = 93.90$, $p = 0.34$, CFI = 0.99, TLI = 0.99, RMSEA = 0.020, SRMR = 0.059] which fit significantly better than the initial model with only the covariate [$\Delta\chi^2(8) = 22.68$, $p < 0.05$]. This cognitive style-only model explained a significant amount of variance in virtual team preference over working alone ($R^2 = 0.11$, $p < 0.05$), but not over face-to-face teamwork. Thus, H2 was partially supported. Taken together, these results suggest that both personality and cognitive style are important predictors of preference for virtual teamwork, but that they differentially affect the two facets.

A closer look at the individual dimensions of personality and cognitive style reveals that openness to new experiences ($\beta = 0.33$, $p < 0.001$) is the driver behind the significant effect for personality on preference for virtual teams over face-to-face, while both the thinking/feeling ($\beta = 0.18$, $p < 0.05$) and the judging/perceiving ($\beta = 0.22$, $p < 0.05$) dimensions of cognitive style are the significant predictors of virtual team preference over working alone. The finding that the extraversion/introversion ($\beta = -0.19$, $p < 0.05$) dimension of cognitive style significantly predicts virtual team preference over face-to-face groups is discounted by the fact that cognitive style as a whole failed to add significantly to the model.

The inclusion of both personality and cognitive style separately as freely estimated parameters (Step 3, Table 1) significantly improved model fit [$\Delta\chi^2(10) = 19.89$, $p < 0.05$ and $\Delta\chi^2(8) = 22.68$, $p < 0.05$, respectively]. Moreover, when both personality and cognitive style are entered into the model, the ability to predict preference for working in virtual teams was significantly increased over the ability of either one alone. This finding, which applies to both dimensions of virtual team preference, suggests a lack of support for H3.

6. Discussion

For this research, a theoretical construct of virtual team preference was operationalized based on previous research and accepted measures of face-to-face team research. Two facets of virtual team preference, preference for working in virtual teams over alone and preference for working in virtual teams over face-to-face, were measured. A thorough psychometric analysis indicates that these two facets hold very well and show excellent validity and reliability. In fact, we believe that our virtual team preference construct offers promise for future research analyzing individual preparedness for virtual team work.

The results of our research show that both personality and cognitive style predict aspects of virtual team preference. The overall model fit shows demonstrates that both cognitive style and personality provide significant improvements in predictive capacity for understanding individual preference to participate in virtual teams and can be used to assess individual preference prior to implementation of such work teams.

The results also show that personality and cognitive style predict the two aspects of virtual team preference differently. First, personality explains a significant amount of variance (10%) above that explained by one's technical background in preference for working in virtual over face-to-face teams. This finding is primarily due to the effect of openness. Open individuals may perceive virtual team environments as a way to explore new ideas within a nontraditional team environment, thereby leading to an easier transition to using such technology (Vreede et al., 2012). Second, cognitive style explains a similar amount of variance (8%) in preference for working in virtual teams over working alone, a finding resulting from the roles played by the extraversion/introversion and the judging/perceiving dimensions. While some previous research has found extraversion to negatively impact the transition to collaboration technology (Vreede et al., 2012), extraverted individuals may be more likely to trust in virtual environments

Table 1
Standardized loadings for personality and cognitive style on virtual two aspects of team preference, controlling for technological background.

	VT Preference over alone				VT Preference over F2F			
	Step 1	Step 2		Step 3	Step 1	Step 2		Step 3
		Personality first	Cog Style first			Personality first	Cog Style first	
Technical background	0.18[*]	0.18[*]	0.21[**]	0.22[**]	0.18[*]	0.16	0.20[*]	0.17[*]
Agreeableness		0.09		0.19[*]		0.04		0.12
Conscientiousness		−0.02		−0.27[**]		0.10		−0.10
Extraversion		0.12		0.26[*]		−0.17		0.15
Neuroticism		−0.12		−0.11		−0.03		−0.03
Openness		0.06		0.11		0.33[***]		0.39[***]
MBTIT-F			0.18[*]	0.25[**]			0.13	0.17
MBTI E-I			0.13	−0.07			−0.19[*]	−0.35[**]
MBTI S-N			−0.19	−0.06			−0.07	0.21
MBTIJ-P			0.22[*]	0.28[**]			−0.06	−0.08
R2	0.03	0.09	0.11[*]	0.19[**]	0.03	0.13[*]	0.10	0.23[***]

[*] $p < 0.05$.
[**] $p < 0.01$.
[***] $p < 0.001$.

(Kalman et al., 2010) and may simply prefer virtual interaction with others over no interaction at all. Judgers may perceive the on-line environment as less accommodating for drawn-out team discussions, leading to decisions which are more quickly finalized with better overall results (Peslak, 2006).

It is significant to note that both personality and cognitive style provide a meaningful explanation of two distinct but critical aspects of virtual teamwork preference. This research suggests that if the issue at hand requires a team approach, then the openness to new experience personality factor will indicate those more likely to prefer a virtual team environment over face-to-face. On the other hand, cognitive style predicts virtual team preference over working alone because of its focus on information processing and decision making. The decision process used in a team situation will vary greatly from individual decision making. Thus the use of cognitive style to assess virtual team preference will be most effective when individuals have the choice of either a team-based or individual work process. Given the added value of both personality and cognitive style, a combined model offered even greater predictive power by explaining 19% and 23% of the variance in the two aspects of virtual team preference respectively.

One purpose of this research was to comparatively test personality and cognitive style as predictors of virtual team preference. In contrast to earlier research in a technology-based environment (McElroy et al., 2007), both personality and cognitive style offer significant model fit with regard to virtual team preference, albeit with respect to different dimensions. This argues for a dual approach to the study of virtual team preference using both personality and cognitive style as each shows different relative strengths in predicting our two dimensions of preference for virtual work.

7. Limitations and future work

This research specifically tests the predictive power of personality and cognitive style on virtual team preference. One limitation of the study is that we focused our work on preference for working in virtual teams rather than what aspects of the virtual team environment potential members might find appealing or repelling. Future research could address the role of personality and cognitive style on individual preferences for specific aspects of the virtual team environment. Because we focused on preference for working in virtual teams, we did not contrast the effects of personality and cognitive style on preference for working in face-to-face groups. Future research using a more complete design could determine whether the personality and cognitive style effects found here for preference in virtual teams also apply to preference for working in face-to-face teams. In addition, other personal factors may be useful in predicting virtual team preference and other methods for measuring personality and cognitive style may produce different results. Personality has also been shown to have various levels of abstraction (Markon et al., 2005) with varying trait levels having different predictive outcomes. Future research should investigate whether the Big Five aggregations offer optimal predictive capacity or whether less broad dimensions are better at predicting virtual team preference as has been suggested in previous research (George, 1992). Also, future research should investigate the impact of personality and cognitive style on other aspects of virtual team use beyond initial preference including during and after implementation of such work teams. It would also be prudent to examine the effect of past experiences in working in virtual teams. Finally, our study looked only at preference for working in virtual teams. Preference is a far cry from performance. Future research should examine whether preference for working in virtual teams is a determinant of the actual performance of those teams.

Table A1
Means, standard deviations, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), and correlations (with square root of AVE along the diagonal for the two latent variables).

		Mean	Std. Dev	Alpha	CR	AVE	Over alone	Over F2F	Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness	Thinking	Extraversion	Sensing	Judging
VTPref	Over alone	3.04	0.88	0.91 [CI = 0.88.0.93]	0.91	0.72	0.85										
	Over F2F	3.33	0.82	0.82 [CI = 0.77.0.87]	0.83	0.55	0.42**	0.74									
NEO-PI	Agreeableness	115.13	20.99	0.89 [CI = 0.87.0.92]			0.07	0.01									
	Conscientiousness	125.54	21.55	0.89 [CI = 0.87.0.92]			0.04	0.03	0.45**								
	Extraversion	118.58	23.08	0.91 [CI = 0.89.0.93]			0.14	-0.01	0.24**	0.48**							
	Neuroticism	85.01	24.4	0.93 [CI = 0.91.0.94]	–		-0.21**	-0.11	-0.15	-0.17*	-0.13						
	Openness	114.07	22.33	0.90 [CI = 0.87.0.92]	–		0.11	0.22*	0.21**	0.25**	0.53**	0.00					
MBTI	TMnking	1.99	13.62	0.85	–		0.13	0.06	-0.17*	0.28**	-0.08	-0.23**	-0.10				
	Extraversion	2.28	12.46	0.73			0.10	-0.15	0.01	-0.01	0.60**	-0.14	0.19*	-0.19*			
	Sensing	-0.16	13.86	0.91			-0.02	-0.06	0.09	0.24**	-0.17*	0.21*	-0.54**	0.15	-0.11		
	Judging	5.45	12.83	0.92			0.14	-0.05	0.04	0.30**	-0.10	0.11	-0.31**	0.21*	-0.10	0.61**	

* p < 0.05.
** p < 0.01.

The survey method used may also provide some limitations for this research. The data in this study were self-reported at a single point in time. Future research should investigate other methods of reporting as well as longitudinal approaches to data collection. While the student population in this sample represents a population likely to be influenced by virtual teams, student samples can be problematic when generalizing to the workforce at large. Also, given students' above average Internet and technology usage, this research may provide a bias which may not apply as readily to other individuals who are not as technologically literate.

8. Conclusion

This research adds to the extant literature in two significant ways. First, we offer a validated operationalization of a construct central to research concerning virtual teamwork, virtual team preference. This two dimensional latent construct should prove valuable to future research that attempts to explain varying levels of performance in virtual team environments. Second, we have shown that two widely used frameworks, personality and cognitive style, have utility in identifying those most likely to prefer virtual teamwork. Both have explanatory power when used in concert with each other, and need not be posed as an either or choice in future research. However, depending on whether the nature of the structural problem to be solved is one of virtual teams versus face-to-face teams or whether it is virtual teamwork versus individual efforts, either personality or cognitive style will offer insight. In either case, this study offers a first step in understanding why some people prefer working in virtual teams while others do not. Knowing this in advance of virtual teamwork can go a long way toward alleviating problems associated with virtual teamwork.

Appendix A.

See Table A1.

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