



Cultural differences in the perception of critical interaction behaviors in global virtual teams

Daphne M. Dekker^{a,*}, Christel G. Rutte^b, Peter T. Van den Berg^b

^a Eindhoven University of Technology, P.O. Box 513, 5600 MB Eindhoven, The Netherlands

^b Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands

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ABSTRACT

We investigated whether members of virtual teams from the U.S., India, and Belgium perceived the same interaction behaviors to be critical for team functioning as Dutch members from an earlier study. Thirteen virtual team workers from the U.S., 11 from India, and 11 from Belgium were interviewed by means of the Critical Incident Technique Flanagan [Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin*, 51, 327–358]. The total number of critical incidents from all countries was 493 and most incidents could be grouped into the same 13 categories as those found in the original Dutch study. However, the results showed that the distributions of the critical incidents from the American, Indian, and Belgian respondents differed from those of the Dutch. Indian and Belgian respondents also mentioned a new category of critical incidents: Respectfulness. The cultural differences were interpreted by means of Hofstede's [Hofstede, G. (2001). *Cultures consequences: comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, California, U.S.: SAGE Publications] dimensions.

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1. Introduction

Due to globalization, global virtual teams are commonplace and the number of virtual teams keeps growing. In their extensive overview of research on team processes, Kozlowski and Ilgen (2006) highlighted that global virtual teams with members from different cultures are an emerging trend, but that theory and research on the subject are limited. Connaughton and Shuffler (2007) pointed out that cultural difference is an aspect, critical to the effectiveness of global virtual teams that needs to be researched. The present study offers insight into interaction behaviors that are viewed by members from different cultures to be critical for effective team functioning. Our study investigates whether (a) a category system of critical interaction behaviors in virtual teams developed in a previous study of Dutch professional virtual team workers (Dekker & Rutte, submitted for publication¹) needs to be extended when participants from other cultures are investigated, and (b) whether team workers from different cultures attach the same values to the categories. These findings are important because virtual team members, to be effective, need to understand one another's culture-driven expectations.

1.1. Critical interaction behaviors in global virtual teams

Global virtual teams are technology-mediated groups of people from different countries that work on common tasks (Hardin, Fuller, & Davison, 2007). Team members use interaction media such as chat, e-mail, audio conference, and video

* Corresponding author. Tel.: +31 40 247 5211; fax: +31 40 243 7161.

E-mail addresses: D.M.Dekker@tue.nl (D.M. Dekker), C.G.Rutte@uvt.nl (C.G. Rutte), P.T.vandenberg@uvt.nl (P.T. Van den Berg).

¹ Manuscript available upon request by the first author.

Table 1

13 categories of interaction behavior in virtual teams and how team members should behave per category (Dekker & Rutte, submitted for publication)

No.	Category label	Interaction behavior
1	Media use	Effectively matching the media to the task and effective use of media
2	Handling diversity	Taking into account language-, time zone-, and cultural differences when interacting and behaving accordingly
3	Interaction volume	Communicating short, to the point, and only when necessary
4	In-role behavior	Taking task and goal of the team seriously and complying with obligations
5	Structuring of meeting	Planning and structuring of meetings
6	Reliable interaction	Being predictable in behavior and responsive to messages of team members
7	Active participation	Showing active participation in meetings by contributing and listening
8	Including team members	Including and inviting team members for contribution
9	Task-progress communication	Communicating deadlines, actions, and progress of a task to the team
10	Extra-role behavior	Showing pro-social behavior towards team members
11	Sharing by leader	Sharing of information and decisions with the team by team leader
12	Attendance	Being involved in the meeting and not showing up late or not at all. No multitasking
13	Social-emotional communication	Talking about non-task-related subjects.
14	Respectfulness	Behaving in accordance with the hierarchy of the team

conferencing to interact with one another without needing to meet face-to-face. The more a team relies on media for interaction, the more virtual it is (Hertel, Geiser, & Konradt, 2005). Global virtual teams enable companies to combine skills, talents, and other advantages from people across the globe. Previous studies have shown that teams with members from different cultures outperform homogeneous teams (e.g. Lovelace, Shapiro, & Weingart, 2001; Watson, Johnson, Kumar, & Critelli, 1998; Watson & Kumar, 1992). The reasons for the growing number of virtual teams are obvious: reduced travel expenses, CO₂ emissions, and less working time wasted on traveling. In order to be able to compete in the global economy, organizations are almost forced to work with global virtual teams (Lu, Watson-Manheim, House, & Matzkevich, 2005).

To make virtual teams effective, it is important to focus on behaviors that are critical for effective team functioning. In a study among professional virtual team workers, Dekker and Rutte (submitted for publication) designed a framework of 13 categories that contain behaviors that are crucial in global virtual teams (see first 13 categories in Table 1). The categories contain behaviors that were perceived to be critical for the satisfaction and performance of the team. A comparison with frameworks from the literature on face-to-face interactions (e.g. Bales, 1950; Cooke & Szumal, 1994; Potter & Balthazard, 2002a, 2002b; Rousseau, Aubé, & Savoie, 2006) showed that most of the 13 categories were exclusive to virtual teams. Some categories partly overlapped with behaviors described in face-to-face frameworks, but the emphasis in virtual teams was different.

The 13 categories were derived from interviews with 30 professional global virtual team workers by means of the Critical Incident Technique (CIT) (Flanagan, 1954). However, all interviewees were working in the Netherlands, which means that the findings might be culture-specific. The first question that the present study addressed was whether the 13 categories developed in the Dutch study could be generalized to other cultures, or whether new categories would emerge if virtual team members from other cultures were interviewed. The second question was whether members from different cultures would attach the same values to the different categories. In the next paragraph we will argue why we think that the framework may be culture specific.

1.2. The impact of cultures

Global virtual teams consist of people from different national cultures with different native languages and different value systems. Hofstede defined culture as “the collective programming of the human mind that distinguishes the members of one human group from another” (1980, p. 25). Hardin et al. (2007) argued that it is reasonable to believe that cultural differences at the national level influence the way people interact in virtual teams and that, in turn, may influence team outcomes. These problems are difficult to solve because people may not realize how influenced they are by their culture until they meet people from other cultures and conflict occurs (Adler, 1983).

Janssens and Brett (2006) described three models of how teams can cope with cultural differences. An assumption that underlies these models is that people from different cultures have different cultural *precepts*. Cultural precepts are sets of norms or standards of how to interact with one another. Cultural differences in precepts, often unrecognized by the team members, can create inaccurate attributions, which leads to conflict and affects team performance (Cramton, Orvis, & Wilson, 2007; Janssens & Brett, 2006).

In the dominant coalition model, one culture dominates over other cultures. The culture of the corporate headquarters, as well as the common corporate language, usually stem from a single culture that is chosen as the dominant culture (Canney Davison & Ward, 1999). Dominant culture members may make up the majority of the team, but may also be a minority, or an individual. A second model, the integrative/identity model, stresses cooperative collaboration based on a common identity. Members of a team have adopted a common identity and superordinate goals. Janssens and Brett (2006) argued that this model is more culturally intelligent than the dominant coalition model because it generates fewer process losses. However, according to these researchers, the fusion model, in which culturally diverse teams have to accept and respect the coexistence of differences and utilize the unique qualities of those

differences, produces the best team outcomes. According to Janssens and Brett, teams that have adopted the fusion model incorporate the best knowledge available across cultures. To be able to do so, it is necessary to know what behaviors in virtual teams are viewed as critical in different cultures.

In this study we used Hofstede's (2001) cultural dimensions. There are several other frameworks about culture (for an excellent overview see Tsui, Nifadkar, & Ou, 2007), but Hofstede's work has been widely accepted and used by researchers to compare cultural groups (e.g. Leong, 2008). Moreover, Hofstede conducted his research in a high-technology organization that employed mainly highly skilled professionals and managers, an environment that is similar to that of the virtual team workers in our study. Hofstede provided five cultural dimensions that differentiate national cultures: power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation. In the next section we will discuss how, based on these cultural dimensions, one could expect differences in preferences for interaction behaviors by virtual team members from different cultures.

1.2.1. Power distance

Power distance (PD) is the acceptance of inequality between a less powerful and a more powerful individual, where both belong to the same social system (Hofstede, 2001). In other work, PD has also been referred to as *hierarchy* (e.g. Adiar, Okumura, & Brett, 2001; Glazer & Beehr, 2005; Tinsley & Brett, 2001). An example of a low PD cultural norm is that all members should have equal rights, and that subordinates and superiors are equal (Hofstede, 2001). Earley (1999) found that subordinates in low PD teams expect to be consulted by their manager before decisions are made, and that the judgment of each team member is perceived as important. Subordinates in high PD countries, on the other hand, prefer a manager who tells them what to do. Javidan and House (2001) found that input and feedback from subordinates in high PD countries are seldom solicited and that such solicitations would be seen as impolite and disloyal. Hofstede's work (2001) showed that the Netherlands scores low on PD. This score may be related to interaction behaviors perceived as critical in the framework of Dekker and Rutte (submitted for publication). It seems reasonable to believe that behaviors from the category *Including team members* are perceived as more important by low PD cultures, as compared to high PD cultures, because the input of all team members is appreciated. Therefore it could be that behaviors in this category are mentioned more often by virtual team workers from low than from high PD cultures.

In their study about media choice, Richardson and Smith (2007) found that high PD cultures prefer face-to-face communication over e-mail when contacting supervisors. Maybe the latter is seen as too informal to bridge the distance between the self and the supervisor. In Dekker and Rutte's framework, the category *Media use* is about choosing an appropriate medium for interaction. Because people from high PD cultures are more concerned about what medium to use, it could be that this category will be mentioned more often in high than in low PD cultures.

1.2.2. Uncertainty avoidance

The uncertainty avoidance (UA) dimension scores countries on how much uncertainty and ambiguity is tolerated and how much is perceived as comfortable. High UA cultures try to minimize uncertainty by, for example, strict laws and rules. Cohen, Pant, and Sharp (1996) argued that high UA cultures are inclined to support rules and regulations, to avoid risks, and are intolerant of persons with divergent ideas. Low UA cultures, on the other hand, are more tolerant of different opinions and have fewer rules (Hofstede, 2001). In a study across 62 countries (the GLOBE study), Javidan and House (2001) found that UA influences the communication process. In high UA cultures, communication needs to be clear, explicit, and based on facts. Work in low UA countries is oriented toward relationships, whereas work in high UA countries is oriented towards the task (Hofstede, 2001), and therefore the degree of UA in a culture may be related to what interaction behaviors are seen as important. One of the categories, *Social-emotional communication*, emphasizes discussing personal issues to improve relationships. Behaviors from this category were mentioned by the Dutch, who score low on UA (Hofstede, 2001). Previous findings have suggested that countries scoring high on UA might perceive the behaviors from this category as less important for effective team functioning. Thus, team members in low UA cultures, could mention behaviors in the category *Social-emotional behavior* more often than those in high UA cultures.

1.2.3. Individualism versus collectivism

On the low side of the individualism (IND) dimension, we find collectivism. Collectivism is the degree to which individuals are integrated into groups. In high IND cultures, the ties between individuals are loose, people are expected to look after themselves, and the individual's rights are seen as very important. In low IND cultures, we find people that are integrated into large, strong, and cohesive groups. Strong associations with friends and family are considered of great importance.

More than the other dimensions, individualism has been related to attitudes, values, norms, behaviors, team processes, and outcomes (Connaughton & Shuffler, 2007; Kaushal & Kwantes, 2006; Paul, Samarah, Seetharaman, & Mykty, 2005; Sarker, 2005). Previously, the IND dimension has often been used as the operationalization of culture (e.g. Kessapidou & Varsakelis, 2002; Schwartz, 1999; Stedham & Yamamura, 2004). Earley (1999) stated that individualism potentially affects communication and coordination patterns among individual team members, as well as their expectations. This gives us reason to believe that Dekker and Rutte's framework may be affected by the fact that the Netherlands scores high on IND (Hofstede, 2001). In high IND cultures, the focus is on individual performance and responsibility (Hofstede, 2001). This might be related to *Reliable interaction*, which includes being responsible for one's communication and being reliable in general.

Low IND cultures might find this less important and therefore members from low IND cultures could mention behaviors in this category less often.

With regard to behaviors in teams, McLeod, Lobel, and Cox (1996) found that low IND people are more willing to help others, make personal sacrifices, and cooperate more than people from individualistic cultures. Paul et al. (2005) also concluded that a collective orientation is related to enhanced collaboration. Unlike the Netherlands, which scores high on IND, low IND cultures believe in collective decisions (Hofstede, 2001) and may prefer behaviors in the category *Active participation* because issues need to be discussed over and over again until everyone agrees with the decision. Therefore it could be that behaviors from the category *Active participation* will be mentioned more often by virtual team workers from low than from high IND cultures.

1.2.4. Masculinity

The masculinity (MAS) dimension refers to the division of emotional roles between males and females. In low MAS (feminine) cultures, like the Netherlands, men and women have similar values. In high MAS cultures on the other hand, there is a larger gap between the values of males and females in high MAS cultures, even though females are more assertive and competitive as compared to females in low MAS cultures. To our knowledge, no differences between low and high MAS cultures have been found with regard to virtual, or face-to-face, teams. Researchers who did study masculinity mentioned no significant results (e.g. Mjøs, 2002; Smith, Peterson, & Schwartz, 2002). However, we think that the low score of the Netherlands on this dimension may have influenced what Dutch virtual team workers perceive to be critical interaction behaviors. The categories *Task-progress communication* and *Extra-role behavior* seem to be categories that contain behaviors more important in low MAS cultures. Task-process communication is usually about showing one's weakness (admitting that one cannot finish something before the deadline), something not very likely done in a more masculine environment. Also caring for others and helping them seem to be behaviors more valued in a feminine culture. Therefore it could very well be that behaviors in the categories *Task-progress communication* and *Extra-role behavior* will be mentioned more often by team members from low than from high MAS cultures.

1.2.5. Long-term orientation

The final dimension of Hofstede's model was identified in a subsequent international study with Chinese employees and managers, and was originally called Confucian Dynamism (Hofstede & Bond, 1988). On the lower end of the dimension we find short-term orientation and on the higher end we find long-term orientation (LTO). This dimension deals with virtue regardless of truth (Hofstede, 2001). Values associated with high LTO are thrift, ordering relationships by status and observing its order, having a sense of shame, and perseverance. Whereas values associated with low LTO are respect for tradition, personal steadiness and stability, protecting one's "face", and fulfilling social obligations (Hofstede, 2001). In earlier research it has been argued that this dimension is difficult to apply and understand (Fang, 2003). The Netherlands scores average on this dimension. However, higher or lower scores may possibly influence what behaviors are seen as important. We have no specific expectations with regard to LTO.

In conclusion, the discussion about Hofstede's cultural dimensions makes it likely that members of virtual teams who have different national cultures differ with respect to what interaction behaviors they perceive to contribute to the team outcome. This could first and foremost lead to entirely new categories of behaviors besides the categories already found by Dekker and Rutte (submitted for publication). Second this could lead to differences in the values attached to the 13 original categories. It is important to investigate whether team members from different cultures differ on behaviors that are critical for effective teams, because according to the fusion model of Janssens and Brett (2006), these differences should be accepted and respected. As a minimal condition, global virtual team workers should be aware of these differences. Before we move on to the method section, we would like to restate our hypotheses with regard to different values attached by different cultures to the categories:

Hypothesis 1. Global virtual team workers from low PD cultures, compared to high PD cultures, attach greater value to *Including team members*.

Hypothesis 2. Global virtual team workers from high PD, compared to low PD cultures, attach greater value to *Media use*.

Hypothesis 3. Global virtual team workers from low UA cultures, compared to high UA cultures, attach greater value to *Social-emotional communication*.

Hypothesis 4. Global virtual team workers from high IND cultures, compared to low IND cultures, attach greater value to *Reliable interaction*.

Hypothesis 5. Global virtual team workers from low IND cultures, compared to high IND cultures, attach greater value to *Active participation*.

Hypothesis 6. Global virtual team workers from low MAS cultures, compared to high MAS cultures, attach greater value to *Task progress communication*.

Table 2

Scores of the Netherlands, the United States, India, Belgium and the world's average on Hofstede's dimensions (Hofstede, 2001)

Dimension	Netherlands	U.S.	India	Belgium	World average
Power distance (PD)	38	40	77	65	55
Uncertainty avoidance (UA)	53	46	40	94	64
Individualism (IND)	80	91	48	75	43
Masculinity (MAS)	14	62	56	54	50
Long-term orientation (LTO)	44	29	61	38	45

Hypothesis 7. Global virtual team workers from low MAS cultures, compared to high MAS cultures, attach greater value to *Extra-role behavior*.

2. Method

2.1. Selection of cultures

To determine whether national cultures influence what interaction behaviors are perceived as critical, we selected professional virtual team workers from countries with national cultures that were different on some cultural dimensions but similar on others (maximum variation sampling) (Miles & Huberman, 1994). We did not pretend to study the average perceptions within the countries because for this we would have needed a representative sample of the total population. We did, however, compare perceptions between countries of individuals who work in similar jobs under similar circumstances. Selecting contrasting countries enabled us to explain whether the category pattern of the original 13 Dutch categories is culture specific. We chose the U.S., India, and Belgium because their cultures are very different from one another and from the Dutch culture. As can be seen in Table 2, each national culture is unique and in contrast with the other national cultures with regard to Hofstede's dimensions. Table 2 shows that India has a high PD, resulting in a top 10 ranking in the world. Belgium scores higher than most other European countries with a score of 65. The U.S. and the Netherlands score similar and have a PD that is lower than the world average. India and the U.S. score low on UA whereas The Netherlands has a moderate score. Belgium, on the other hand, has one of the five highest ranked national cultures (Hofstede, 2001). The Netherlands and the U.S. score high on IND. Both cultures are in the top five ranking of the world. Belgium also scores high. India scores similar to the world average score. The Netherlands has a very low MAS culture, whereas the U.S. scores high on MAS and Belgium and India have average MAS scores. As can be seen in the table, the U.S. has a short-term orientation, whereas India scores high on long-term orientation. The scores of the Netherlands and Belgium are close to the world average.

2.2. Participants

To compare the different cultures, we interviewed 36 professional virtual team workers from large multinational corporations in the U.S., India, and Belgium. The samples from these national cultures were similar with regard to size, company, team structure, job, years of experience, and interaction media used. These samples were also similar to the sample from the original Dutch study by Dekker and Rutte (submitted for publication).

Using snowball sampling (in which participants helped us to recruit other participants from different global virtual teams), we interviewed 14 virtual team workers (seven males, seven females) from the U.S., 11 (nine males, two females) from India, and 11 (nine males, two females) from Belgium. All interviewees (except one American who worked for a scientific organization) worked in a Fortune Global 500 (2006) or Forbes Global 2000 (2006) company. The companies were oil or software oriented. The years of experience with working in a virtual team in the American sample ranged from 1 to 10 years ($m = 5.3$, $S.D. = 2.7$), in the Indian sample from six months to 10 years ($m = 5.2$, $S.D. = 3.6$), and in the Belgian sample from 10 months to 15 years ($m = 5.1$, $S.D. = 4.9$). The teams had comparable sizes with an average of five locations, usually including the U.S., Europe, and Asia (mostly India). From the 14 American interviewees, nine indicated that their team also had several locations within the U.S. Thus they not only interacted virtually with people from other countries, but also with people located elsewhere in the U.S. The participants held similar jobs in their organizations: in information systems, services, sales, and human resources. Eight American, five Indian, and eight Belgian participants indicated that they were the leader or manager of their virtual teams.

The teams used e-mail, chat, telephone, and teleconference to interact. Teleconference meetings were usually scheduled on a regular basis (e.g. daily, weekly, biweekly, monthly). A tool like Net-meeting or Groove was often used in combination with the teleconference. Only one interviewee from India used videoconference as a medium to interact, and only when a virtual team member had to physically demonstrate something. Seven American, five Indian, and five Belgian interviewees had face-to-face meetings with their virtual team members on a regular basis, ranging from once a month to once a year. Three Belgian interviewees had never seen any of their team members. The other American, Indian, and Belgian interviewees had seen virtual team members during training sessions.

2.3. Procedure

We chose an open interview method because it was not known beforehand what categories would be found for the different national cultures and because we did not want to bias the results. By taking an explorative method, we left the possibility open that we would find new categories or that some categories would be more or less important than those in the study by Dekker and Rutte (submitted for publication).

In this study, examples of important positive or negative interaction behaviors were collected by means of the Critical Incident Technique (CIT) (Flanagan, 1954). The CIT is "... a set of procedures for collecting direct observations of human behavior in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles" (Flanagan, 1954, pp. 327–358). Previously, this technique proved its use in job analysis, performance appraisal, competency management (Latham & Wexley, 1981; Wiersma, Van den Berg, & Latham, 1995), dual career couples (Wiersma, 1994), and cross-cultural studies (e.g. Arthur, 2001; Driskill & Downs, 1995). Outcomes that we focused on in this study were: satisfaction of team members and the performance of the team.

An incident is considered to be critical if the observer believes that the observed behavior contributed significantly to the outcome. The interviewees were told that the incidents needed to be reported in such a way that it was as if the interviewer herself observed the incident. With this in mind, the interviewer needed to make sure that for each incident the following criteria were met: (a) actual behavior needed to be reported; (b) the actual behavior needed to have been observed by the interviewee; (c) the interviewee needed to provide relevant factors of the situation; (d) the interviewee needed to judge the criticalness of the behavior (contributed to a positive or negative outcome); and (e) the interviewee needed to make clear why he or she believed the behavior had been critical (Flanagan, 1954).

A week prior to the interview the interviewees received an overview of the interview by e-mail so that they could prepare themselves. To obtain background information about the interviewee, the interview started with questions about (a) the interviewee's job and organization, (b) the virtual team of which the interviewee was a member, (c) the experience of the interviewee with working virtually, (d) the interaction media that were used in the interviewee's virtual team, and (e) how frequently these media were used. If the interviewee had anything important to add, he or she was invited to do so. After explaining the general goal of the study, the interviewee was asked the following questions: "Now I want you to think back to specific incidents that you have seen occur in the last year. Can you think of an incident in which your virtual team members showed a critical interaction behavior? Would you describe for each example: (1) what were the circumstances surrounding this incident, (2) what exactly did the team member(s) do that was critical, and (3) how did the behavior (positively or negatively) affect the satisfaction of the team members and/or the performance of the team?"

The interviewer asked the interviewees to recall as many critical incidents as possible in which they had observed critical interaction behaviors about themselves or team members. If an incident was less clear or specific than desired, the interviewer would ask for clarification or for further details. In order to minimize interviewer bias, all CIT interviews were conducted by the first author. All interviews were conducted in English, except for nine interviews with Belgian interviewees that were conducted in Dutch. In the beginning of the interview, the interviewees were (a) informed that the conversation would be kept confidential to the research team; (b) informed that their name or the names they mentioned would not be used in any published article or made public in any other way; and (c) asked permission to record the interview. One interviewee did not give permission to record the interview. This interview was written down during the interview. Thirty-two interviews were conducted by telephone. Four interviews with Belgian virtual team workers were conducted in a face-to-face setting in Brussels. All interviews took 30–60 min. The digital records of the interviews were transcribed into a list of critical incidents.

2.4. Categorization process

The list of critical incidents from the three countries had to be transformed into behavioral items that were used as input for the categorization process (Latham & Wexley, 1981). This was important because all items needed to be phrased in a useful way (Latham & Wexley, 1981) and because some critical incidents contained multiple behavioral items (Peeters, Tuijl, van Reymen, & Rutte, 2007). Each behavioral item consisted of one "observed act" and was written on a card. We had separate piles of behavioral items for the Indian, American, and Belgian samples. Next, for each group we randomly took out 10% of the items, which we later used to establish content validity (Latham & Wexley, 1981). We categorized the remaining 90% of the items from each culture using the 13 categories of the prior categorization (Dekker & Rutte, submitted for publication).

From the critical incidents reported by the interviewees from the U.S., 208 behavioral items (average per interviewee = 14.9, S.D. = 2.14) were derived. From the interviews with the Indian virtual team workers 122 behavioral items ($m = 11.1$, S.D. = 2.30) were derived, and 163 ($m = 14.8$, S.D. = 1.66) behavioral items were derived from the critical incidents that were reported by the Belgian interviewees. For the U.S., 67% of the items were critical behaviors believed to have contributed to a positive outcome, for India this was 80%, and for Belgium this was 65%. Per country we distributed 90% of the behavioral items over the 13 categories of Dekker and Rutte (submitted for publication). Two raters independently distributed the items over the 13 categories. Cohen's kappa between the two raters for the behavioral items was .82 for the U.S., .80 for India, and .79 for Belgium. According to Landis and Koch (1977), strength of agreement of .79 or .80 is substantial and strength of agreement above .80 is almost perfect. Next, the two raters discussed the distribution until they reached

agreement about the distribution of all behavioral items. We attained content validity with the 10% of the behavioral items per country that had initially been left out. Per country these items could be categorized without a problem.

2.5. Analysis of data

By means of a Chi-square it was possible to investigate whether the distributions of the cultures differed significantly. To test our specific hypotheses concerning the values attached to categories by different cultures we conducted a log linear analysis. This analysis provided insight into which cells caused significant differences between the cultures by providing a significant deviance value. The first hypothesis would be supported if the Netherlands and the U.S. (low PD) mentioned more items than the Indian and Belgium sample (high PD) regarding Including team members. The Netherlands and the U.S. should have a significant deviance value, indicating that the cell contained more items than would have been expected. The second hypothesis stated that high PD cultures, represented by India and Belgium in our sample, should have more items regarding Media use, compared to the Netherlands and the U.S. In this case the log linear analysis should show significant higher values for India and Belgium in this category. The third hypothesis dealt with UA, stating that low UA cultures mention more items regarding Social-emotional communication compared to high UA cultures. For the hypothesis to be supported, the sample from the Netherlands, the U.S. and India (low UA) should have mentioned a higher number of items than expected. Hypothesis four and five concerned IND. High IND cultures, in the current study represented by the Netherlands, the U.S., and Belgium, should have mentioned more items than expected regarding Reliable interaction for hypothesis four to be supported. This should not be the case for Active participation, because here the Indian sample (low IND) should have mentioned more items than the Netherlands, the U.S., and Belgium for hypothesis five to be supported. For hypothesis six and seven to be supported, the Dutch sample (low MAS) should have a significant deviance value, which indicates that this sample mentioned significantly more items regarding Task progress communication and Extra-role behavior than expected according to the log linear analysis.

3. Results

Table 3 gives an overview of how the behavioral items for the different cultures were distributed. As can be seen, for India and Belgium an extra category “Respectfulness” was added. This means that the category system developed previously (Dekker & Rutte, submitted for publication) turned out to be incomplete after participants from India and Belgium were investigated. The new category contained behaviors like: not trivializing work of remote team members, taking hierarchy into consideration, and not concentrating on someone who made a mistake.

According to the Chi-square test, the cultures differed significantly on the distribution of the categories ($\chi^2(39, N = 906) = 219.647, p = .000$). This means that the various categories were mentioned to a different extent among the cultures. To see whether the distribution of the Netherlands differed significantly from the distributions of the other cultures, we compared the distribution of each national culture that was found with the distribution that had been found for the Netherlands. To calculate χ^2 between the American and the Dutch samples we had to eliminate category 14 because this category was not found in these cultures, which would lead to an expected value below 1, which is not in accordance with the rules of Cochran (1952). For each table, at least 80% of the expected values were larger than 5, which is in accordance with Cochran's rules. We found significant differences between the Netherlands and the U.S. ($\chi^2(12, N = 621) = 79.125, p < .001$), the Netherlands and India ($\chi^2(13, N = 534) = 86.367, p < .001$), and the Netherlands and Belgium ($\chi^2(13, N = 582) = 65.925, p < .001$). This suggests that interaction behaviors perceived to be critical in virtual teams are culture specific.

Table 3
Distribution of behavioral items for The Netherlands, U.S., India, and Belgium

No.	Category label	Number (and %) of critical behavioral items			
		The Netherlands	U.S. (n = 14)	India (n = 11)	Belgium (n = 11)
1	Media use	56 (14%) ^a	25 (12%) ^a	31 (25%) ^a	47 (29%) ^a
2	Handling diversity	54 (13%)	39 (19%) ^a	13 (11%)	18 (11%)
3	Interaction volume	51 (12%) ^a	12 (6%)	8 (7%)	17 (10%)
4	In-role behavior	44 (11%) ^a	4 (2%)	10 (8%)	16 (10%)
5	Structuring of meeting	34 (8%)	31 (15%) ^a	7 (6%)	10 (6%)
6	Reliable interaction	34 (8%) ^a	15 (7%)	4 (3%)	3 (2%)
7	Active participation	27 (7%) ^a	17 (8%)	24 (20%) ^a	14 (9%)
8	Including team members	26 (6%)	27 (13%) ^a	5 (4%)	4 (2%)
9	Task-progress communication	25 (6%) ^a	2 (1%)	0 (0%)	7 (4%)
10	Extra-role behavior	19 (5%) ^a	1 (0%)	0 (0%)	3 (2%)
11	Sharing by leader	18 (4%) ^a	0 (0%)	1 (1%)	0 (0%)
12	Attendance	15 (4%)	16 (8%) ^a	3 (2%)	6 (4%)
13	Social-emotional communication	10 (2%)	19 (9%) ^a	6 (5%)	8 (5%)
14	Respectfulness	0 (0%)	0 (0%)	10 (8%) ^a	10 (6%) ^a
	Total	413	208	122	163

^a Cell has significant deviance measure between observed and expected frequency ($\chi^2(1), p < .05$).

To get a complete overview, we also compared the distributions of the U.S., India, and Belgium interviewees. To compare the distributions of India and the U.S., we combined the categories 9–11, on which both countries scored low, to meet the criteria of Cochran. We found that the distributions of these two countries were significantly different ($\chi^2(11, N = 329) = 63.410, p < .001$). The distributions of the U.S. and Belgium were also significantly different ($\chi^2(12, N = 377) = 77.113, p < .001$). These overall significant χ^2 values indicate that the observed frequencies were not simply chance deviations from the expected frequencies. When we compared the distribution of Belgium and India, we saw that, after combining categories 10, 11, and 12 and categories 6 and 9, these distributions did not differ significantly ($\chi^2(10, N = 290) = 11.097, p = .35, n.s.$).

Next, we performed a log linear analysis. This test gives the deviance per cell between the observed and expected frequencies, and enabled us to see which cells caused the significant χ^2 . For the cells that had an observed frequency of zero, the deviance measure could not be calculated. Table 3 shows which cell frequencies were significantly different from the expected frequency. With regard to the first hypothesis, in which we expected that global virtual team workers from low PD cultures would mention more behaviors regarding Including team members. The U.S., a low PD culture, did indeed have a higher observed frequency than the expected frequency for this category. However, even though the Dutch sample had a higher frequency as compared to India and Belgium, the frequency was not significantly higher as compared to the expected frequency. The first hypothesis is thus partially supported. For the category Media use, we see that the frequencies of the Netherlands and the U.S. were significantly lower than the expected frequencies, according to the log linear analysis. The frequencies of India and Belgium, on the other hand, were significantly higher as compared to the expected frequencies. This provides support for the second hypothesis, as we expected that high PD countries would mention more items regarding Media use. With regard to the third hypothesis we found that the U.S. had a higher observed frequency than the expected frequency for the category Social-emotional communication. Because the U.S. has a low UA culture, this is according to the hypothesis, as we expected virtual team workers from low UA cultures to mention more items in this category. However, the Dutch and Indian cultures also have a low UA, but these do not mention more items than the Belgian participants, who have a high UA. The third hypothesis has thus been partially supported. In the fourth hypothesis, we expected that global virtual team workers from high IND cultures would value reliable interaction. As expected, the Dutch sample, scoring high on IND, had a higher than expected frequency for the category Reliable interaction. The U.S. also had a higher frequency than expected, but this was not significant. The U.S., however, scores higher on IND than the Netherlands. In addition to this, we found that the Belgian sample had a very low frequency, instead of a higher than expected frequency. The fourth hypothesis has thus been partially supported. The data fully support the fifth hypothesis, as we found that India, a low IND culture, had an observed frequency that was significantly higher than the expected frequency for the category Active participation. The sixth hypothesis has also been fully supported as the findings show that the observed frequency for the Dutch sample (low MAS) was higher than the expected frequency for the category Task-progress communication. Finally, because the Extra-role behavior had been mentioned most often by the Dutch sample (low MAS), the seventh hypothesis also has been fully supported.

4. Discussion

An important finding, after analyzing the data from the Belgian and Indian samples, is that an extra category: *Respectfulness* should be added to the framework. This indicates that the category system of critical behaviors for virtual teams (Dekker & Rutte, submitted for publication) was not yet complete. According to Hofstede (2001), both India and Belgium score high on PD. This means that people in these cultures accept a difference in power between a less powerful and more powerful individual, as can be seen in behaviors that support hierarchical differences between individuals. In Belgium and India it is important to take into account status differences when interacting with team members. These behaviors are most likely viewed as critical because they support the hierarchy that was created to protect and control the working relationship in the team, which in turn influences the outcomes of the team. In the Netherlands and the U.S. no behaviors regarding Respectfulness were mentioned. Individuals from these cultures may not take this into account because they live in a low PD environment. Therefore, individuals need to be aware of these differences, because members from high and low PD countries in global virtual teams need to collaborate in order to succeed.

We asked interviewees to describe positive and negative interaction behaviors that contribute significantly to the satisfaction and performance of their virtual teams. Results show that the Indian sample mentioned more critical behaviors that lead to positive outcomes. This is not surprising, because these virtual team workers are from a collective culture and therefore less likely to offer opinions that do not support the in-group or cause disharmony (Hofstede, 2001).

Our results also suggest that the values that cultures attach to the different categories differ. Behaviors regarding *Including team members* were mentioned most often in the U.S., a low PD culture. The Dutch virtual team workers, low on PD too, also mentioned these behaviors more than the Indian and Belgian interviewees, but the difference was smaller. In low PD cultures the opinion of all team members is important because status differences are minimized and individuals are viewed as being equal. In high PD cultures, on the other hand, people that are higher in status are viewed as superior. Therefore, including all team members might not always be seen as something that is necessary. Maybe the reason that the US respondents mentioned relatively more items than Dutch respondents is because the Netherlands has a feminine culture, whereas the U.S. has a masculine culture. Including team members might be a behavior that is related to the more assertive/leadership role of high MAS cultures. Therefore, it could be that the combination of low PD, in which everybody is equal,

combined with high MAS, in which assertive, firm, and just behaviors are appreciated, caused virtual team workers to mention more items regarding Including team members as important behaviors.

Richardson and Smith (2007) found that people from high PD countries regard certain media appropriate to use whereas other media inappropriate. People from high PD cultures are more concerned about what medium is appropriate to use and this might therefore explain why high PD countries think these behaviors have a greater influence on the outcomes of a virtual team. This reasoning is in agreement with the finding that behaviors in the category *Media use* were most often mentioned by virtual team workers from India and Belgium, as compared to virtual team workers from the Netherlands and the U.S.

In Section 1 we suggested that high UA cultures, such as Belgium, would mention less items regarding *Social-emotional communication*. We found, however, that Belgians mentioned a same number of items as Indians (low UA). Interviewees from the U.S. mentioned more items. The latter finding was according to our expectations, because the U.S. scores low on UA. The reason that the Dutch (low UA) mentioned only a small number of items compared to the other cultures might be because the Dutch are direct. Unlike in other cultures, Dutch people find it normal to come straight to the point. Other cultures first want to get to know someone, if possible go out for dinner, before getting down to business (Breukel, 2007).

The findings that behaviors from the category *Reliable interaction* were most often mentioned by virtual team workers from countries high on IND may be explained by the fact that in high IND countries the emphasis is on the individual, therefore individuals are responsible for reliable interactions with others. Failing to do so is viewed as being ineffective. Low IND countries emphasize the individual less and therefore these behaviors might be seen as less important.

It is not surprising that active behaviors in meetings are seen as very important in collective cultures, such as India, because everybody needs to ask and talk so that a collective decision can be made. This category is similar to the *Contributing answers and questions* category of Bales (1950). Bales' category also deals with active behaviors that show participation in meetings. We add to the literature that IND has influence on how effective these behaviors are perceived.

The finding that *Extra-role behavior* and *Task-progress communication* were mentioned most often by the Dutch was expected. Additionally, we found that *Sharing by leader* was mentioned more often by the Dutch as well. Contrary to the other countries that were included in this study, the Netherlands is a feminine country. Behaviors that are included in *Extra-role behavior* and *Sharing by leader* are about caring for team members, sharing information, and doing extra things to help them. These behaviors are unlikely in the more competitive, hard, and assertive cultures of the U.S., India, and Belgium. *Task-progress communication* is extremely important when one is not able to reach the goals on time and concerns showing one's weaknesses when not being able to meet a deadline. Showing one's failure is something not likely to be seen in more masculine cultures. Therefore, a Dutch virtual team worker who shows, for example, behaviors from the category *Task-progress communication* could be viewed by other Dutch virtual team workers as very effective. However, these behaviors might be viewed as neutral by team members from other cultures.

There were two additional findings with regard to the American global virtual team workers. Behaviors regarding *Structuring of meeting* were most often mentioned by the American interviewees. The American culture scores high on MAS. The Netherlands, India, and Belgium had less and all three a relatively equal number of items, even though the Netherlands scored very low on MAS. It could be that a combination of high MAS and a low PD is important. In the U.S. the seemingly masculine behaviors that fall in the category *Structuring of meeting* might be seen as effective behavior that needs to be present in a virtual team and is viewed as effective when it is performed by any virtual team member, regardless of status. Another additional finding was that behaviors regarding *Handling diversity* were mentioned most often by the American virtual team workers we interviewed. We cannot find a logical explanation for this with Hofstede's dimensions. Perhaps equal opportunity legislation in the U.S., requiring equal consideration of applicants, may explain this difference. To be politically correct, Americans might feel the need to mention issues related to this category. *Handling diversity* may also be a behavioral item among American interviewees because of the rapidly changing demographics in the U.S. and the market-driven need to pay attention to the differing needs of these new groups. On the other hand, the work of Hannerz (1990) suggests that some societies and cultures may be more willing to respect different cultures.

4.1. Theoretical and practical implications

Previous work of Dekker and Rutte (submitted for publication) showed that some behaviors that are found in virtual teams have not yet been covered in frameworks of face-to-face interactions (e.g. Bales, 1950; Cooke & Szumal, 1994; Rousseau et al., 2006). In the present study we note that behaviors that are perceived to be critical for the satisfaction and performance of the team are culture-specific. In line with the assumptions of Janssens and Brett (2006), we find that cultures differ with respect to what behaviors are perceived as critical. This means that behaviors viewed by virtual team workers from one national culture as contributing significantly to the output are not necessarily viewed similarly by virtual team workers from other cultures. In other words, the *precepts* of the cultures are different. Additionally, Hofstede's dimensions (2001) could explain some of the significant differences.

The fusion theory of Janssens and Brett (2006) suggests that the qualities of different cultural percepts should be combined. The coexistence of cultural differences in teams can only be achieved when virtual team members recognize and respect each other's cultural differences. If, however, other strategies are followed such as *dominant coalition* or *Integration*/

identity, the advantage of being cultural diverse is not fully utilized. We found that people from different cultures have different opinions on what behaviors are critical for effective team functioning. Members of virtual teams have to be aware of these differences in order to take advantage of the fusion model.

Cramton et al. (2007) highlighted the importance of situational differences in virtual teams. In their study, the authors argued that three aspects of virtual teams trigger members to make dispositional rather than situational attributions; (a) different locations, (b) situation invisibility (lack of opportunity to observe), and (c) the use of communication technologies. Virtual team workers are usually unable to observe relevant situational information and therefore there will be no situational correction when making an attribution. The present study expands the theory concerning interpersonal relations in virtual teams by providing insights into cultural differences in global virtual teams. People from different cultures have different perceptions of what interaction behaviors are critical in virtual teams. Attributions that people make influence outcomes such as cohesion (Brawley, Carron, & Widmeyer, 1987) and satisfaction (Wang, 1994). In order to make accurate attributions, one should take the culture of team members into account. For instance, we illustrate a situation in which a Dutch team member behaves differently than the Indian virtual team worker would have expected. In this situation, a Dutch colleague introduces the names of all the team members that are present in the meeting and does so in random order. The Indian colleague, however, interprets the person that was mentioned first as being the most important. Instead, he prefers that introductions are done in alphabetical order. If the Indian knows nothing about the situation or culture of the Dutch colleague, then he will make a dispositional attribution which will most likely negatively influence the collaboration in the future (Gilbert & Malone, 1995). Thus cultural as well as situational (such as a broken down network) information is important in order to construct accurate attributions. We suggest that, besides situation information sharing (Cramton et al., 2007), information about cultures should be shared in virtual teams.

As Tsui et al. (2007, p. 427) noted “cross-cultural studies in cross-national context are more complex than domestic cross-cultural studies”. It is even more complicated in studies about virtual teams because these cross-cultural studies, which cover cross-national contexts, research individuals who share a common goal and work together. Even though global virtual team members have shared experiences, similar work environments, and deal with other cultures on a regular basis, we found differences among virtual team workers from different national cultures. This would indicate that integration of cultures among virtual team members is limited (Berry, 1997) and virtual team workers from different cultures have unique precepts, as is suggested in the fusion model (Janssens & Brett, 2006).

To deal with the consequences of different cultures, we believe that it is important for global virtual teams to engage in activities to explore and understand the cultures and the consequences of cultures of other team members. These can be activities that highlight differences in frames of reference, that focus on the interpretation of English words (or other common language), or that concentrate on cultural norms. These activities help members of global virtual teams understand the cultures of other members and the way that team members from different cultures collaborate. Organizations can incorporate these activities in training sessions.

The countries selected in this study have practical relevance because they have many virtual team workers. Much work that was previously done within Europe or the U.S. is now outsourced to India, mainly because the quality of the work done in India is high and the costs are low. Due to its high level of education, India has many gifted engineering, computer science, and software talents (Friedman, 2005). Of the American Fortune 1000 companies, 250 outsource part of their business to India (Eastern Enterprise, n.d.). Outsourcing is still growing according to the Indian National Association of Software and Services (NASSCOM) (Automatiseringgids, 2007). Future research should take into account other national cultures, such as China, countries in South America, or countries in Eastern Europe, because these countries are becoming more popular as outsourcing destinations and therefore people from these countries will increasingly become members of virtual teams.

Even though we collected a large number of critical incidents, a limitation of the present study is the small number of participants. Another limitation of this study is that the CIT is based on the memory of interviewees. We tried to minimize this by asking interviewees to recall critical examples that had happened in the last year. For future research it will be interesting to have an overview of what behaviors are performed by whom and whether they are perceived as critical. For example, in this study Americans indicated that behaviors from the category Handling diversity are critical; however, we do not know who performed these behaviors. More insight can be provided through questionnaires or observations.

4.2. Conclusion

The conclusion of this study is that perceptions of critical interaction behaviors within global virtual teams differ across cultures. Cultural awareness of differences is very important. Paul et al. (2005) called this *cross-cultural capital*. Virtual team workers need to become aware that their views of what behaviors are important are not automatically shared with people from other cultures. People from different national cultures thus have different expectations with regard to the behavior of others, which may result in misunderstandings and inaccurate attributions (Cramton et al., 2007). The fusion model (Janssens & Brett, 2006), suggests that superior outcomes in global virtual teams are achieved when qualities of the different cultures are combined. Because virtual teams are becoming more common, we hope that this research is a step in the right direction towards enhancing satisfaction and productivity in such teams.

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