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It takes two to tango: *The close interplay between trust and identification in predicting virtual team effectiveness*

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Abstract

The purpose of this study was to examine how trust between the team-members and identification with the team are related to the effectiveness of virtual teams. The literature suggests that both trust and identification are crucial for success of virtual teams but there is a lack of empirical studies to substantiate this assumption. We hypothesized that the identification-effectiveness link should be stronger under high-trust than under low-trust conditions, and that the relationship between trust and effectiveness should be stronger when team members identify strongly with the team. In our study based on a cross-sectional survey methodology and data aggregated to team level ($N = 31$), we found clear support for our hypotheses.

Keywords: virtual teams, trust, identification, effectiveness

1. Introduction

Virtual teams have been a topic of growing interest to researchers and practitioners for over a decade (e.g., Lipnack & Stamps, 2000; Powell, Piccoli, & Ives, 2004). A virtual team (VT) is often described and defined here as a group of people striving toward a common goal, dispersed in many locations, and communicating with each other predominantly via information and communication technology (e.g., Axtell, Fleck, & Turner, 2004; see also Gibson & Gibbs, 2006 for detailed discussion on definitions of a VT). In fact, the opportunities provided by information and communication technology (ICT) have been a major force in the proliferation of VTs as an organizational form. Experts can work flexibly on their sites around the globe, near their customers, and travelling costs can be reduced (e.g., Martins, Gilson, & Maynard, 2004).

Because direct control is impeded due to distance, numerous authors have suggested that it must be at least partially substituted by trust in VTs (Aubert & Kelsey, 2003; Ishaya & Macaulay, 1999; Jarvenpaa & Leidner, 1999). Moreover, it has often been stated that trust is a key success factor and the “glue” that binds VTs together (e.g., Nemiro, 2000). Correspondingly, many authors have stressed that the formation of a shared team identity is crucial for virtual teams because it provides a sense of belonging despite the relative lack of face-to-face interaction (Fiol & O’Connor, 2005; Mortensen & Hinds, 2001; Wiesenfeld, Raghuram, & Garud, 1999). The claim that trust and shared group identity are the keys to the success of virtual organizations implies that these factors are positively related to VT effectiveness. However, to our knowledge, the interplay of these three concepts have not been studied before, even though all of them have gained VT researchers’ attention. In this study we start to disentangle these relationships using survey data from 31 virtual teams.

We use the theories from previous trust research (Dirks & Ferrin, 2001) and the social identity approach (Tajfel & Turner, 1979) to study the dynamics of trust, identity, and effectiveness in VTs. Applying these well developed and robust theories to explain the processes in a relatively new organizational form informs us whether or not the new context discloses novel relationships between the studied variables. Furthermore, given the growing interest in and importance of VTs in working life it is rather surprising that more or less artificial student samples dominate empirical studies, as recent reviews of VT literature point out (Hertel, Geister, & Konradt, 2005; Martins et al., 2004). This study contributes to fill this gap by studying real-life VTs.

We structure our theoretical development in the following manner. First, we explore the complex construct of trust in different settings. Second, we introduce the social identity approach and discuss how social identification has been studied in VTs. Third, we build on the seminal work of Dirks and Ferrin (2001) in order to develop argumentation for our first hypothesis: why trust could moderate the relationship between identification and effectiveness. Fourth, we build on the arguments derived from the social identity approach to build a complementary moderation hypothesis, namely why identification could moderate the trust-effectiveness relationship.

2. Theoretical framework

2.1 Trust

Trust has been studied from different viewpoints, including social psychology, philosophy, economics, and management research (Blomqvist, 1997). Hence, no consensus exists on the definition of trust. In most conceptualizations, trust is associated with risk taking, positive expectations and vulnerability (e.g., Mayer, Davis, & Shoorman, 1995). In this study we investigate trust within group (interpersonal trust) from the social psychological perspective. In line with Boon and Holmes (1991) we define trust as a psychological state involving confident positive expectations about another’s motives with respect to oneself in situations which entail risk.

Trust in organizations has been a topic of growing interest to researchers (Kramer & Tyler, 1996; Noteboom & Six, 2003). Generally, most authors seem to agree that trust is beneficial for organizations (Dirks & Ferrin, 2001). Several studies have demonstrated

that trust has multiple positive outcomes in organizations varying from increased commitment to organizational citizenship behaviours (Dirks & Ferrin, 2002). According to Bijlsma and Koopman (2003), it is also commonly agreed that trust is positively related to cooperation. It has been noted that trust becomes more important and even partially replaces traditional mechanisms of control in new, virtual work settings (Sabherwal, 1999; Tyler, 2003). Direct control is strongly impeded due to distance, but coordination and cooperation are indispensable in VTs for the team to achieve its shared goal.

Consequently, trust has been one of the key areas of interest for VT researchers (e.g., Aubert & Kelsey, 2003; Zolin, Hinds, Fruchter, & Levitt, 2004). In their seminal study of VTs comprised of students from different countries, Jarvenpaa and Leidner (1999) found that, among other things, proactive, predictable communication and social cues in computer-mediated communication were keys to high interpersonal trust within the teams. They suggest that trust in virtual settings is swift and fragile. Meyerson, Weick and Kramer (1996), who developed the concept of swift trust, suggested that swift trust develops depersonally. If the common task requires trust, but the parties do not have time to become acquainted with each other, trust is built on role-based interaction and prototypical categorizations. However, the enthusiasm for swift trust as a theoretical construct that could explain trust in VTs seems to have declined. This might be due to at least two issues. First, to our knowledge any clear quantifiable operationalizations of swift trust have not been developed. In fact, Jarvenpaa and Leidner (1999) used a traditional and personalized conceptualization to measure trust which, based on their qualitative studies, they claimed to be swift. Second, as in this study, in real life the members of VTs often do have time to build trust in a more personalized manner. Consequently, in later phases of virtual teamwork the construct of swift trust may not be able to capture the nature of interpersonal trust. These issues may have affected the current trust research in VTs which utilizes the conceptualizations of trust developed in traditional settings rather than suggesting that trust within VTs would be something qualitatively different from co-located teamwork (e.g., Aubert & Kelsey, 2003; Geister, Konradt, & Hertel, 2006).

Direct empirical tests of the relationship between trust and effectiveness in virtual settings are rather rare and the results are mixed. For instance, in their qualitative study of virtual student teams, Ishaya and Macaulay (1999) found that high-trust groups outperformed low-trust groups. Similarly, Geister et al. (2006) found that trust had a main effect on performance in student VTs. However, in their study, Aubert and Kelsey did not (2003) find support for their hypothesis that trust within a virtual team would be positively associated to effective performance. Thus, it seems clear that we need more research on how and under what conditions trust would be related to VT performance.

2.2 Identification

The social identity approach provides a theoretical framework for the relationship between an individual and a group. Specifically, it consists of two distinct theories: the original social identity theory (Tajfel & Turner, 1979) and the more recent self-categorization theory (Turner, Hogg, Oakes, Reichell, & Wetherell, 1987). Despite certain differences, both theories share the same fundamental assumption that individuals define themselves in terms of their social group memberships and that group-defined self-

perception produces distinctive effects on social behaviour and inter-group relations (Hogg & Abrams, 1988; Turner, 1999). This means that the more an individual conceives of him or herself in terms of membership in a group or, in other words, identifies with the group, the more his or her attitudes and behaviour are governed by this group membership (Hogg & Abrams, 1988; Van Knippenberg & Van Schie, 2000).

During the past ten years, social identity principles have been increasingly applied to the study of organizational psychological processes (Haslam, 2001; Hogg & Terry, 2000). In this context, organizational or team membership is understood to reflect on self-concept in the same way as other social memberships do (Ashforth & Mael, 1989; Hogg & Terry, 2000). Thus, organizational identification is defined as “the perception of oneness with or belonging to a group” (Ashforth & Mael, 1989, p.34). Moreover, this group-based self-conception is proposed to lead to activities that are congruent with this identity.

According to self-categorization theory (Turner et al., 1987), different levels of self-definition (e.g., self as an individual or self as a group member) should be related to a distinct set of needs or motivators. When people categorize themselves at the personal level, they should be motivated to do things that promote their personal identity as individuals (e.g., personal advancement). When social identity is salient, it should be associated with the motivation to do things that promote their social identity as group members, for example through the enhancement of group goals. Although in most previous studies work-group identification has been used as an individual level variable (Riketta, 2005; Ullrich, Wieseke, Christ, Schulze, & van Dick, 2007), recent findings by van Dick, Grojean, Christ and Wieseke (2006, study 3) indicate that the positive effects of identification on work-group functioning exist not only at an individual level, but also at higher levels of analysis. Van Dick et al. (2006), for example, found that identification and organizational citizenship behaviour (OCB) were positively related also in team-level analysis. Moreover, they suggested that this indicated that the dimensions of OCB that contribute to (group) performance are more than the sum of individual behaviours (see also Hardin, Fuller, & Valacich, 2006 on aggregate measures in the context of VTs).

Current empirical research is not necessarily informative about whether or not there is something special about identification with VTs (Fiol & O’Connor, 2005). Despite the rather common claim that it is more difficult to identify with a VT than with a co-located team, Mortensen and Hinds (2001) found no difference between the levels of identification of virtual and co-located team members. The limited number of previous studies limits our knowledge about the interplay between identification and other variables in VTs (Fiol & O’Connor, 2005). Moreover, the focus of previous studies has predominantly been on communication and communication technology. However, relevant research has been carried out. For instance, Wiesenfeld et al. (1999) found in a seminal study that virtual workers built their identification on electronic communication to a greater extent than their less virtual counterparts. Moreover, Mortensen and Hinds (2001) found that shared identity reduced conflict in distributed teams. Insofar as conflict can be seen as detrimental to effectiveness, this result may be interpreted as indirect evidence that VT-level identification increases effectiveness. However, to our knowledge there are no direct empirical tests of this relationship in VTs (either main or moderated effects). This is rather surprising considering the importance given to identification in the VT literature (e.g., Bartel, Wrzeniewski, & Wiesenfeld, 2007; Fiol & O’Connor, 2005;

Wiesenfeld et al., 1999) and the vast number of studies on VT performance (see e.g., Powell et al., 2004).

Although the concepts of trust and identification have both been frequently (and sometimes even interchangeably) used in VT literature, it is important to underline their conceptual distinctiveness. While interpersonal trust refers to a psychological state involving confident positive expectations about another group-member's motives in risk-taking situations, it lacks the crucial self-defining component of identification that refers to the psychological merging of self and a specific group. Consequently, it seems quite clear that trust and identification are independent constructs and it is also in practice possible that group members can be identified with the group without trusting other members. An interesting question then is whether VTs can really be effective if only one of these important conditions is fulfilled.

2.3 The interplay between trust and identification in predicting effectiveness

Dirks (1999) and Dirks and Ferrin (2001) have criticized the dominant model in trust research which suggests that trust has a direct (main) effect on attitudes and especially on group performance. The common theoretical rationale for the expected trust-effectiveness relationship has been that a high level of trust increases the probability of risk taking (e.g. cooperation without certainty of reciprocity), which in turn leads to a high level of effectiveness (Costa, 2003; Dirks, 1999). However, in their review of 40 years of trust research Dirks and Ferrin (2001) concluded that the empirical evidence especially regarding the assumed trust - group effectiveness relationship does not support the main effect model.

Dirks and Ferrin (2001) stress that trust may moderate the relationship between motivational constructs and group performance. This proposition is based on the theoretical idea that trust may have an indirect effect on group performance by providing an assessment tool of one's work partners' potential behaviour and on interpreting their past actions. In a high-trust condition a team member believes in others' willingness to reciprocate and cooperate but in the opposite condition the team members become cautious or even suspicious and avoid cooperation. In line with this idea, Dirks (1999) found that motivation had significant positive effects on group performance in the high-trust condition but no effect on performance in the low-trust condition. A similar proposition can be made concerning the link between identification and effectiveness. Identification with a group is a strong motivational force which may provide the drive for group-serving behaviours (e.g., enhancement of group goals), while trust helps to facilitate such behaviours because in high-trust conditions a person believes that the others are also willing to cooperate and promote the group goals. Moreover, Dirks and Ferrin (2001) suggest that the moderation model of trust could be especially applicable to virtual settings. In VTs, there are few cues about the motivations and behaviours of others, and trust may provide a lens through which action is interpreted and responded to. Drawing on the theoretical reasoning of Dirks and Ferrin (2001) we propose the following:

Hypothesis 1: Within VTs, the relationship between identification and effectiveness is moderated by trust: the more the team members trust each other, the stronger the relationship between identification and effectiveness.

Based on the social identity approach (e.g., Haslam, 2001) and previous research it is also reasonable to expect that group identification may moderate the relationship between various motivators and group effectiveness. For example, Terry and Hogg (1996) found that group norms were more strongly related to corresponding behavioural intentions if individuals were highly identified with a group. More recently, Lipponen, Bardi and Haapamäki (2008) have shown that certain personal values are more likely to promote group-enhancing value-congruent behaviour if employees identify with the work-group. As previously noted, trust can be considered a strong motivator in interpersonal cooperation, because team members are willing to take risks if they believe that others are going to reciprocate. However, interpersonal cooperation between group members may take various forms and be directed towards a variety of goals some of which may not necessarily be related to group goals. In other words, cooperation (as a result of trust) may not be directed towards the enhancement of group goals if group members are not simultaneously identified with the group. Based on the reasoning above we hypothesize the following:

Hypothesis 2: Within VTs, the relationship between trust and effectiveness is moderated by identification: the higher the identification with the VT, the stronger the relationship between trust and effectiveness.

3. Methods

3.1 Procedure and respondents

The data for this study were gathered with a web-based questionnaire from eleven organizations. The questionnaires were sent to the members of 31 VTs in the Finnish based organizations. The fields that the organizations represented ranged from the social sector to the metal industry but most of the data came from the members of VTs in multinational companies (20 teams). All the VTs consisted of specialists conducting non-routine tasks. The respondent teams were selected in collaboration with the contact person in each company, and with the agreement of the team leaders. The minimal conditions for selection were the major definitional features of VTs presented above, that is the teams had more than one member collaborating to achieve a common goal, the team members or subgroups of them were located in different towns, and the respondents communicated mainly via ICT.

In total, 295 respondents received individual e-mails with an introduction to the study and a web address through which they could confidentially complete the questionnaire. In the e-mail and in the questionnaire, the respondents were prompted to answer all the questions relating to their named VT. It was stressed that even though in the items the term “team” was consistently used, the respondents should think about their VT named in the e-mail and in the questionnaire cover page when answering. 211 acceptable questionnaires were returned, a response rate of 71.5%. A slight majority of the respondents were male (56.4%), with an average age of 40.4 years ($SD = 8.7$). Their average team tenure was 25.9 ($SD = 34.6$) months. The geographical distribution of the team members or their sub-groups ranged from 2 to 13 different towns ($M = 4.7$; $SD = 2.6$).

The mean size of teams was 9.5 employees ($SD = 6.2$). As group size has been

found to be negatively related to group identification (e.g., Lipponen, Helkama, Olkkonen, & Juslin, 2005) we decided to control for size in our analyses.

3.2 Measures

Trust. Trust was measured with a ten-item scale based on previous measures by Cummings and Bromiley (1996; e.g., “In my opinion, my team members are reliable”) and McAllister (1995; e.g., “My team members approach their job with professionalism and dedication”). All items were modified to assess trust within the team and they reflected integrity, benevolence, and ability dimensions, all suggested to be important in the literature (Mayer et al. 1995; see Appendix 1). The response scale ranged from (1) “strongly disagree” to (5) “strongly agree”. Cronbach’s alpha for this scale was .94.

Identification. Identification was measured with a modified version of the organizational identification scale developed by Mael and Ashforth (1992). The questions were modified to assess identification with the VT (e.g., “This team’s successes are my successes”; see Appendix 1). The response scale was identical to that for the trust items. The five-item scale achieved Cronbach’s alpha of .74.

Effectiveness. Researchers often assess effectiveness by measuring dimensions of performance or attitudes towards a group or an organization (Cohen & Bailey, 1997). Hence, in the absence of objective measures, we rely on perceived effectiveness. Here we assess and define effectiveness as perceived task performance and coordination. Perceived team effectiveness was assessed with a three-item measure adapted from Connolly, Jessup and Valacich (1990; e.g., “We are very effective in coordinating our work”; see Appendix 1). The response scale was the same as that for the trust measure. Cronbach’s alpha for this measure was .73

We also carried out confirmatory factor analysis by using the AMOS program (Arbuckle & Wothke, 1999) in order to ensure the empirical distinctiveness of the measures of our study. When the ten items that were assumed to measure trust, the five items for identification, and the three items for effectiveness were included in a three-factor solution, they showed a good fit (CFI = .93, RMSEA = .07, C.I. RMSEA .06 - .09) ($\chi^2(132, N = 211) = 282.6, p < .001$), and the inter-factor correlations ranged from .38 to .56. A one-factor model with the same items showed a rather poor fit (CFI = .78, RMSEA = .13, C.I. RMSEA .12 - .14) ($\chi^2(135, N = 211) = 618.7, p < .001$). Comparison of the confidence intervals of the RMSEA indices reveals that a three-factor model is superior.

3.3 Aggregation to team level

As we were interested in the team level measurement and used such team level constructs as trust in the team and perceived team effectiveness, we aggregated the data to the VT level. In recent psychological literature three indicators are usually used to assess the appropriateness of the aggregation of individual level measures to the team level. Firstly, the r_{wg} statistics reflecting inter-rater agreement and within-team consensus were computed as suggested by James, Demaree and Wolf (1984). The r_{wg} values for trust were .89, for identification .83, and for perceived effectiveness .78, all of which reached the conventionally acceptable level (.70). Moreover, we computed the ICC(1) statistics, that is the inter-rater reliability indices, and the ICC(2) values indicating the reliability of group means (Chen & Bliese, 2002; Liao & Rupp, 2005). For our three measures, namely

trust, identification, and perceived effectiveness, the ICC(1) values were .18, .15, and .12 and the ICC(2) values were .60, .23, and .48 respectively. The ICC(1) scores are acceptable when compared to many previous studies (e.g., Chen & Bliese, 2002; Simons & Robertson, 2003) although they indicate some variation across respondents within the VTs. Unlike the ICC(1) formula, the ICC(2) scores do not take into account the small number of actual respondents from each team ($M = 6.8$) and remained rather low. However, as noted by Chen and Bliese (2002), the low ICC(2) values may hinder the detection of existing relationships in the aggregated data, meaning that we are not likely to find any relationships which are merely an artifact of the regression analysis – our main method of testing the hypotheses.

4. Results

In Table 1 we present means, standard deviations and correlations of the studied variables at the individual level. Comparison of those figures to the team-level statistics (Table 2) reveals that the correlations are at about the same level at both levels of scrutiny. Since we are interested in team-level analyses we shall concentrate on those results from now on (Tables 2 and 3). As can be seen (Table 2), both trust and identification had rather high means, indicating that neither the building of trust nor the formation of identification are problematic in VTs. The zero-order correlations suggest that trust and identification were strongly correlated with perceived effectiveness ($r = .70, p < .001$ and $r = .54, p < .01$, respectively). Moreover, team size, our control variable, had a negative correlation with identification ($r = -.34, p < .10$) as expected.

Table 1. Descriptive statistics and Pearson correlations among the variables at the individual level ($N = 211$)

Variables	<i>M</i>	<i>SD</i>	1	2	3
1. Team size	12.60	7.49			
2. Trust	4.19	0.70	-.10		
3. Identification	3.92	0.72	-.16*	.42***	
4. Perceived effectiveness	3.45	0.75	.01	.50***	.31***

* $p < .05$, *** $p < .001$, two-tailed

Table 2. Descriptive statistics and Pearson correlations among the variables at the VT level ($N = 31$)

Variables	<i>M</i>	<i>SD</i>	1	2	3
1. Team size	9.52	6.27			
2. Trust	4.19	0.41	-.15		
3. Identification	3.96	0.33	-.34 [#]	.40*	
4. Perceived effectiveness	3.45	0.44	-.03	.70***	.54**

[#] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed

The results of the regression analyses are presented in Table 2. We regressed perceived effectiveness on trust and identification (Step 2) after entering our control variable (Step 1). Both trust (Step 2: $\beta = .58, p < .001$) and identification (Step 2: $\beta = .37, p < .05$) were positively related to perceived effectiveness. In the final step (Step 3), we added the interaction term to the equation in order to test the moderation hypotheses (H1 and H2). We followed the procedure recommended by Aiken and West (1991) while creating the interaction term and in testing our moderation hypotheses. The results gave initial support for both of our hypotheses: the interaction term was positive and significant as expected (Step 3: $\beta = .31, p < .05$).

Table 3. Hierarchical moderated regressions predicting perceived effectiveness ($N = 31$)

	Step1 ^a	Step 2 ^a	Step 3 ^a
Control variables			
Team size	-.03	.18	.16
Main effects			
Trust		.58***	.46**
Identification		.37*	.28*
Moderator			
Identification X Trust			.31*
Statistics			
R ²	.001	.606	.673

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed; ^a Betas are reported

The interaction effects were further subjected to simple slope analyses using conditional values for trust calculated to be one standard deviation above and one standard deviation below the mean of the moderator (Aiken & West, 1991). As expected (H1), the analysis indicated that the relationship between identification and perceived effectiveness was strong and positive when the level of trust within the team was high ($\beta = .51, p < .01$), but nonexistent when it was low ($\beta = -.06, n.s.$). Also, our second moderation hypothesis (H2) gained support: the trust-effectiveness relationship was strongly positive when the team members identified strongly with their VT ($\beta = .73, p < .001$) but under low-identification condition there was no association ($\beta = .16, n.s.$).

5. Discussion

In this study we investigated the close interplay between trust and identification in predicting VT effectiveness. We expected that there would be reciprocal moderation between identification and trust in predicting effectiveness. In this respect the results were actually stronger than we originally expected because we did not anticipate that the effects of trust and identification would necessarily totally disappear at the low levels of these moderator variables. Nevertheless, this seemed to be the case for both identification and trust in this sample. These results were important if we consider the discussion on the presumed role of trust and identification as VT success factors (e.g., Aubert & Kelsey,

2003; Fiol & O'Connor, 2005). Our results indicated that these two constructs are indeed essential for high VT effectiveness.

Previous studies (e.g., Worchel et al., 1998; Van Dick et al., 2006) have shown that identification may be related to performance. Based on Dirks and Ferrin (2001) we predicted and found that the moderation model of trust would be applicable to virtual teams, in which the amount of contextual information is limited. To our knowledge this is the first study to show that the strength of the link between identification and performance indeed varies depending on the level of trust within a group. Thus, our study adds to the basic knowledge on identification-performance relations. The identification as a moderator result, in turn, indicated that the trust-effectiveness relationship only existed when VT members are strongly identified with their team. In other words, team members would coordinate their work to accomplish group goals only when they identify with the team. Although this result is in line with the social identity approach (e.g., Terry & Hogg, 1998) and some previous studies conducted in the work context (e.g., Lipponen et al., 2008), to our knowledge this is the first study showing that identification moderates the effects of trust. Taken together, these results provide a novel insight into the interplay of trust and identity in predicting VT effectiveness, as it seems that neither high-trust nor high-identification alone is sufficient in producing effectiveness – both are needed simultaneously.

5.1 Limitations and directions for future research

Cross-sectional surveys are vulnerable to common method variance. However, as noted above, analysis of aggregated, VT-level data, low ICC(2) values, and especially the finding of a statistically significant interaction term gives us reason to believe that the results are not merely due to response bias (Ambrose & Schminke, 2003; Chen & Bliese, 2002).

In this article we have used the terms performance and effectiveness interchangeably. This follows from our definition of perceived effectiveness as perceived task performance and coordination. However, other researchers have operationalized performance in various ways which are often tailored to suit student samples (e.g., Aubert & Kelsey, 2003; Geister et al., 2006). These differences might impede the comparison of our results with previous studies. Moreover, as objective measures were not available, we used self-reports of effectiveness. However, this potential weakness does not diminish our confidence in the main findings, because objective and subjective measures have often been found to correlate strongly with each other (e.g., Costa, 2003; Geister et al., 2006; Hardin et al., 2006; Smith & Barclay, 1997). Moreover, the measure of trust used in this study did not distinguish between different forms of trust (e.g., knowledge-based trust; see Lewicki & Bunker, 1996). Therefore, future research still faces challenges in disclosing the relative importance of various forms of trust in VTs.

Cross-sectional methodology does not lend itself to the inference of causality. In fact, it is possible and even probable that in real-life VTs causalities are not very straightforward, whereas trust, identification, and effectiveness form virtuous or vicious circles depending on different situations and contexts. It might well be that the early successes of a VT promote identification with and trust within a team, which in turn motivate the team members to work harder and more effectively toward their common goal. In order to investigate these complicated reciprocal causalities longitudinal studies

are needed.

Finally, one potential weakness of our study is related to the rather limited number of teams ($N = 31$) in our sample. It is often unfortunate but in practice unavoidable that we cannot obtain large number of observations when we are doing group-level studies. Although we did have slightly fewer teams than Collquitt, Noe and Jackson (2002) had (N ranged from 46 to 88), or West, Smith, Lu Feng and Lawthom (1998) had ($N = 46$), our number of observations is actually the same as in Ehrhart, Bliese and Thomas' (2006) study ($N = 31$). Nevertheless, it would, of course, be important to replicate our results with larger samples before making strong conclusions.

5.2 Practical implications

Our results indicated that optimal VT effectiveness requires both high trust and high identification. Hence, the practical question is: How does one facilitate these two complementary building blocks of effectiveness in VTs? The VT literature suggests that some communication practices enhance the formation and maintenance of interpersonal trust in VTs. The keys to facilitate trust include showing enthusiasm, proactive and predictable communication, and substantial and timely responses (see e.g., Jarvenpaa & Leidner, 1999). Rather similar behaviours have been noted to enhance identification with VTs, namely the establishment of protocol and procedures to ease the use of electronic media and frequent electronic communication (see e.g., Sivunen, 2006; Wiesenfeld et al., 1999). Since our study highlighted the importance of promoting both trust and identification simultaneously the practical suggestion from previous VT literature for VT members and leaders can be summarized as follows: support predictable electronic communication.

Another means of tackling trust and identification simultaneously stems from the realm of justice research. Procedural justice, in other words the perceived fairness and quality of decision-making procedures, has been shown to be closely linked to both constructs. Even though procedural fairness is understudied in VTs the recent study by Hakonen and Lipponen (2007) showed that fairness in decision-making is strongly linked to identification with VTs. In other work settings this link has been found to be rather robust (e.g., Blader & Tyler, 2005). Even though to our knowledge there is no research on the fairness-trust link in VTs these two constructs have been widely shown to be closely related to each other in other contexts (Lewicki, Wiethof, & Tomlinson, 2005), and there is no reason to believe that the same would not apply to VTs. These links have practical value because procedural justice can be easily translated from theory to practical guidelines for action. Procedural justice has been shown to grow from listening to those whom decisions affect, basing decisions on accurate information, giving opportunities for corrections, suppressing personal biases and being consistent in decision-making procedures (e.g., Leventhal, 1980). Furthermore, procedural fairness is reflected in respectful treatment and being polite and kind in interactions (here electronically mediated) related to the decision-making (Tyler & Blader, 2000). In sum, these means of promoting procedural justice in VTs should simultaneously enhance trust and identification and consequently the effectiveness of VTs.

5.3 Conclusion

In this study we found that trust within and identification with VTs are strongly related to perceived team effectiveness. It is noteworthy that trust and identification explained an extraordinarily high amount of the variance of perceived effectiveness, which indicates that the interplay of these variables is indeed important in VT success. Trust and identification clearly lubricate group processes, which lead to the enhanced coordination of tasks and to increased effort to achieve a common goal. Moreover, our study indicates that trust and identification are needed simultaneously in order to gain optimal VT effectiveness. Since similar studies have not to our knowledge been conducted in traditional teams, it is premature to say whether or not this conditional effect is unique to the virtual setting. In any case, our results cry for replication and elaboration and hopefully will inspire scholars to join their efforts to study the interplay of trust and identification in different contexts.

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Appendix 1

Trust items

1. I think that my team members tell the truth in negotiations.
2. I think that my team members meet their negotiated obligations to our team.
3. In my opinion, my team members are reliable.
4. I feel that my team members negotiate honestly with me.
5. I feel that my team members will keep their word.
6. I think that my team members do not mislead me.
7. I feel that my team members negotiate joint expectations fairly.
8. My team members approach their job with professionalism.
9. I see no reason to doubt my team members' competences.
10. I can rely on my team members not to make my job more difficult by careless work.


Identification items

1. When someone criticizes this team, it feels like a personal insult.
2. I am very interested in what others think about this team.
3. When I talk about this team, I usually say "we" rather than "they".
4. This team's successes are my successes.
5. When someone praises this team, it feels like a personal compliment.

Perceived effectiveness items

1. We are very effective in using the skills of different team members.
2. We are very effective at generating new ideas.
3. We are very effective at coordinating our work.

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