

## **Antecedents and consequences of identification with virtual teams: Structural characteristics and justice concerns**

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### **Abstract**

This research examined the antecedents and consequences of identification with virtual teams. Specifically, we hypothesized that two structural characteristics (number of face-to-face meetings and task interdependence) and perceived quality of interaction (procedural and distributive justice) would be positively related to identification with the virtual team. A further hypothesis was that team identification would have a positive relationship to extra-role behaviors towards the virtual team. The results from our study, based on a sample of 102 employees of Finnish-based companies, gave partial support for these hypotheses. We found that task interdependence and procedural justice were positively related to team identification. Moreover, team identification mediated the relationship between task interdependence and extra-role behaviors and the relationship between procedural justice and extra-role behaviors as we predicted. We discuss our findings in terms of research on virtual teams, social identity, and organizational justice.

**Keywords:** Virtual teams, social identification, organizational justice, extra-role behaviors

### **1. Introduction**

Literature about virtual teams (VTs) has been rapidly accumulating during the past decade. However, there is still amazingly little empirical research about VTs in real working-life situations, as two recent reviews of the research area have highlighted

(Hertel, Geister, & Konradt, 2005; Martins, Gilson, & Maynard, 2004). Furthermore, previous studies on VTs have mainly used qualitative methodology and there is a clear need for quantitative research conducted in field settings (Hertel et al., 2005). The aim of this paper is to partially fill this gap by presenting survey results and their quantitative analysis from real VTs. Moreover, our aim is to incorporate previous literature on social identification (e.g., Tajfel & Turner, 1979) and organizational justice (e.g., Lind & Tyler, 1988) into the research on VTs.

Most VTs usually consist of sub-groups or individuals working in different locations, and the members of distributed groups also have many other affiliations. Besides the VT membership they are members of local work groups, networks, line and matrix organizations and the whole company (e.g., Hinds & Kiesler, 2002). In practice, this often means that creating cooperation between distributed sub-groups and individuals is one major challenge for VTs. Building cooperation between the members of VTs may also be much more challenging than in traditional teams, purely because of the nature of VTs: out of sight is easily out of mind (e.g., Gibson & Cohen, 2003; Brown, 1988).

Many authors in the VT literature point out that the shared VT identity is crucial for VT success because it provides a sense of belonging, despite the relative lack of face-to-face interaction (Gibson & Cohen, 2003; Hinds & Kiesler, 2002; Lipnack & Stamps, 2000). However, there are few empirical studies on identification with VTs (Fiol & O'Connor, 2005). The existing research (e.g., Bouas & Arrow, 1996; Wiesenfeld, Raghuram, & Garud, 1999) is promising. For instance, Wiesenfeld et al. (1999) studied separate virtual workers rather than virtual teams. Still, their results suggest that identification is important since it enhanced, for example, cooperation.

In this paper we study the interplay of identification and related variables from the perspective of social identity approach (Tajfel & Turner, 1979). Among others, Fiol and O'Connor (2005) have demonstrated the potential fruitfulness of the social identity approach also in VT research. They state that prior research on identification with VTs is too focused on VT characteristics and on the communication technology used. We contribute to this line of research by examining how identification with a VT is related to such structural factors as the number of face-to-face (FTF) meetings and task interdependence. In addition, we test how organizational justice variables interplay with identification. Some organizational justice researchers argue that identification mediates the relationship between perceived justice and cooperative or extra-role behaviors (Tyler & Blader, 2000; Blader & Tyler, 2005). Organizational justice has been understudied in the VT literature (see Hakonen and Lipponen, *in press* and Kurland and Egan, 1999, for exceptions) and our purpose is to examine whether similar effects can be found in VTs as have been found in co-located settings. Finally, we bring the central element of cooperation, called here extra-role behaviors, as our main dependent variable. In doing this, we examine some solutions to the above-mentioned challenge of collaboration in VTs.

## 2. Theoretical framework

### *Virtual teams*

In the VT literature, one of the elementary debates concerns the definition of a VT. The recent reviews of VT literature (Hertel et al., 2005, Martins et al., 2004) concur in the notion that virtuality is a matter of degree. Indeed, there are more and less virtual teams and we also share the view that virtuality should be seen as a continuum rather than as an absolute state. In addition, different authors name different aspects of VTs as definitional. It seems rather clear that, for a VT to be a team, it should consist of more than one person collaborating towards a common goal (e.g., Hertel et al., 2005; Lipnack & Stamps, 2000). Very often virtual teams are characterized by the fact that members communicate with each other mainly via information and communication technology (Axtell et al., 2004; Gibson & Gibbs, 2006). This can be put in another way: lack of face-to-face meetings is typical feature of VTs. Usually it is also proposed (e.g., Bosch-Sijtsema, 2003; Duarte & Snyder, 1999; Hertel et al., 2005) that for a team to be virtual at least one of its members must work in a different location from the others. Furthermore, many authors also include other features, such as crossing temporal, cultural, and organizational boundaries in their definitions of VTs and virtuality (see Gibson & Gibbs, 2006, for review). We do not, however, take a stance in the ongoing debate of what attributes of VTs constitute the core of virtuality. We simply study the effects of one, obviously rather important (Axtell et al., 2004), feature of VTs: the number of face-to-face meetings (see Kirkman, Rosen, Tesluk, & Gibson, 2004, for similar use).

### *Social identity approach to virtual teams*

The social identity approach provides a theoretical framework for the relationship between the individual and the group. Specifically, it consists of two distinct theories: the original social identity theory (e.g., Tajfel & Turner, 1979), and the more recent self-categorization theory (Turner, Hogg, Oakes, Reicher, & 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 behavior 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 of a group, or, in other words, identifies with the group, the more his or her attitudes and behavior 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 (e.g., Haslam, 2001; Hogg & Terry, 2001). In this context, organizational or team membership is understood to reflect on the self-concept in the same way as other social memberships do (Ashforth & Mael, 1989; Hogg & Terry, 2001). Thus, organizational identification is often 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 the self-categorization theory (Turner et al., 1987) different levels of self-definition (e.g., self as individual or self as group member) should be related to a distinct set of needs or motivators. When people categorize themselves at a personal level, they should be motivated to do things which promote their personal identity as individuals (e.g., personal advancement and growth). When group-level categorization and social identity are salient, they should be associated with motivation to do things which promote the individuals' social identity as group members, for example, through cooperation and enhancement of group goals. Accordingly, empirical studies have shown that group identification is linked to various important outcomes, such as high levels of extra-role behaviors (e.g., Tyler & Blader, 2000; 2001; see Riketta, 2005, for a review). We define extra-role behavior as behavior which benefits the team and/or is intended to benefit the team, which is discretionary, and which goes beyond the existing role expectations (see van Dune, Cummings, & McLean Parks, 1995). Hence in VTs, the shared or superordinate VT-level identity could be one tentative answer to the obvious challenge of sub-group cooperation outlined above. Based on the argumentation presented above, our first hypothesis is:

*H1: Identification with a VT is positively related to the team members' extra-role behaviors within the VT.*

#### *Structural characteristics – FTF meetings and task interdependence*

From the social identity viewpoint, the number of FTF meetings is related to social category salience (Turner, 1987; Hogg & Terry, 2001). We tend to form social categories more easily to the groups which we meet often. Therefore, it seems plausible that the more there are FTF meetings, the higher the category salience. Salient group categories, in turn, facilitate group members' identification with the group (Fiol & O'Connor, 2005). Hence we hypothesize as follows:

*H2: The number of face-to-face meeting in a VT is positively related to identification with the VT.*

Task interdependence has been named even as a management practice of VTs (Hertel, Konradt, & Orlikowski, 2004). The reasoning behind the claim is appealing. The more the tasks of VT members are coupled with each other, the stronger are the demands for team members to coordinate, communicate, and cooperate. Thus, by structuring the task in an interdependent manner, the management can foster collaboration within the team (see also Bell & Kozlowski, 2002). In a field study of VTs, Hertel et al. (2004) found also empirical support for their hypothesis, according to which task interdependence was positively related to VT effectiveness. They found that during the start-up period of one year the hypothesized relationship was rather strong ( $r = .49, p < .03$ ) but after that, the VTs having established their collaboration patterns, the relationship was no more

significant. The authors explain this effect by noting that, at the beginning of a group's life, keeping the tasks strongly interdependent helps the VT to build collaboration patterns, but it can cause process losses later on due to high transaction costs.

A complementary view to the above reasoning can be found from the social category salience effects that task interdependence may produce (Hogg & Terry, 2001). It is plausible to claim that the coordination needs created by strong task interdependence help VT members to perceive their VT as a salient social category with which they can identify. Taking a closer look at the hypotheses and findings of Hertel et al. (2004) we find that they expected and found motivational factors to (partially) mediate the relationship between structural factors (e.g., task interdependence) and outcomes (i.e., effectiveness). Similarly, the number of FTF meetings can be seen as a structural factor of VTs which is not necessarily directly related to behavioral outcomes but the effect is mediated by a motivational factor. As previously noted, based on social identity approach (Turner et al., 1987), identification with a VT could be regarded as a powerful motivational force, which may also serve as a mediator between the structural factors and extra-role behaviors. Therefore, we propose:

*H3: Task interdependence is positively related to identification with the VT.*

*H4: Identification with a VT mediates both (a) the relationship between the number of FTF meetings and extra-role behaviors and (b) the relationship between task interdependence and extra-role behaviors.*

#### *Justice concerns*

After many years of research, it is now well-acknowledged that employees' perceptions of organizational justice are critical factors influencing various important work outcomes, such as organizational commitment, job satisfaction, organizational citizenship behavior and turnover intentions (see Cohen-Charash & Spector, 2001 and Colquitt, Conlon, Wesson, Porter, & Ng, 2001, for recent reviews). These attitudes and behaviors have been found to be related to two aspects of organizational justice: (1) distributive justice - the perceived fairness of outcome distributions and (2) procedural justice - the perceived fairness of the decision-making procedures (Cropanzano & Greenberg, 1997). Given these important consequences of perceived justice, researchers have been trying to explain why people care about justice.

In order to explain the justice effects on extra-role behaviors and the mediating role of VT identification in that relationship we will use the group engagement model (GEM). The model is closely related to the social identity approach since it focuses on the identity implications of perceived fairness (Blader & Tyler, 2005). The propositions of how justice perceptions enhance cooperation were originally developed in the group-value model (Lind & Tyler, 1988) and in the relational model of authority (Tyler & Lind, 1992).

According to the GEM, the team members' identification is shaped by procedural justice perceptions (Tyler & Blader, 2000; 2001). The model suggests that procedural justice matters because it communicates information to group members about the quality of their relationship with authority and with other group members. In particular, fair procedures and treatment indicate a positive, respectful position within the group and promote pride in group membership. These feelings of respect and pride, in turn, are suggested to be related to group identification and other group-related attitudes and behavior. In other words, the proponents of the GEM claim that procedural justice perceptions in an organization create positive identification with that organization and that identification mediates the relationship between procedural justice judgments and cooperative behaviors towards the organization (e.g., Blader & Tyler, 2005). To our knowledge, GEM has not been previously tested in virtual settings.

GEM holds that it is primarily procedural fairness, in contrast to distributive fairness, that is related to identification. There is, however, reason to believe that distributive justice is also related to identification. Equity theory (e.g., Adams, 1963) assumes that an individual judges the fairness of his or her own or others' rewards based on an equity principle that dictates that persons with greater contributions should receive higher outcomes (Leventhal, 1980). In most previous studies (e.g., Cropanzano & Greenberg, 1997; Moorman, 1991), distributive justice has been operationalized based on the equity principle, because it is generally considered appropriate, especially in achievement-related contexts such as work-organizations. If outcomes are distributed in a way which is not in accordance with one's effort, it is very likely that this leads to feelings that one is not valued and respected by the group (see also De Cremer, 2002). This idea is also in line with Deutsch's (1985) argument that outcomes can have either economic or socio-emotional consequences. The argument is also supported by a study of De Cremer (2002), which showed that equity perceptions are strongly related to self-esteem and acceptance, concepts closely linked to respect, pride, and identification. In addition, recent meta-analyses show that distributive justice has significant correlations with affective commitment, a concept closely related to identification (Cohen-Charash & Spector, 2001; Colquitt et al., 2001).

Taken the above theories and empirical findings together we hypothesize as follows:

*H5: Perceptions of procedural justice are positively related to identification with a VT.*

*H6: Perceptions of distributive justice are positively related to identification with a VT.*

*H7: Identification with a VT mediates (a) the relationship between procedural justice and extra-role behaviors and (b) the relationship between distributive justice and extra-role behaviors.*

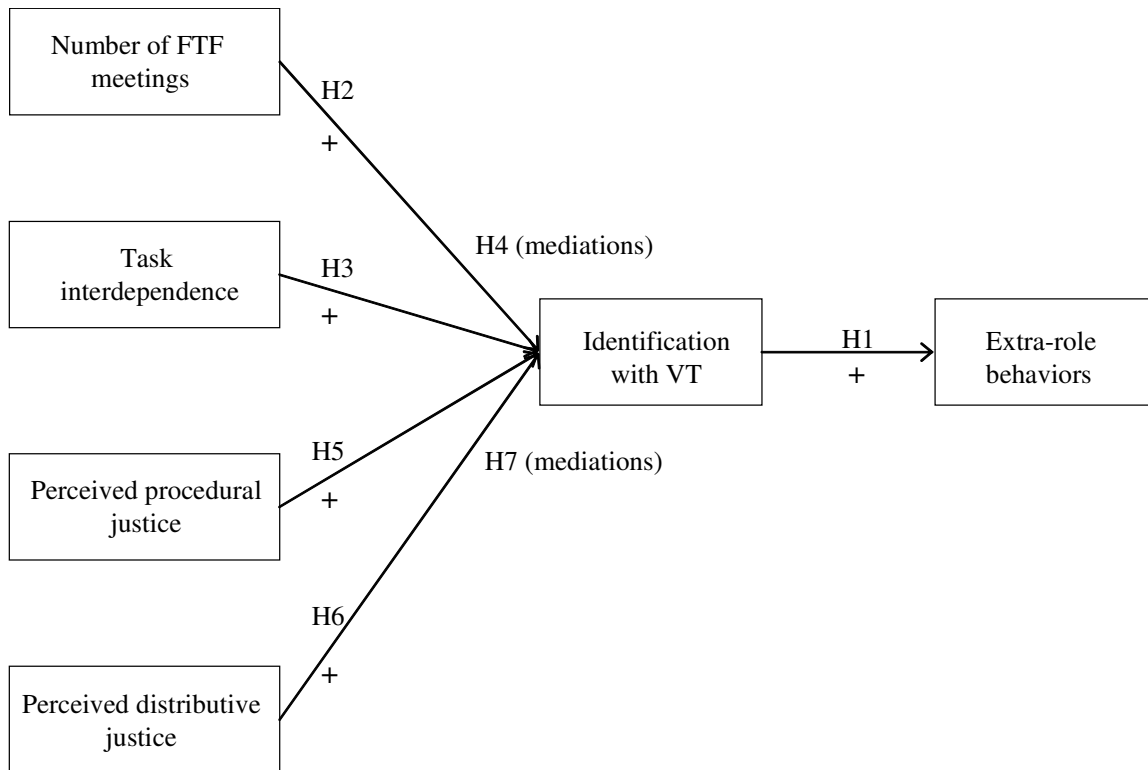


Figure 1. Summary of the hypotheses of this study

### 3. Methods

#### *Procedure and respondents*

The set-up of our study is based on a cross-sectional survey methodology. The data was gathered with a web-based questionnaire during the year 2005 from six companies participating in research projects carried out by the first author's university department. The questionnaires were sent to the members of the 14 VTs in the participating Finnish-based companies. These companies represented different lines of business, but the majority of the data was gathered from the members of VTs in multinational IT companies (9 teams). All of the VTs consisted of specialists conducting non-routine tasks. The respondent teams were selected in collaboration with the contact person in each company and following the agreement of the team leaders. The minimal conditions for selection were the following features of VTs: the teams had more than one member collaborating towards a common goal, (at least one of) the team members were located in different towns, and they communicated mainly via ICT (not FTF).

Altogether 172 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 of 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 while answering. 102 acceptable questionnaires were returned, a response rate of 59.3%. Respondents were predominantly male (71.2%), with an average age of 38.5 years ( $SD = 8.1$ ). Their mean team tenure was 24.6 ( $SD = 20.5$ ) months and they represented altogether 14 nationalities. Team size ranged from 6 to 29 members ( $M = 14.5$ ; it did not correlate significantly with any of the variables of our study).

Since the companies did not allow us access to the respondent VTs’ full demographical data we could not test statistically whether there was response bias. Due to the small sample size (102 respondents from 14 teams) we were, unfortunately, not able to perform multilevel analyses. Consequently, the data is analyzed at individual level.

### *Measures*

*Number of FTF meetings.* Since the numbers of both formal and informal team meetings were asked, the responses were summed and averaged to create the measure of number of FTF meetings. The response scale in each question was: never (1), less than monthly (2), monthly (3), weekly (4) and daily (5).

*Task interdependence.* The three-item measure developed by Campion, Medsker, and Higgs (1993) was used to assess the task interdependence (e.g., “My team cannot accomplish its tasks without information or materials from all the members in the team”). The response scale ranged from strongly disagree (1) to strongly agree (5). The measure reached moderate reliability ( $\alpha = .64$ ).

*Distributive justice.* Perceptions of distributive justice were measured with three items based upon Moorman’s (1991) measure. The evaluations focused on the team level by sharing a common opening: “When resources and rewards are distributed in our team”. The claims after the lead (e.g., “... I get a fair share considering the stresses and strains of my job”) tapped the perceived equity of distributions from different angles.

*Procedural justice.* Employees’ perceptions of procedural justice were measured with eight items derived from previous scales by Moorman (1991) and Tyler and Blader’s (2000) procedural justice scale. The items reflect the three aspects of fair procedures and treatment suggested by the group value model: neutrality, trustworthiness, and status recognition, and they focus on both the quality of the team’s decision-making procedures and the quality of treatment at the team level. The response focus was highlighted to be at the team level by opening all the questions with “When decisions are made in our team”. The claims after the focus-creating lead tapped the procedural aspects outlined above (e.g., “... they are based on accurate information”, or “... I am dealt with in a truthful manner”). In the distributive and procedural justice measures, the items were answered on a five-point scale ranging from strongly disagree (1) to strongly agree (5).



To test the empirical distinctiveness of the two justice dimensions, a principal-components analysis (PCA) with oblimin rotation was conducted. PCA yielded two components (Eigenvalue of component 1 = 5.39; component 2 = 2.0; variance explained by component 1 = 49.0%; component 2 = 18.3%) which accounted for 67.3% of the total variance. All of the procedural justice items loaded on the first component and all the distributive justice items on the second component. There were no cross-loadings above .35. The Cronbach's alpha for the distributive justice measure was .94 and for procedural justice .89.

*Team identification.* Identification with VT was measured using a modified version of the organizational identification scale developed by Mael and Ashforth (1992). One original item regarding public opinions was not used, since teams seldom attract the same publicity as organizations. In addition, the questions were modified to assess the team level identification (e.g., "When I talk about this team, I usually say 'we' rather than 'they'"). The response scale was similar to the justice items. The Cronbach's alpha for this five-item scale was .81.

*Extra-role behaviors.* To measure the extra-role behaviors, a scale developed and tested by Olkkonen and Lipponen (2006) was used. They used items from three existing scales (Smith, Organ & Near, 1983; O'Reilly & Chatman, 1986; Tyler & Blader, 2000) to develop their six-item measure (e.g., "I have volunteered to do tasks beyond my job description in order to help my team to succeed"). One item regarding information and innovation sharing ("I have shared information and innovations in my team even when I was not required to do so") was added to the scale, since the work in all the VTs of the sample was expert work and information-intensive. The measure covered helping and innovation dimensions of OCB (Moon, Van Dyne, & Wrobel, 2005). The scope of respondent's thinking was limited to the last month by a common question ("How often have you engaged in the following behaviors during last month?") before the items. The final seven items were answered in a five-point scale: never (1), seldom (2), sometimes (3), often (4), and very often (5). The reliability of the measure was good ( $\alpha = .84$ ).

## 4. Results

The descriptive statistics and correlations between the studied variables are presented in Table 1. As can be seen, the respondents were relatively highly identified with the VT ( $M = 3.90$ ). In addition, identification with the VT was strongly ( $r = .41, p < .001$ ) related to extra-role behaviors within the VT, as we predicted (H1). Interestingly, none of the other variables had a significant correlation with extra-role behaviors.

Table 1. Descriptive statistics and Pearson correlations among the variables ( $N = 102$ )

Variables	M	SD	1	2	3	4	5
1 No. of FTF meetings	2.94	1.01					
2 Task interdependence	3.50	0.86	.08				
3 Distributive justice	3.51	1.05	-.04	.12			
4 Procedural justice	3.80	0.72	.04	.12	.40**		
5 Identification	3.90	0.75	-.05	.25*	.14	.40**	
6 Extra-role behaviors	3.67	0.77	.04	.11	.04	.07.	.41**

\*  $p < .05$ ; \*\*  $p < .001$ ; two-tailed

To test the main effect hypotheses, H2, H3, H5, and H6, we regressed identification with VT on both the structural variables and the justice variables. The results are shown in Table 2. In order to investigate the relative importance of structural and justice variables, we entered them into analysis in two steps. Our structural variables accounted 7% of the variance in identification, and adding the justice variables significantly increased the amount of variance explained ( $R^2 = .22$ ,  $p < .001$ ;  $R^2_{change} = .15$ ,  $p < .001$ ). Task interdependence (H3) and procedural justice (H5) were, in turn, positively related to identification ( $\beta = .22$ ,  $p < .05$  and  $\beta = .40$ ,  $p < .001$ ), just as we expected. Contrary to our hypothesis H2 and H6, the number of FTF meetings and distributive justice were not related to identification ( $\beta = -.08$ ;  $n.s.$  and  $\beta = -.06$ ,  $n.s.$ ).

Table 2. Hierarchical regressions predicting identification with VT ( $N = 102$ )

	Identification	
	Step 1 $\beta$	Step 2 $\beta$
Structural variables		
Number of FTF meetings	-.08	-.08
Task interdependence	.26*	.22*
Justice variables		
Distributive justice		-.06
Procedural justice		.40**
$R^2$	.07*	.22**
$R^2_{change}$		.15**

\*  $p < .05$ ; \*\*  $p < .001$ ; two-tailed

We used hierarchical regression to test the mediation hypotheses H4 and H7 (Table 3). In the first step we entered the structural variables (the number of FTF meetings and task interdependence) and the two justice variables (distributive justice and procedural justice)

into the equation. In the second step, to test the mediation, identification was entered into the regression model. As can be seen from the Table 3, neither the structural nor justice variables had a main effect on extra-role behaviors. Rather, as we predicted, identification had a strong relationship with extra-role behaviors ( $\beta = .46, p < .001$ ). Since the independent variables had no main effect on extra-role behaviors, their beta coefficients did not change significantly after the entry of the expected mediator. This pattern violates the classic third rule of the four-step mediation testing strategy, that is, the independent variables should be related to the dependent variable (Baron & Kenny, 1986). However, several subsequent authors (e.g., Kenny, Kashy, & Bolger, 1998; Shrout & Bolger, 2002) have suggested that the relationship between independent variables and the dependent variable is not a necessary condition for the mediation. The essential criteria for establishing mediation were met here (Kenny et al., 1998), since task interdependence and procedural justice (independent variables) were related to identification (mediator; see Table 2) and identification was related to extra-role behaviors (dependent variable; see Table 3). The mediation hypotheses regarding the number of FTF meetings (H4a) and distributive justice (H7b) were naturally rejected, because these variables were not related to identification.

Table 3. Hierarchical regression predicting extra-role behaviors ( $N = 102$ )

	Extra-role behaviors	
	Step 1 $\beta$	Step 2 $\beta$
Independent variables		
Number of FTF meetings	.03	.07
Task interdependence	.10	.00
Distributive justice	.01	.03
Procedural justice	.05	-.13
Mediator		
Identification		.46**
Totals		
$R^2$	.02	.19**
$R^2_{change}$		.17**

\*  $p < .05$ ; \*\*  $p < .001$ ; two tailed

To substantiate the mediation findings we computed the Sobel's statistics for the two mediation paths. For the task interdependence – identification – extra-role behaviors path the Sobel's test value  $z$  was 2.01 ( $p < .05$ ) and for the procedural justice – identification – extra-role behaviors path  $z$  was 3.02 ( $p < .01$ ). Thus, the mediation hypotheses regarding these two paths (H4b and H7a) gained further support.

We also conducted some additional analyses in order to create more confidence on our findings. For example, as our data was gathered from 14 different teams we also controlled for teams in our analyses. Teams were added as dummy variables into regression models, and the results relating to the variables of our study were virtually identical to those presented in Tables 2 and 3.

## 5. Discussion

Our finding, according to which the number of face-to-face meetings of the VT, was not related to identification is, at first glance, rather surprising. It seems to contradict our assumption that rare meetings blur VT level social category salience and hence impedes identification formation with VT. In the light of current literature, we must note that our data sets us limitations in capturing the essential features of VTs. Even though the number of FTF meetings is obviously relevant in VTs, it certainly is not the only relevant attribute of such teams. Hertel et al. (2005) suggest, for example, the relative amount of face-to-face communication and mediated communication, and the average distance between team members, as key attributes of VTs. Furthermore, Gibson & Gibbs (2006) propose geographical dispersion, electronic dependence, structural dynamism, and national diversity to be associated with VTs or virtuality. Our measure might simply not have been sufficiently wide to capture the complex nature of VTs. Thus, it remains the task of further research to use more covering sets of variables that characterize VTs and study their effects on identification and extra-role behaviors.

Based on our results, it seems that task interdependence is an important factor in VTs. A practical implication of this is that it can be used as a management practice, forcing the remote sub-groups and individuals to coordinate their activities and to encourage them to cooperate effectively as suggested by Hertel et al. (2004). Our outcome variable was a self report of extra-role behaviors, whereas Hertel et al. (2004) used manager-rated effectiveness as their outcome measure. Still, the pattern between these two studies is interestingly similar. In both studies it was assumed, and found, that task interdependence has an mediated effect on behavioral outcomes and that the mediator is a motivational construct. Our approach highlights the importance of VT-level identity in shaping the cooperative behaviors, as suggested by earlier research on organizational identity (see e.g., Riketta, 2005, for a review). Hence our theorizing based on the social identity approach provides a complementary explanatory mechanism to the one suggested by Hertel et al. (2004). Unfortunately, we were not able to control the objective team age and its effects on task interdependence as Hertel et al. (2004) did.

This study gave a strong indication that procedural justice matters also in VTs. Procedural justice was positively related to identification with the VT, which, in turn, was strongly related to cooperative or extra-role behaviors. This result is in-line with assumptions of the group engagement model (GEM) of organizational justice (Tyler & Blader, 2000, 2001) and suggests that the perception of fair decision-making and the

perceived quality of interaction are important in VTs. Concretely, these results imply that leaders and members striving to make their VTs successful, should enhance fair and transparent decision-making procedures as well as respectful interpersonal treatment. Contrary to our expectations, distributive justice perceptions were neither related to identification, nor to extra-role behaviors. One possible explanation for this may be that we measured distributive justice at the team level and in this particular context the team members had limited power to allocate rewards and resources, especially when compared to the authorities that represent the whole organization (e.g., immediate supervisors in the traditional line organization). Thus, the relative importance of distributive justice perceptions in carrying identity-relevant information may therefore be much weaker.

As already noted above, we found that identification is an important factor in predicting behavioral outcomes in VTs, at least extra-role behaviors. In the light of the GEM, and the social identity approach more generally, our results suggest that similar identity dynamics appear in co-located and virtual settings. As Martins et al. (2004) state, VTs are primarily teams, and the researchers should try to find to what extent the results found in co-located teams apply also to VTs. Simultaneously, we should be cautious in expecting similar dynamics in all kinds of teams and try to map the new phenomena in VTs. Nevertheless, our study supports the applicability of the social identity approach also to VTs.

There are also some limitations in this study which are worth mentioning. The problems of using a single measure to characterize VTs are discussed above. Even though we have used the terms like antecedent, consequence, and effect in the title and some points of our article for the sake of simplicity, we naturally can not infer causality from the present cross-sectional study. Longitudinal studies of VTs could overcome this problem. In addition, the use of solely self-report measures naturally risks the reliability and validity of the findings (common method variance).

Since the quantitative field research of VTs is rather rare and has been called for (Hertel et al., 2005), our study helps in filling this gap. A look at the regression statistics shows that we were able to explain 22 per cent of the variance of identification and 19 per cent of the variance of extra-role behaviors. The figures are not necessarily impressive, but we strove for theoretical coherence and novelty, not for maximizing the explained variance. Our small sample forced us to keep our analyses at individual level and prevented us from performing group-level analysis (see e.g., Liao & Rupp, 2005). In addition, the small sample may have hidden some relationships, such as the one between task interdependence and extra-role behaviors, simply due to the lack of statistical power.

Taken together, the results of the present study suggest that VT researchers might want to explore identification with and justice within VTs in more detail. The wider application of the social identity approach is certainly worthwhile for further VT research. This work has begun (e.g., Mortensen & Hinds, 2001), but the field studies are still rare (Hertel et al, 2005; Martins at al., 2004). Moreover, in the previous literature on VTs the concept of trust is often mentioned and the relationship between trust and team success has been

rather frequently studied (e.g., Jarvenpaa & Leidner, 1999; Zolin, Hinds, Fruchter, & Levitt, 2004), but the nearby construct of justice has thus far been largely neglected. Therefore, one potential direction for future research would be to study the complex relationship between trust and justice in virtual settings.

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