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# Conflict, Conflict Management and Performance in Virtual Teams

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# Conflict, Conflict Management and Performance in Virtual Teams

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## ABSTRACT

Although conflict is widely acknowledged as critical to virtual teams, little is known regarding the interplay between different types of conflict and the corresponding conflict management styles in virtual teams. This paper examines the influence of relationship as well as process conflict on team performance together with adequate conflict management styles. Using survey and archival data from a massively multiplayer online game (MMOG), this study's findings show that team performance is strongly influenced by conflict and that this relationship is moderated by conflict management style. While relationship conflict negatively influenced team performance, process conflict positively influenced performance. Furthermore, we found competitive conflict management moderated the relationship of process conflict and performance while relationship conflict was moderated by collaborative conflict management. Detailed discussion of the findings is provided in the conclusion of the paper.

**Keywords:** *Conflict, conflict management, virtual teams, massively multiplayer, performance*

## INTRODUCTION

The importance of conflict in teams prior to decision making has long been stated by researchers (Jehn and Mannix 2001). Scholars have consistently argued that conflict can be higher on geographically distributed teams compared to collocated teams (Hinds and Bailey 2003; Mannix et al. 2002; Mortensen and Hinds 2001). Communication in virtual teams, besides the growing advances in technology, still requires a great deal of effort (Straus 1996). Gestures and nonverbal nuances are not easily captured or transmitted what makes interaction and consensus building difficult (Straus 1996). These communication and coordination difficulties create great potential for conflict in virtual teams (Jarvenpaa et al. 1998; Turoff et al. 1993). On the other hand, research also finds that virtuality can reduce team process losses associated with conflicts commonly experienced by face-to-face teams (Kirkman et al. 2002). However, the extent and effects of conflict in virtual teams have been found to depend on several factors. Members' perception of having a common group identity within virtual teams lowers the amount of conflict (Mortensen et al. 2001) while the ability of virtual teams to manage their conflict depends on how teams adapt their use of technology to handle their conflict (Poole et al. 1991). Research also indicates that successful virtual teams tend to manage their internal conflict by using either competitive or collaborative conflict management styles (Montoya-Weiss et al. 2001).

The impact of conflict on the team also depends on the type of conflict experienced by the group. In that more personalized and emotional conflict is particularly disruptive to group functioning. Research suggests that groups experience three distinct types of conflict: task, relationship and process conflict. (Jehn 1995). Task conflicts is based on disagreements on strategies and approaches to the group's task, relationship conflict concerns personal and emotional disagreements within the group and process conflict centers on allocation of resources. Research suggests that all three forms can undermine group performance

but that each poses unique impediments to group functioning (De Dreu et al., 2003). Although research suggest that conflict management strategies mitigate the adverse effects of intragroup conflict (Sawyer 2001), what is not clear is whether certain forms of conflict management are more or less effective on the type of conflict experienced in virtual groups.

The goal of this investigation is to address this gap. Specifically, this study focuses on different types of conflict, namely relationship and process conflict, and their effect on performance of virtual teams. Furthermore, this study investigates the moderating influence of conflict management styles on the relationship between conflict and performance. This study is guided by the following questions: In investigating these relationships, we seek to bring empirical evidence to bear on the virtual team dynamics regarding conflict, conflict management styles, and performance with the team. We approach our research questions by using the unique setting of an online game. These games are said to be natural laboratories for studying virtual teams in their environment (Bainbridge 2007; Castronova 2006; Reeves et al. 2008). This context allows us to obtain objective team outputs as well as perceptual data in a setting in which participants are highly engaged over an extended period of time. Team members in this setting are physically dispersed and interact through the use of computer-mediated communication technologies. The remainder of this paper is organized as follows. First, the study gives an overview of the relevant literature. Next, theory and hypotheses are presented, followed by a description of the research method. We then display the results of the study. Finally, the study's results, contributions and limitations are discussed.

## **THEORETICAL FOUNDATIONS AND HYPOTHESES**

### **Conflict**

Conflict is defined as the experience between or among individuals that their goals or interests are incompatible or in opposition to one-another (Korsgaard et al. 2008). There are three main types or bases of conflict, relationship conflict, task conflict, and process conflict differing in their object of disagreement. Relationship conflict is a perception of personal antipathies and incompatibility between individuals, whereas task conflict is said to be a perception of disagreements among individuals about the content of their decisions, tasks, objectives and procedures (Jehn 1995). Process conflict concerns disagreements regarding how resources should be allocated to accomplish the group's tasks. The impact of task conflict and relationship conflict has received considerable empirical attention (Jehn et al. 2001), while the effect of process conflict is not as clearly established (Hinds and Mortensen 2005). Thus, to gain further insights into these types of conflict, we incorporate process conflict into this study. As will be explained later in the paper, the context of the teams we studied involved very clear goals and objectives, so substantial differences, opinions or ideas about what to do in the game were not likely to occur. Therefore, it is not likely to see much variance in task conflict between the groups. The study therefore focuses on relationship as well as process conflict and their influence on team performance.

### **Relationship Conflict**

Relationship conflict reflects the interpersonal and emotional side of the conflict dimensions. It centers on personal issues such as dislike among group members and is associated with feelings such as annoyance, frustration, and irritation (Jehn et al. 2001). Studies have shown that relationship conflict is mostly detrimental to individual and group performance (De Dreu and Weingart 2003; Jehn 1995; Shah and Jehn 1993). Researchers have reported that affective conflict detracts from performance in student project teams (Jehn et al. 1997), work and management teams (Jehn 1997) as well as top-management teams (Amason and Sapienza 1997; Eisenhardt et al. 1997). These effects have been explained by relationship conflict increasing emotionality within the team, distracting members from the task at hand (Jehn and Bendersky 2003), making members less open to the work-related ideas of other members (Pelled et al. 1999), and thereby inhibiting members' effective task performance (Greer et al. 2008). Research posited that their evasion nullified the relationship between relationship conflict and performance. In line with previous research we hypothesize the following:

*H<sub>1</sub>: Relationship conflict in a virtual team is negatively related to team performance.*

### **Process Conflict**

Process conflict involves disagreements about how resources and activities should be handled and how to proceed in order to accomplish tasks. Although not as widely researched as relationship conflict, process conflict has been found to also have a consistent, negative impact on group outcomes (Behfar et al. 2008; Greer et al. 2008). Process conflict has been shown to decrease productivity (Jehn 1992). Jehn (1997) observed that process conflict interferes with productive work processes and can delay the completion of group tasks. Process conflict can also lower group morale (Jehn et al. 2001) and foster the

likelihood that members exit the team (Jehn et al. 2001). One explanation for these findings is that when a group argues about responsibilities and resources, individuals are dissatisfied with the uncertainty caused by the process conflict and feel a greater desire to exit the group (Jehn et al. 2001). In addition, process conflicts interfere with task quality and often lead focus on irrelevant discussions of member ability (Jehn 1997). Continually discussing task assignments in groups lead to ineffective work performance (Jehn et al. 1999). Therefore we hypothesize the following:

*H<sub>2</sub>: Process conflict in a virtual team is negatively related to team performance.*

### **Conflict Management Styles**

Although research on conflict has often examined conflict resolution, there has yet to be extensive research examining conflict resolution in conjunction with the specific intra-group conflict types, i.e. relationship and process conflict (Greer et al. 2008; Weingart and Jehn 2000). In this study, we draw on the work of (Montoya-Weiss et al. 2001), who extracted five different conflict management styles for their work on virtual teams. They based their scales on the work of Rahim (1983). The five different conflict management styles in their work are avoidance, accommodation, competition, collaboration, and compromise. Competition behavior is characterized by each person pursuing his or her own interest before others. This behavior comprises for example concealment of information, negative attitudes towards alternative solutions, and competitiveness (Montoya-Weiss et al. 2001). Competition behavior usually involves the use of power since one party tries to dominate the ideas of others. Collaboration behavior on the other hand, tries to incorporate the interests and ideas of all parties involved. This emphasizes openness to other points of view, objective consideration of alternatives, integration of all relevant information as well as shared efforts.

Contrary to previous research that used the conflict management styles on the individual level, we examine conflict management styles on the group level. We assume that teams develop reliable and shared strategies for conflict management. These strategies are likely to emerge based on the styles of individual team members as well as the nature of the tasks and conflicts team members are exposed to. Based on these assumptions, we focus on two distinct management styles that we posit to be particularly likely to emerge in virtual team settings: collaborative and competitive management. In this context, collaboration is a task requirement, as teams must work together to achieve a collective goal. A collaborative conflict management style should be an accessible and well-learned strategy when faced with conflicts within the team. At the same time, the dynamics of the game are highly competitive and adversarial between teams wherein teams interact with other teams in a competitive manner. Given that teams are regularly engaged in competitive, win/lose encounters with other teams, a competitive approach to managing conflicts is apt to be a salient strategy to teams when faced with conflicts within the group.

Kankanhalli et al. (2007) found that conflict resolution approaches moderate the relationship between conflict and team performance in virtual teams. According to the authors, conflict resolution approach is not likely to influence team performance by itself, but is likely to influence performance in conjunction with the type of conflict (Kankanhalli et al. 2007). Specifically, relationship conflict should be resolved through collaboration to avoid harmful effects on performance. Avoidance resolution can leave members with low cohesion and team efficacy, leading to lower performance (Kankanhalli et al. 2007). Thus, we expected a collaborative approach to mitigate the negative relationship between relationship conflict and team performance. Therefore, we hypothesize the following:

*H<sub>3</sub>: A collaborative conflict management style in a team will moderate the effect of relationship conflict on performance such that the negative effect of relationship conflict on group performance will be weaker when the group is high in collaborative conflict management.*

As there are results from case studies on the relationship between relationship conflict and management styles, there are no results so far on the relationships of process conflict and the adequate management styles. This study is investigating top management teams. The decisions on how to proceed for example before attacks has to be made very quickly and efficiently. Therefore, we believe that a collaborative management style would need too much efforts and time. The use of authority however would be the fastest process.

Research is lacking on the joint effects of process conflict and conflict management styles, but there is reason to believe competitive conflict management is especially relevant to the effects of process conflict. At the heart of process conflict is disputes over resources, be they the time and effort of team members or the supplies and equipment used by the team. Resource allocation decisions can easily become polarizing because the material interests of individuals are pitted against one another and against the good of the group. As team members become focused on efforts to gain, or avert losses of personal resources and power, the conflict becomes distributive or competitive in nature. To the extent that a team frames process

conflict as a competition, a competitive conflict management style is likely to appear to be a legitimate method for resolving the conflict. Under these circumstances team members are more apt to accept decisions arrived at through competitive conflict management (or at least, be less resistant to these decisions) and be committed to the team's course of action. Moreover, resource allocation decisions are likely to become politicized and difficult to resolve through consensus. Because a competitive conflict management style involves resolution through power, it may lead to a more autocratic – as opposed to consensus-based -- decision making process. In this way, competitive conflict management can result in more timely decisions. In sum, we propose that a competitive conflict management style will mitigate process conflict.

*H<sub>4</sub>: A competitive conflict management style in a team will moderate the effect of process conflict on performance such that the negative effect of process conflict on group performance will be weaker for groups that are high in competitive conflict management.*

The hypothesized relationships are summarized in the following model.

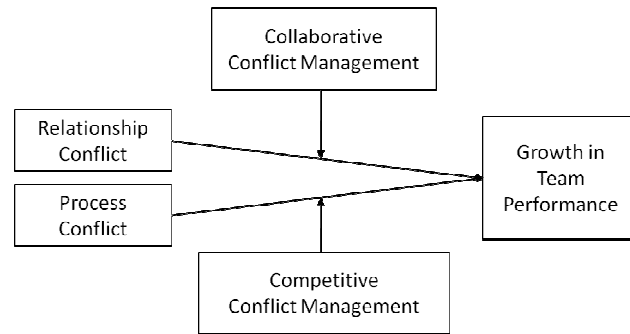


Figure 1. The research model

## METHOD

### The Online Game Context

As described in an article in *Science* (Bainbridge 2007), social scientists are beginning to discover the research potential of virtual worlds. The context of an online game in this study has the advantage of being highly engaging and psychologically meaningful to participants compared to laboratory simulations (Williams et al. 2006; Yee 2006). Often the relationship between players is compared to the relationship between co-workers in their real job (Williams et al. 2006). Our data was derived from a popular browser based MMOG called Travian with up to 25,000 players on a given server. The game itself is a real-time strategy game. Players start out as chieftains of their own villages and seek to gain natural resources, build armies and expand their realms. The game is timed to last approximately one year, at which one entity being deemed the winner based on the fastest completion of a certain building called “wonder of the world”. The resources required to complete this work cannot be acquired by an individual player. Thus players must join forces, forming teams and intergroup alliances. Teamwork, diplomacy, and negotiation skills play a crucial role in this context leading to complex team structures and interactions between and among teams. Alliance members become colleagues, and losing a village or contingents of soldiers causes real emotions, suggesting psychological involvement. Team members are physically separated and interact through various electronic media (e.g., instant messaging, email, discussion forum). Thus the teams in this study can be regarded as virtual teams.

In this game, players form teams of up to 60 members under a smaller leadership team. Given that intragroup conflict is a small-group phenomenon (e.g. < 10 player), the focus of our study was the leadership teams of these large teams.

### Sample and Procedure

We collected data on the leadership teams engaged in the game on one server. In total, 537 players were members of leadership teams. We collected data directly from the computer servers and from a questionnaire which is distributed to subscribed players in virtual teams. We posted the survey on the game website, which was restricted to participants over 18 years of age, and obtained responses from 396 leadership team members, constituting a response rate of 67%. Because we aggregated data to the team level, we only used data from teams for which we received more than two players answering the survey so that we had sufficient numbers of responses to justify the aggregation of the measures. Using these criteria, we identified 116 members in 25 leadership teams. The average age of the surveyed players was 35, ranging from 18 to 61 years

and 28% of the sample was female. The average ally size was 46 players ranging from 14 to 60 players. The average size of the top-management team was seven leaders ranging from two to 15 leaders.

## Measures

*Dependent Variable.* The data on team performance was obtained directly from the in-game scoring system provided by log-files of the game server. We measured team performance on two different points in time and calculated the growth as the percent change from one period to another over this period.

*Independent Variables.* The data on relationship conflict and process conflict was obtained from the survey. The three items for relationship conflict and the three items for process conflict were adapted from Jehn and Mannix (2001). The items were rated on a five-point Likert-type scale with anchors of “not at all” and “a great deal”. The measures showed acceptable reliabilities with Cronbach’s  $\alpha = .87$  and  $\alpha = .83$ , respectively. Items were averaged to a single score per individual and the individual scores were aggregated to the team level. The data on conflict management styles were obtained from the survey (Montoya-Weiss et al. 2001). We adapted the seven measures for the two conflict management behaviors from Montoya-Weiss et al. 2001. The measures showed acceptable reliabilities with Cronbach’s  $\alpha = .93$  for the collaborative management (five items) and  $\alpha = .82$  for the competitive management (two items), respectively. These scores were then aggregated to the team level. Factor analyses for the conflict scales as well as for the conflict management scales showed that all measures loaded on the supposed factors and are therefore distinct constructs. All independent variables were recorded at the first data collection.

*Control Variables.* Data on gender, age, and task conflict was obtained from the survey. Data on group sizes was obtained directly from the log-files of the game.

## RESULTS

Table 1 shows means, standard deviations and correlations for variables of our study.

Variable	Mean	STD	1	2	3	4	5	6	7	8	9
1 Performance Growth	7.3	3.0	1								
2 Task Conflict	2.4	0.4	-0.3	1							
3 Ally size	45.5	11.0	-0.3	0.0	1						
4 Age	35.0	5.0	0.4 *	0.2	-0.1	1					
5 Gender	0.7	0.2	-0.2	0.3	0.1	-0.4 *	1				
6 Relationship Conflict	2.0	0.4	-0.2	0.7 *	-0.2	0.3	0.2	1			
7 Process Conflict	2.0	0.4	0.0	0.7 *	0.0	0.2	0.1	0.7 *	1		
8 Competitive Mgmt.	3.0	0.5	-0.5 *	0.2	0.1	-0.3	0.3	0.1	0.0	1	
9 Collaborative Mgmt.	4.2	0.4	-0.1	0.0	-0.6 *	-0.2	-0.2	-0.2	0.0	0.0	1

\*  $p < .05$ ,  $N=27$

Table 1. Means, standard deviations and correlations for study variables

Table 2 shows the results of OLS analyses for the predictors of team performance. In the column called model 1 we inserted our control variables while in column labeled model 2 we tested our independent variables for hypotheses 1 and 2. Hypothesis 1 predicted that relationship conflict in a virtual team is negatively related to team performance. As shown in table 2, this hypothesis was supported ( $\beta = -4.9$ ,  $p < .05$ ). Hypotheses 2 regarding the negative relationship between process conflict and team performance, was not supported. Contrary to our hypothesis the influence of process conflict on performance was significantly positive ( $\beta = 3.9$ ,  $p < .05$ ). The column labeled model 3 includes the hypothesized moderation of our third hypothesis. Hypothesis 3 stated that the negative relationship between relationship conflict and virtual team

performance is moderated by collaborative conflict management. This hypothesis was supported ( $\beta = 4.8, p < .1$ ). Finally, hypothesis 4 stated that the negative relationship between process conflict and virtual team performance growth is moderated by competitive conflict management. Even though we found a positive relationship between process conflict and performance the interaction testing of this hypothesis was significant ( $\beta = 5.1, p < .01$ ). The control variables alone (task conflict, ally size age gender) explain 35% of the variance in the dependent variable (team performance). Out of the control variables task conflict and age are significantly related to team performance, the other control variables are not. By adding the independent variables (relationship conflict, process conflict, competitive and collaborative management) we explain additional 29% of the variance and now altogether 64% of the variance of the dependent variable (team performance). Relationship conflict is significant (negative) whereas process conflict is significantly positive. By adding the moderation terms into the regression model, we explain additional 14% of the variance in the dependent variable. Our final model explains 78% of the variance in team performance.

To interpret the results of the moderation hypotheses, we estimated the simple slopes for these relationships 1 s.d. above and below the mean of the moderator. The slopes plotted in Figure 2 support the hypothesized relationship: the negative relationship between relationship conflict and performance was mitigated by a collaborative conflict management style.

	Performance Growth					
	Model 1		Model 2		Model 3	
	$\beta$	SE	$\beta$	SE	$\beta$	SE
Intercept	8.45	(5.00) *	29.45	(8.91) ***	100.33	(25.80) ***
Task Conflict	-2.40	(1.20) *	-0.94	(1.40)	-0.78	(1.15)
Ally size	-0.10	(0.05)	-0.20	(0.05) **	-0.12	(0.04) **
Age	0.23	(0.10) **	0.15	(0.10)	0.13	(0.08)
Gender	0.25	(2.90)	0.15	(2.44)	-1.12	(2.10)
Relationship Conflict			-4.94	(1.64) **	-29.71	(11.83) **
Process Conflict			3.90	(1.63) **	-10.06	(6.88)
Competitive Mgmt.			-1.45	(0.85)	-10.50	(4.13) **
Collaborative Mgmt.			-2.74	(1.22) **	-13.30	(5.40) **
Proc_x_Comp					5.08	(2.80) *
Rel_x_Coll					4.82	(2.30) *
R <sup>2</sup>	.35		.64		.78	

Note. Unstandardized parameter estimates are reported in the body of the table, with standard errors reported in parentheses;

\*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$ ; \*\*\*\*  
 $p < .001$

Table 2. OLS results for performance growth

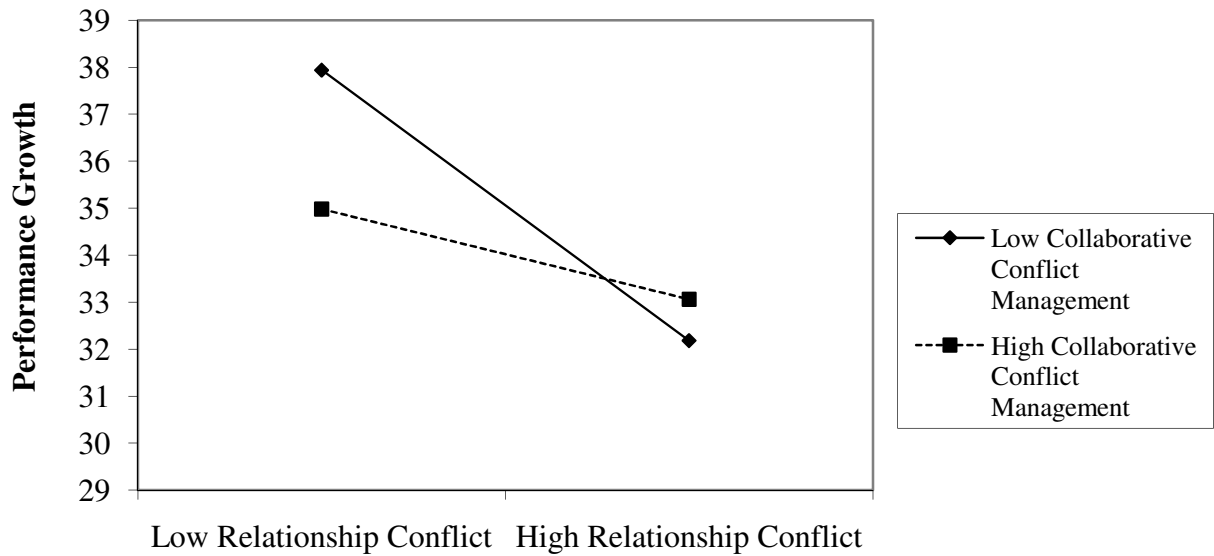


Figure 2. Simple slopes for the interactions of relationship conflict and collaborative management style

Finally, hypothesis 4 stated that the negative relationship between process conflict and virtual team performance is moderated by competitive conflict management. This relationship was significant; the simple slopes illustrating the interaction are plotted in Figure 3. We expected that a competitive style would exacerbate the adverse effect of process conflict. Given that process conflict was positively related to performance, this pattern was not possible. However, we did find that competitive conflict management strengthened this positive relationship. Thus, the pattern supports the general contention that a competitive conflict management style is helpful for managing process conflict.

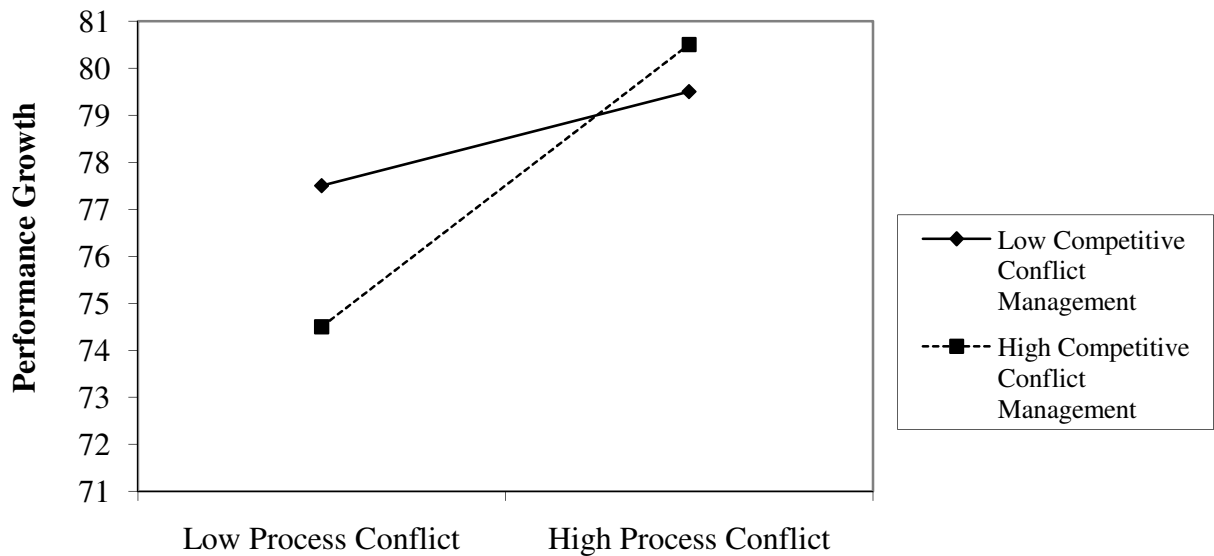


Figure 3. Simple slopes for the interactions of process conflict and competitive management style



## DISCUSSION

This investigation sought to address a significant gap in the research on conflict and conflict management in virtual teams. Although theory indicates the importance of conflict management styles in combination with different types of conflict in virtual settings, there is a noted absence of empirical research on these relations especially in virtual teams. To address this gap, we investigated the influence of two distinct types of conflict, namely relationship and process conflict, on performance growth of virtual teams as well as the moderating influence of two conflict management styles. We examined these relationships utilizing a unique combination of survey and longitudinal, unobtrusive data in the context of an online computer game. In general, the findings indicate that conflicts in virtual teams have significant consequences for the team performance growth. This empirical study underlines previous qualitative research findings and answers calls for studies that incorporate both at the same time, conflict types as well as conflict management styles (Kankanhalli et al. 2007).

The results show that relationship conflict negatively influences the growth of team performance. As expected, this relationship was moderated by collaborative conflict management. The simple slopes on the influence of relationship conflict on performance revealed that teams that are high in collaborative conflict management are less negatively affected by relationship conflict in terms of decreasing performance while teams that are low in collaborative conflict management respond to high relationship conflict with an intense decline in team performance.

Contrary, opposed to our hypothesis, process conflict positively influenced the growth of team performance. This result might be attributable to the specific context of this study. As noted above, goals and objectives in this game were clear and unambiguous, and team members were highly interdependent for their not only their collective success but for their survival in the game. Thus, under circumstances where there are shared goals that are clear and in which individuals feel a personal stake, process disputes may be highly productive to developing effective task strategies. In particular, they may be less likely to be characterized by an emphasis on parochial interests. This interpretation might also be in accordance with management literature and practice claiming that “organized” process conflicts (as can be found e.g. in formal matrix structures) would create productive, performance increasing conflicts (e.g. Daft, 2009; Mintzberg and Ghoshal, 2003). The moderation results are shown with the simple slopes above. In the case of process conflict and its influence on performance teams which are high in competitive conflict management benefit slightly from process conflict more than teams that are low in competitive conflict management. Perhaps more telling is that the worst performing teams were those with little process conflict that employ a competitive conflict management style. This pattern suggests that competitive conflict management is highly disruptive when process conflict is low and somewhat beneficial when process conflict is high.

A few limitations of this study are worth noting. First, we employed a correlational design, which limits our ability to draw causal conclusions. However, this limitation is offset by the use of multiple sources of data and the temporal separation of survey data and performance data, which both mitigate self-report bias and reverse causality. In contrast to teams in actual work settings, this study was conducted in the context of a game, which may limit the extent to which the findings can be generalized. However, like many MMOGs, this particular game is highly engaging and requires many of the team-related skills and behaviors needed in virtual teams at work. Another limitation that has to be taken into account is that the measures of conflict are self-reported and then aggregated to the group level in order to reach an analysis at the group level. This method implies a so-called compositional group phenomenon. Though the indicators of agreement, such as intra-class correlation coefficients (ICCs), can be validated, this approach assumes that each member’s perception contributes equally to the conflict, which may be questioned (Korsgaard et al. 2008).

Future research may build upon the results of this study in a number of ways. As implied above, further research is needed on understanding the potential benefits of process conflict. This relationship warrants further attention. Future research should also examine the role of communication media, a critical and defining feature of virtual teams, in fomenting and managing conflict. Finally, it is not uncommon for virtual teams to span national and cultural boundaries. We suspect that a diversity of cultures may not only contribute to conflict but how teams response to different conflict management styles as well. Therefore, future research should incorporate culturally diverse samples in their studies.

This study has implications for practice as well. Clearly, conflict has implications for performance in interdependent teams. Our findings support the contention that not all forms of conflict are alike and managing conflict depends on the basis of conflict. This represents a critical team and leadership competency, made all the more important in virtual context where social bonds may be more vulnerable and miscommunication more likely. Ensuring that the team members and conflict in teams are addressed with adequate management styles is vital to virtual team collaboration.

In conclusion, the results of this study provide new insights into the effects of conflict in virtual teams and the importance of the adequate conflict management style for virtual team performance. The findings hold promise for understanding the role of conflict management in virtual teams and for discovering new routes to making virtual teams more effective.

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