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# Towards the mitigation of cultural barriers to communication and cooperation

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## ABSTRACT

This thesis combines theories from cross-cultural psychology with literature on group faultlines to understand cultural barriers to communication and cooperation experienced in multinational emergency management teams. The aim is to investigate whether the faultline concept is a viable theoretical vocabulary for addressing cultural differences in communication and cooperation (in the domain of emergency management). Culture is defined as a relatively organized system of shared meanings which influences people's cognition, values, behaviors, and so on. Group faultlines are hypothetical dividing lines that may split a team into homogeneous subgroups based on demographic characteristics. Three papers are included in the thesis, all of which investigate various aspects of group behavior in relation to emergency management. Results suggest that faultlines can be formed not only by demographic characteristics, but also by culturally-driven behavior. The results presented in the papers and in this thesis are meant to supply emergency management personnel with general knowledge of cultural differences and ideas for future 'cultural awareness' training. The thesis contributes to the scientific community by taking cross-cultural research into the applied domain so that its findings can be made relevant to people in multinational organizations.

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# 1 INTRODUCTION

With new technology and easier access to other parts of the world it is easy to be in contact with people in other cultures. A distant country is only a flight away. For emergency management personnel in Sweden, the ease of access and movement and its consequences are evident. The Swedish Rescue Services Agency (SRSA) now operates outside Swedish borders and frequently participates in international relief operations, contributing personnel and knowledge to multinational coordination teams. As emergency management turns international, the relief teams turn multinational. At the SRSA, much attention is given to international exercises and training programs for the personnel engaged in international operations. Still much confusion and conflict due to cultural differences within the multinational teams is reported back to the SRSA. As a result, cultural issues are currently being given much attention.

During international emergency management operations, people from various national and organizational cultures have to work together. The demands on efficient and effective coordination and cooperation are high. Not only must an emergency be sorted out, all personnel must also represent their home nations and contribute to the relief operation requested by the affected country. According to Berthlin (2006), a SRSA employee and emergency management veteran, concepts such as understanding, overall picture, responsibility, equality, ethics, and morale are instilled in the personnel to be practiced during the operations. But do these concepts have the same meaning across cultures?

Emergencies such as the 2005 earthquake in Pakistan and the East Asian Tsunami of 2004 have publicly illustrated the importance and need for effective and efficient international humanitarian relief operations. Not only do international relief teams need to be sent to the right place at the right time; when in place, they also need efficient coordination. To ensure that these international relief teams can help the authorities in the affected region without being a burden on the local resources, coordination of the international teams has been the domain of the UN, the European Union (EU) or some other legitimate international body. In response to these concerns, the UN has designed the onsite operations coordination center (OSOCC) to coordinate relief operations. The OSOCC structure has been adopted by the EU and NATO/Partnership for Peace.

In order to prepare the emergency management personnel for cross-cultural cooperation, cultural awareness training is part of their preparations. Personnel are trained in multinational teams and receive lectures on culture. But cultural awareness training is often perceived as being too general, too specific, or too academic (Krajic, personal communication).

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The results reported in this thesis are meant to generalize to the teams that the United Nations (UN) sends out to form its OSOCC, used to coordinate international relief teams following extensive disasters. OSOCCs are often set up and manned by a multinational team. The team members generally do not know each other, speak different languages, and have different cultural and professional backgrounds. In spite of these difficulties, they are charged with the task of working together immediately to coordinate a flood of humanitarian activities and to facilitate the local authorities' efforts to coordinate the relief effort.

Even though predictions can be made, we cannot know for sure where the next emergency will occur. It is difficult to prepare the personnel for a specific culture. Instead of instructing emergency management personnel on the general characteristics of every nation around our globe, there is a wish for general knowledge concerning dimensions along which people from different cultures can differ. By preparing the personnel for potential differences, it is assumed that cross-cultural cooperation will run more smoothly. This thesis is a link in that work.

## **1.1 Cross-cultural research**

There is a plethora of studies concerned with cross-cultural differences and similarities. In management research and cross-cultural psychology, the usual manner to go about such an investigation is to make an in depth study of particular cultures, compare them and later map them in some model (e.g. Hofstede, 1980; Schwartz, 1992, 1994). I am not trying to map specific cultures. Instead I try to find dimensions with the potential for conflict, no matter what culture people are from. For some, this might sound too general. I think not. For people working in an international and ad-hoc setting, it is probably more valuable to know in what general areas conflict may arise than to be buried with information on every culture they may encounter during their missions.

Many areas of research deal with culture. The literature reviewed in this thesis is mainly taken from the area of cross-cultural psychology. In the past, researchers interested in psychology and management have done a relatively poor job noting the difference between cultures. Western theories have been treated as if they are universal (Smith, Bond & Kağıtçıbaşı, 2006). Much discussion within this area concerns methodological issues. Not only have researchers been confused regarding the unit of analysis, mixing measures of individuals and nations (referred to as the ecological fallacy), there have also been serious issues with replicability (Hofstede & Hofstede, 2005; Smith & Bond, 1999). Many psychological studies conducted in the West have not been replicable in other parts of our world.

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## 1.2 Diversity and group faultlines

The research on diversity in work groups has not produced consistent results (Thatcher, Jehn & Zanutto, 2003). Just as there is a multitude of studies that show that diversity in work groups leads to increased conflict and poorer performance, there are numerous studies that show that diversity leads to decreased conflict and improved performance (Thatcher et al., 2003). Thatcher et al. argue that one of the reasons for this inconsistency in diversity research is that it has assessed the effects of diversity regarding only one demographic characteristic at a time. Typically, the groups that have been studied were composed of a mix of, exclusively, genders or ethnicities or educational backgrounds and so on. Only recently has research been conducted with groups with a mix of several characteristics.

In this thesis, I am investigating a relatively unexplored concept concerning group diversity called *group faultlines* (Lau & Murnighan, 1998). The underlying assumption is that group members initially form opinions about each other based on demographic characteristics. Groups that can form homogeneous subgroups based on demographic similarities are likely to split into subgroups. In turn, a split can potentially lead to less cohesion and more conflict within the group (Lau & Murnighan, 1998). How and why faultlines are activated needs further empirical investigation. This thesis concludes with hypotheses for how the group faultlines concept can contribute to the body of cross-cultural research and how faultlines can be tested empirically.

## 1.3 Aim

I aim to conduct research that will allow practitioners to mitigate cultural barriers to communication and cooperation in multinational teams. The way I have chosen to discuss barriers is to use the concept of group faultlines. My research has pinpointed dimensions related to communication and cooperation that, if aligned, may form faultlines in an emergency management team. These dimensions are meant to supply emergency management personnel with general knowledge on cultural differences and ideas for future ‘cultural awareness’ training. The scientific contribution of this thesis is not that differences between specific cultures have been studied and found; rather it is the method for uncovering such differences, the vocabulary for explaining their impact on the formation of small multinational teams, and its applicability to multicultural interactions everywhere.

A couple of important decisions have constrained the scope of the studies reported in this thesis. The literature on culture is constrained to the area of cross-cultural psychology. The reasons for this choice are described in the section on culture and cross-cultural research in the frame of reference section.

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Concerning small groups and teams in relation to culture and faultlines, this thesis is only concerned with the initial phase of a group's existence during which group members know nothing or very little about each other. During this phase of group formation, demographic characteristics are important. With time, other factors such as personality and personal interests become increasingly important and other group processes become important.

The emergency management training domain was chosen because it is a rewarding domain for studying the initial phases of group formation since many emergency management teams are formed ad-hoc and on site.

## 1.4 Research question

*Is the faultline concept a viable theoretical vocabulary for addressing cultural differences in communication and cooperation (in the domain of emergency management)?*

There is a practical and theoretical need for a vocabulary that discusses culture in a general manner, and yet is flexible enough to capture the complexity of cultural differences. I believe that the answer to my research question is a step on the way to finding a vocabulary that can assess, describe and discuss cultural differences in small groups and teams in a way that is general, yet specific enough to be interesting. The answer to this question should benefit both practitioners and academics interested in cultural issues in relation to cooperation.

## 1.5 Organization of the thesis

This thesis has six parts. 1) The first part sets the frame of reference. 2) The second part gives an overview of the methods used in the included papers. 3) The third part gives a brief overview of the results reported in the included papers. 4) The fourth section illustrates how the papers contribute to answering the research question. 5) The fifth part suggests hypotheses to be addressed in future studies. 6) The sixth part concludes the thesis with some general comments. At the very end of the thesis, three papers are included:

I) Woltjer, R., Lindgren, I. & Smith, K. (2006). A Case Study of Information and Communication Technology in Collocated Emergency Training. *International Journal of Emergency Management*, 3 (4), 332-347.

II) Lindgren, I. & Smith, K. (2006). Using Microworlds to Understand Cultural Influences on Distributed Collaborative Decision Making in C2 Setting. Conference paper from *the 11th International Command and Control Research and Technology Symposium*, Cambridge, UK, 26-28 Sept. *Awarded the Willard S. Vaughan, Jr. Best Student Paper Award*.

III) Lindgren, I., Smith, K. & Granlund, R. (2007). *Identifying Cross-Cultural Group Faultlines*. Manuscript.

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The study reported in papers II and III, *Bridging cultural barriers to collaborative decision making in onsite operations coordination centers*, is a part of the SRSA's commitment to learn more about cultural issues that might pose barriers to teamwork in multinational teams. This study is designed to meet the current standards set by the cross-cultural psychology community (Smith et al., 2006). Although not directly linked to the international work of the SRSA, Paper I also sheds light on important issues related to emergency management. Together, they all contribute to formulating a theoretical vocabulary for addressing cultural differences in communication and cooperation.

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## 2 FRAME OF REFERENCE

First of all, the title of this thesis deserves an explanation in order to set the frame for this work. ‘Cultural barriers’ refers to conflicts and misunderstandings based on culturally driven differences in expectations and behavior that make cross-cultural interaction difficult. In this thesis ‘cooperation’ refers to joint efforts made by two or more people and ‘communication’ refers to the interactions, either face-to-face or mediated by information and communication technology (ICT), that helps cooperation happen.

This section has three parts. First the unit of analysis is defined, namely the small group or team. Second, *culture* is defined. This second part aims at answering the following questions: What is culture? How does culture influence peoples’ cognition, communication and decision making behavior? How should culture be studied? The third part concerns *group faultlines*, i.e. hypothetical dividing lines that might split a group into homogeneous subgroups.

### 2.1 Small groups and teams

The unit of analysis in this thesis is small groups and teams. There are a wide variety of definitions of what a ‘group’ is and what definition should be chosen is a matter of the nature of one’s study (Stiwne, 1995). In this thesis, a group is perceived as a social system (Stiwne, 1995) that is defined using the words of Brown (2000, p. 4):

“... groups can be categorized as a collection of people bound together by some common experience or purpose, or who are interrelated in a micro-social structure, or who interact with one another. All these may be sufficient conditions to say that a group exists. But perhaps the crucial necessary condition is that those same people share some conception of themselves as belonging to the same social unit.”

Since a group can consist of two or an infinite number of people, I must limit the definition further for the purpose of this thesis. This thesis deals with small groups (approximately up to ten people) and teams of people. A team is usually defined as a small group of people in which group members work together to meet a specific goal and in which group members have specific roles and competencies that complement each other.

Groups are said to go through various phases, such as the classic *forming*, *storming*, *norming*, *performing*, and *adjourning* phases formulated by Tuckman in 1965 (Hogg & Vaughan, 2002). This thesis is concerned with the initial phase of a group’s existence during which group members know nothing or very little about each other and behavior is mostly based on expectations and prior experiences. During

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this initial phase, group *diversity* plays an important role. Two sources for diversity are discussed in this thesis: demographic characteristics and culture.

## 2.2 Culture and cross-cultural research

In order to discuss cultural differences in relation to communication and cooperation I give an account of what culture is, how culture influences cognition and behavior, and methodological issues regarding cross-cultural research. This section has eight parts. I first turn to some of the various definitions of culture. The second part gives a brief overview of cross-cultural psychology. Thirdly, I discuss common pitfalls in cross-cultural research that are important to keep in mind when designing a cross-cultural study. The fourth section discusses nationality as a proxy for culture. The fifth section discusses how culture influences our fundamental human values. The sixth section discusses culture's relation to cognition and communication. The last section deals with culture's influence on decision making.

### 2.2.1 What is culture?

Considering that the word 'culture' can be used to refer not only to literature, arts and music, but also to interpersonal differences in management and organizations, (e.g. organizational and professional culture) (Hofstede & Hofstede, 2005), the frame of reference must be made clear. This review draws mainly on literature on cross-cultural psychology, and therefore defines culture as shared attitudes, beliefs, values, and standards for action that differ across groups (e.g. national or professional groups) and that, in turn, shape action.

Most people have some conception, drawn from their own culture's folk psychology, of what the concept of culture means (Triandis, 1996). These ideas tend to fall short, however, because upon close inspection, when actually trying to define culture, a very complex phenomenon reveals itself. As a result, there is no consensus among researchers on a definition of culture (Smith & Bond, 1999; Triandis, 1996). When reviewing the literature on culture and cultural differences in management (Adler, 1997), social psychology (Smith & Bond, 1999), cognitive anthropology (Foley, 1997), anthropological linguistics (Duranti, 1997) and other related fields, it is clear that there are indeed a large number of diverse definitions of culture.

Here are a few examples:

“Culture consists of patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiment in artifacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as

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products of action, on the other, as conditioning elements of future action” (Kroeber and Kluckhohn, 1952, p. 181; cited by Adler 1997, p. 14).

Culture is “an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes toward life” (Geertz, 1973, p. 89).

Culture is “the collective programming of the mind that distinguishes the members of one group or category of people from others” (Hofstede & Hofstede, 2005, p. 4).

“Culture is a fuzzy set of attitudes, beliefs, behavioural conventions, and basic assumptions and values that are shared by a group of people, and that influence each member’s behaviour and each member’s interpretation of the ‘meaning’ of other people’s behaviour” (Spencer-Oatey, 2000, p. 4).

“A culture is a *relatively organized* system of shared meanings”(Smith & Bond, 1999, p. 39).

Triandis (1996) points out that although there are many definitions of culture, there is wide agreement that culture consists of elements shared by those with a common language, within a specific historic period, and a contiguous geographic location. Among these elements are religious beliefs, customs, and values. These and other elements provide standards for perceiving, believing, evaluating, communicating, and acting. Accordingly, any definition of culture must include a set of shared standards for action. In line with Triandis, Duranti (1997, p. 24) argues that

“A common view of culture is that of something learned, transmitted, passed down from one generation to the next, through human actions, often in the form of face-to-face interaction, and through linguistic communication. This view of culture is meant to explain why any human child, regardless of his genetic heritage will grow up to follow the cultural patterns of the people who raised him”.

Duranti’s point is that culture is not encoded in our DNA but is propagated by interpersonal relations within a given physical and social environment. In line with Duranti, Kim and Markus (1999) point out that the composition of a culture is determined by the immediate contingencies of specific sociohistorical circumstances and of individual actions. Culture emerges and is sustained by social relations within highly specific contexts.

According to Kim and Markus (1999), cultures should be conceptualized as constantly changing, open systems of behaviors, artifacts, attitudes and norms. They also consist of institutions that the people within a culture continuously reinforce through diverse means of engagement and participation. The institutions are also modified or even challenged by the same people who reinforce them. Hence, culture is a slowly evolving phenomenon.

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The many definitions of culture emphasize that culture is something that is created by humans and that is made manifest in both physical and social artifacts. Examples of physical artifacts that differ along cultures are tools, music, literature, architecture. Physical artifacts are dependent on ecology and culture to the extent that ecology constrains what is possible to produce and use in material terms and culture puts constraints on what is socially acceptable to produce and use. Social artifacts are socially produced phenomena that tacitly or explicitly define what people can do. Examples of social artifacts are rules (How do you cross the street? How do you wait in line? Is it illegal to beat one's children?), roles (What behavior defines manliness? What behavior defines femininity? What constitutes a company leader?), relationships (Who is your friend? What are friends' obligations towards each other?).

To summarize, culture can be seen as (a) a group's shared/collective attitudes, beliefs, behavioral norms, and basic assumptions and values, (b) which influence the members' behavior, actions, thoughts, and artifacts, and (c) which are passed down from one generation to the next. For succinctness, I adopt Smith and Bond's (1999, p. 39) definition and interpret it through the lens provided by Triandis and Duranti: a culture is a relatively organized system of shared meanings.

Culture can be identified at different levels of aggregation, such as the national, organizational, or professional level (Hofstede & Hofstede, 2005). In this review, only the national level is addressed. The definition of culture adopted from Smith and Bond (1999) is, however, general enough to apply to all levels of analysis.

### *2.2.2 Cross-cultural psychology*

Cross-cultural psychology is a relatively new field of research. The field of cross-cultural psychology started off with a small group of psychologists interested in what makes people from different cultures different. One important reason why this group of researchers separated from traditional psychology is that traditional psychology seldom considers the wider cultural context in its theories.

Most researchers investigating culture focus on one of two topics: (1) what people have in common across cultures (*cultural psychology*) or (2) what distinguishes people from different cultures (*cross-cultural psychology*) (Daun, 1999a). Cultural psychology focuses on the mutual processes by which everyday interactions between individuals reinforce and reformulate our notion of what goes on around us. Cross-cultural psychologists differ from cultural psychologist in their preference for obtaining separate measures of individuals and the broader contexts in which they live, such as nations (Smith et al., 2006). Since my research focuses on pinpointing cultural differences in behavior that might pose barriers to efficient collaboration in multinational teams, this review deals only with the cross-cultural psychology line of research. I now turn to four common pitfalls in cross-cultural research that cross-cultural psychologist seek to avoid.

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### *2.2.3 Pitfalls in cross-cultural research*

There are four common pitfalls in the conduct of cross-cultural research: (1) ethnocentrism, (2) finding the appropriate unit of analysis, (3) ignoring contextual confounds, and (4) replicability.

The first pitfall, ethnocentrism, is really a problem in all cross-cultural interaction. People, including researchers, generally are ethnocentric, i.e., are centered on their own group's values and standards, and have a hard time imagining how people elsewhere could think and want things differently. Basically, most people subscribe to the folk psychology that the way they see the world is the way most people see the world (Triandis, 1996). Contemporary psychology reflects this bias when it assumes and teaches that theories formulated by Western Europeans and North Americans and tested using subjects from their own cultures are universally applicable.

In fact, classic North American and Western European psychological studies frequently yield different results when repeated in other parts of the world. Examples are the studies by Markus and Kitayama (1991) and Kanagawa, Cross, and Markus (2001) on culture and conceptions of the self, others, and relationships between the self and others. These studies suggest that people from different cultures perceive the 'self' in radically different manners. They found that Japanese students generally see themselves as being part of a network of relationships with other people, which orients them toward social- and situation-centered relationships. This means that the 'self' changes across situations and relationships. 'I' can therefore be different when with a parent than when with a friend. On the other hand, Americans perceive the 'self' as something static and tend to be self-oriented and individual-centered (Weber & Hsee, 2000). This means that 'I' do not change; only the situation does.

These results strongly challenge the validity of traditional Western psychology theories. According to Smith et al. (2006, p. 9), ethnocentrism can be confronted and minimized when researchers "work with others whose socialization yields a different but complementary perspective". Thus, researchers should work in multicultural teams and expose themselves to cultural differences in order to appreciate and deal with their ethnocentrism.

The second problem is confusion about the unit of analysis (Smith et al., 2006). In cross-cultural research there has been much discussion on whether culture should be studied on a group- (nation) or individual level. When studying the culture of a group of people (nation-level), the consensual characterization of the group's attitude, values, beliefs, standards for action, norms, and so on, is measured. Researchers using a nation as the unit of analysis often collect data from thousands of individuals and then use the mean values of the responses. Thus, group-level analysis can never focus on or take into account the individual variations that

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inevitably exist in a culture. Group-level measures of culture are not logically or empirically constituted the same way as individual-level (Bond, 2002). Measures derived on the nation level should therefore only be used to define the context in which individuals are socialized (Smith et al., 2006). If we, however, want to make predictions about individuals, then measures derived from individuals are required (Smith et al., 2006). The dominant individual-level model of values, Schwartz's configural model of ten value types, is discussed in the next section.

In the past, researchers have done a poor job noting the difference between group- and individual-level measures of culture (Matsumoto, 2003; Smith & Bond, 1999; Smith et al., 2006) and fallen victims to what Hofstede (1980) refers to as *the ecological fallacy* (meaning that they confuse individual- and group measures of culture). Matsumoto (2003) points out that researchers often treat these two culture level measures as being equal, applying measures from a group-level theories and measures on individuals. He argues that even though there is, in fact, some overlap among the elements that constitute individual- and group- level cultures, one must not confuse the two. Matsumoto claims that there are distinct differences, for example in relation to how social history, government, politics and the law, geography and climate, and socioeconomics influence the production of individual- and group-level measures of cultures. Exactly how much of the group-level culture can be found when studying any given individual from a specific culture is not known. According to Matsumoto, a study of the actual overlap between the two has never been conducted, due to difficulties measuring all of the social and macro forces that influence and form group-level culture.

To avoid falling into the trap of ecological fallacy, researchers are advised to design and conduct studies that focus on specific groups of individuals, on their values and behavior, rather than on global culture-level characterizations (Matsumoto, 2003; Smith & Bond, 1999; Smith et al., 2006).

The third problem is oblivion to contextual factors. Most cross-cultural research is conducted by scientists with expertise primarily in another content domain (e.g., psychology, sociology, management) and who want to extend their research to different cultural groups. Their work tends to explore either cross-cultural similarities (generalities) or differences through the lens of their domain. Studies of differences are far more common. Unfortunately, most studies of differences are not theory-based. Few consider critical contextual factors. In contrast, studies of similarity tend to exhibit a strong theoretical framework that allows for the formulation of hypotheses about cross-cultural differences and similarities. Unfortunately, once again, few attempt to measure contextual factors. All too often, cross-cultural research emphasizes either the differences between or the universality of particular structures, and expresses little concern for potentially confounding factors, such as personality and socio-economic situation (Van de Vijver & Leung, 2000).

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The fourth pervasive problem faced by cross-cultural research is (the lack of) replicability. Smith and Bond (1999) argue that precise cross-cultural replication is difficult to achieve. Van de Vijver and Leung (2000) refer to replicability as the Achilles heel of cross-cultural endeavors. The likelihood of replicability will increase as researchers become aware of their own cultural “glasses”, as they (we) place more emphasis on theory testing, and use more sensitive and suitable methodological tools, such as (1) designing studies that predict differences and similarities across social contexts and (2) conducting studies in a manner that affords valid assessment of key contextually-dependent variations in behavior (Van de Vijver & Leung, 2000). To be able to achieve successful replication, researchers from the cultures involved need to consult each other to make sure that the same thing is measured across the cultures.

#### *2.2.4 Nationality as a proxy for culture*

Researchers focusing on culture not only find it difficult to agree on a definition of culture, but also struggle to achieve consensus on how to distinguish one culture from another. How much difference must there be between two cultural groups before they can be said to be truly different? According to Smith and Bond (1999), there is no one answer to that question. Once again, there are many answers. Cultural groups can be defined and partitioned based on religion, language, geographical area, ethnicity, ecology, age, hobbies, lifestyles, strength of kinship bonds, etc.

For practical reasons, researchers within cross-cultural psychology take the easy way out by defining a cultural group on the basis of nationality. As a general rule, people from the same country can be assumed to share a language, a historic period, and a geographic location, and therefore to have a shared foundation on which a culture can emerge and be maintained. Using nationality as a ‘definition’ of culture is widely recognized to be a convenient solution at best (e.g., Hofstede, 1980; Schwartz 1992, Smith & Bond, 1999; Smith et al., 2006) and has been roundly criticized (Duranti, 1997; Hofstede & Hofstede, 2005). When using nationality as the basis for a culture, there is a risk losing track of the diversity within a country. Differences found between any two countries might also be found between carefully selected subcultures within any one country. There is also the risk of assuming a homogeneity that does not exist, i.e. assuming that a country is free from variation, conflict, and disagreement (Smith & Bond, 1999). Nevertheless, it is often the only pragmatic thing to do.

When choosing nationality as a proxy for culture and conducting a cross-cultural study concerning group behavior, the diversity of group members’ demographic background becomes very important. A procedural control that might seem trivial but that can be hard to attain is to use a matched group design: sample from populations that are comparable to ensure that cultural differences (and nothing

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else) are measured (Smith et al., 2006). Since the wish is for the group to be representative of its culture and to behave in accordance with what is acceptable and expected in its culture, there must be as few demographic confounds within the group as possible. When for example comparing two cultural groups of the same profession, one must also make sure that the prerequisites for membership in that profession is the same in both cultures.

### *2.2.5 Culture and values*

This section discusses culture and values, by reviewing the influential work of Gert Hofstede (1980) and Shalom H. Schwartz (1992; 1994) to illustrate how values can be studied.

### **Hofstede's cultural dimensions**

In 1980, organizational sociologist Gert Hofstede published his book *Culture's Consequences* which discussed a study that is still considered impressively extensive. He collected questionnaire responses from more than 100 000 individuals from around the world. The respondents were all working in the marketing and servicing divisions of a multinational corporation (IBM). The questionnaires concerned various aspects of employees' work experience that could be tied to fundamental human values. From this material, Hofstede was able to make comparisons across countries. In his first analysis, 40 countries were compared (Smith & Bond, 1999). Later, several more were included in the study and together with other researchers' replications of Hofstede's study, the study now includes more than 60 nations (Hofstede & Hofstede, 2005).

#### *Cultural dimensions*

Based on the data collected at IBM sites around the world, Hofstede identified four different bipolar cultural dimensions; (1) Power Distance; (2) Uncertainty Avoidance; (3) Individualism/Collectivism; and (4) Masculinity/Femininity. These four core dimensions of human values are presented in Table 1. Definitions are taken from Smith and Bond (1999, p. 45).

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**Table 1: Hofstede's four core dimensions**

<b>Dimension</b>	<b>Explanation</b>
Power distance:	The amount of respect and deference between those in superior and subordinate positions. High rankings (low numbers) indicate the expectation of considerable deference.
Uncertainty avoidance:	A focus on planning and stability to deal with life's uncertainties. High rankings indicate a strong emphasis on stability.
Individualism/ Collectivism:	Individualism: One's identity is defined by personal choices and achievements. In contrast, Collectivism: One's identity is defined by the character of the collective groups to which one is more or less permanently attached. High rankings reflect high individualism.
Masculinity/ Femininity:	Masculinity emphasizes achievement. Femininity emphasizes interpersonal harmony. High rankings indicate an emphasis on achievement.

*Power distance* refers to the different weights cultures put on status consistency, in areas such as prestige, wealth, and power. In other words, power distance deals with human inequality, often formalized in boss-subordinate relationships. People in cultures with *low* ranking on power distance expect all people to have equal rights. Hierarchy implies an inequality of roles, established for convenience. In these cultures, older people are neither feared nor respected (due to age) and powerful people are expected to try to look less powerful than they are. In cultures with *high* ranking on power distance subordinates and superiors are perceived as being different kinds of people. Hierarchy is a sign of existential inequality. Older people are both respected and feared. People with power are expected to look as powerful as possible.

*Uncertainty Avoidance* refers to a focus on planning and stability to deal with life's uncertainties. People in cultures with *low* ranking on uncertainty avoidance accept the uncertainties inherent in life relatively easily and take each day as it comes. They believe in their own ability to influence their lives, their superiors and the world. Furthermore, in these cultures, people are willing to take unknown risks, are comfortable with ambiguity and chaos, and are open to change and innovation. In contrast, in cultures with *high* ranking on uncertainty avoidance, the uncertainties inherent in life are perceived as a continuous threat that must be fought. These cultures emphasize conservatism, law and order. People in high uncertainty avoidance cultures tend to feel powerless toward external forces and take risks only if they are known. High uncertainty avoidance reveals itself in behaviors that seek clarity and structure.

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*Individualism/Collectivism* are two poles of one dimension. *Individualism* refers to an identity that is defined by personal choices and achievements. In individualistic cultures a person is expected to take care of only his/her immediate family and to emphasize individual independence, initiative and achievement. Identity is based in the individual; there is a strong sense of 'I'. In contrast, in *collectivistic* cultures, a person's identity is defined by the character of the collective groups to which he/she is more or less permanently attached. People in collectivistic cultures are born into extended families which protect them in exchange for loyalty. In collectivistic cultures a person is expected to take care of his/her extended family. Thus, there is a "we" consciousness; identity is based in the social system.

*Masculinity/Femininity*. This dimension refers to what implications the biological differences between the sexes should have for the emotional and social roles of the genders. In *masculine* cultures there is considerable emotional and social role differentiation between the genders. There is an ego orientation which stresses what you do; what you achieve. Men should be assertive and ambitious. Women should be modest, but may elect to be assertive and ambitious. In *feminine* cultures, however, there is minimal emotional and social role differentiation between the genders. Rather than focusing on what you do, there is focus on who you are. There is an emphasis on interpersonal harmony. Both men and women should be modest.

Hofstede (1980) managed to provide an empirical mapping of the world's major nations across these four dimensions of culture. He also integrated these results with previous theory and data about national cultures, dimension by dimension (Bond, 2002). While Hofstede's study and his dimensions are informative, it must be kept in mind that his characterizations of national cultures are founded on *averages* calculated from thousands of individuals. His analysis of cultural differences can therefore be said to be valid for nations but not for any specific individual in a nation (Bond, 2002; Hofstede, 1980; Smith & Bond, 1998). This is a perfect example of a group-level measure.

### ***Critique of Hofstede***

Hofstede has been criticized for several aspects of his study. First, he has been criticized for his selection of respondents. All participants worked for IBM, a company which is said to have a rather specific organizational culture (Smith & Bond, 1998) which the company most probably tries to instill in all offices, regardless of where in the world they are situated. In addition, all respondents worked within the marketing and servicing divisions and can hardly be seen as a representative sample of their cultures. Furthermore, the questionnaire items that lay the foundation for Hofstede's dimensions were a part of IBM's employee survey and were not designed for cross-cultural comparisons specifically. But, due to the matched groups of participants, he managed to keep the demographic

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diversity low and therefore managed to find differences based largely on the respondents' nationality (Smith & Bond, 1998).

### ***Replications of the cultural dimensions***

Hofstede argued that behavior across nations can be described and explained with his four dimensions. This idea has been taken on by researchers from a plethora of scientific fields and has spawned a variety of studies that have been able to replicate Hofstede's cultural dimensions (e.g. Merritt, 2000). Merritt's replication was conducted in the context of airline pilots' work and culture. She found, in line with Hofstede's work, that national culture exerts an influence on cockpit behavior over and above the professional culture of pilots.

A replication study made in East Asia by Michael Bond and colleagues (Hofstede & Hofstede, 2005) using the Chinese Value Survey gave evidence for a fifth dimension: *Long- and Short-Term Orientation*. The dimension expresses to what extent virtuous living is a goal, independent of any religious justification. It is also related to the ability to solve well-defined problems. *Long-term* orientation stands for the fostering of virtues directed toward future rewards – in particular, perseverance and thrift. Hence, delayed gratification of needs is accepted. *Short-term* orientation stands for the fostering of virtues related to the past and present – in particular, respect for tradition, preservation of “face” and fulfilling social obligations. Immediate gratification of needs is expected (Hofstede & Hofstede, 2005). Hofstede (2001) has expended his framework to include this fifth dimension.

The most commonly replicated and extensively scrutinized dimension seems to be the *individualism – collectivism* dimension. Recently, there have been discussions about whether or not it is fruitful to perceive cultures in this sense (Bond, 2002; Van de Vijver & Leung, 2000). Bond (2002) argues that much of the confusion regarding individualism-collectivism is the product of researchers who have fallen victims to the ecological fallacy. In spite of clear instructions from Hofstede not to apply his cultural dimensions to analyses of individuals, many researchers do when trying to replicate Hofstede's dimensions and apply them in new contexts. Like all of Hofstede's dimensions, individualism/collectivism is a group level construct that cannot be used to infer or predict an individual's values of behavior.

### **Schwartz**

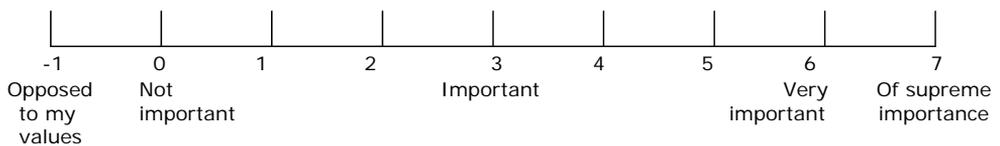
In the last 20 years, Shalom Schwartz (1992, 1994) has become a central figure in theoretically-grounded cross-cultural psychology. Schwartz roots his study of values in a framework of human evolutionary needs (Schwartz & Bilsky, 1987, 1990) and defines values as “desirable trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity” (Schwartz, 1994, p. 21). According to Schwartz, values (1) serve the interests of some social entity, (2) can motivate action, (3) function as standards for

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judging and justifying action, and (4) are acquired “both through socialization to dominant group values and through the unique learning experiences of individuals” (ibid).

Schwartz identified in the previous literature a set of 57 human values (e.g., creativity, curiosity, pleasure, wealth, and health) each of which had been noted in more than one culture. He developed a survey instrument that he and his colleagues have used to collect data from individuals from more than 50 national cultures. In contrast with Hofstede’s study, this method assesses value structures at the individual-level of analysis.

The survey asks respondents to rate each of the 57 values “As a guiding principle in my life,” using the nine-point scale shown in Figure 1. The –1 is unusual but highly useful. It allows respondents to indicate a “negative” value – a value they seek to avoid expressing or promoting through their choices and behavior.



**Figure 1: The 9 point response scale used in the Schwartz value survey. The extreme scores (-1 and 7) are used to anchor the ratings.**

From the participants’ responses to the 57 values, Schwartz found that the interrelationships of the values formed ten value types. When assigning names to the value types, Schwartz was guided by a theoretical framework claiming that values reflect three universal human requirements: 1) biological needs, 2) needs for social coordination, and 3) need for group welfare and maintenance (Smith et al., 2006). The ten value types are presented in Table 2.

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**Table 2: Schwartz's 10 value types (definitions taken from Schwartz (1994)).**

<b>Value type</b>	<b>Description</b>
Self direction	Independent thoughts and actions; autonomy and independence.
Stimulation	The organismic need for variety, excitement, novelty, and challenge.
Hedonism	Pleasure or sensuous gratification for oneself.
Achievement	Demonstrating competence to obtain social approval; the focus is social esteem.
Power	Attainment of social status and prestige, and control or dominance over people and resources; the focus is social esteem.
Security	Safety, harmony, and stability of society, of relationships, and of self.
Conformity	Self-restraint in everyday interaction; restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.
Traditions	Respect, commitment, and acceptance of the customs and ideas that one's culture or religion impose on the individual.
Benevolence	Concern for the welfare of close others.
Universalism	Understanding, appreciation, tolerance and protection of the welfare of all people and for nature.

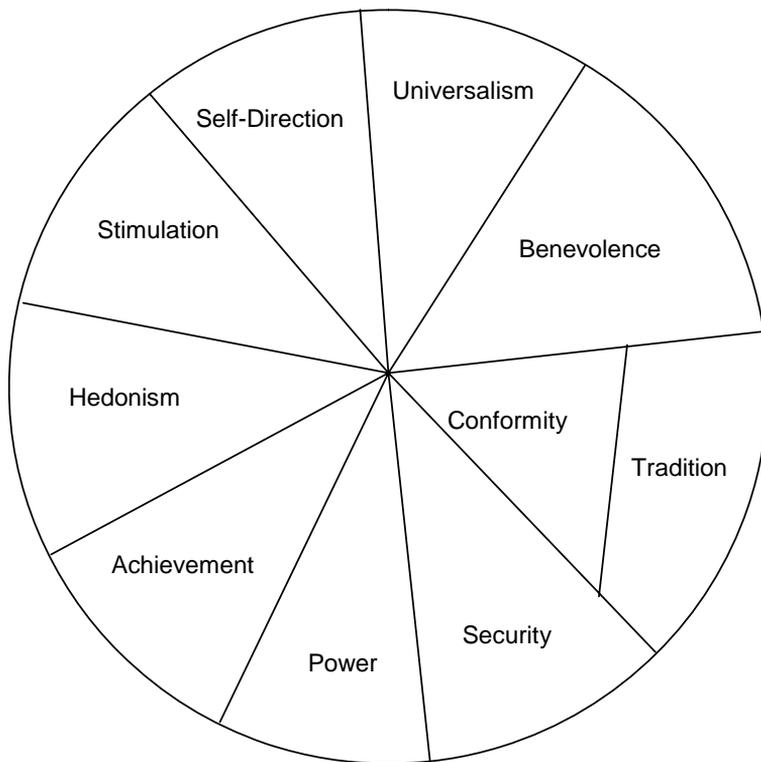
Schwartz set out not only to identify these universal value types, but also to specify the dynamic relations among the types. In order to do this, he analyzed his data using *Smallest Space Analysis*, a scaling technique that represents values as points in a multidimensional space. The distance between the points (values) represent their empirical relations. The more similar two values are, the higher their correlation and, in turn, the closer they are in space.

The smallest space analysis revealed that the ten value types form a configural model, reproduced in Figure 2. The circular shape of the model is explained by the fact that, even though the theory discriminates among value types, the values actually form a continuum of related motivations where adjacent value types share motivational features for the individual. The motivational differences between value types are continuous rather than discrete, with more overlap in meaning near boundaries of adjacent value types. In other words, adjacent value types are proposed to be most compatible and those on opposite sides of the circle to be in most conflict. For example, those individuals who endorse universalism as the guiding principle in their life are not likely to be compatible with those who see power as the guiding principle in their lives. The location of tradition outside of

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conformity implies that these two types share the same motivational goal, that is, the subordination of the self in favor of social expectations.

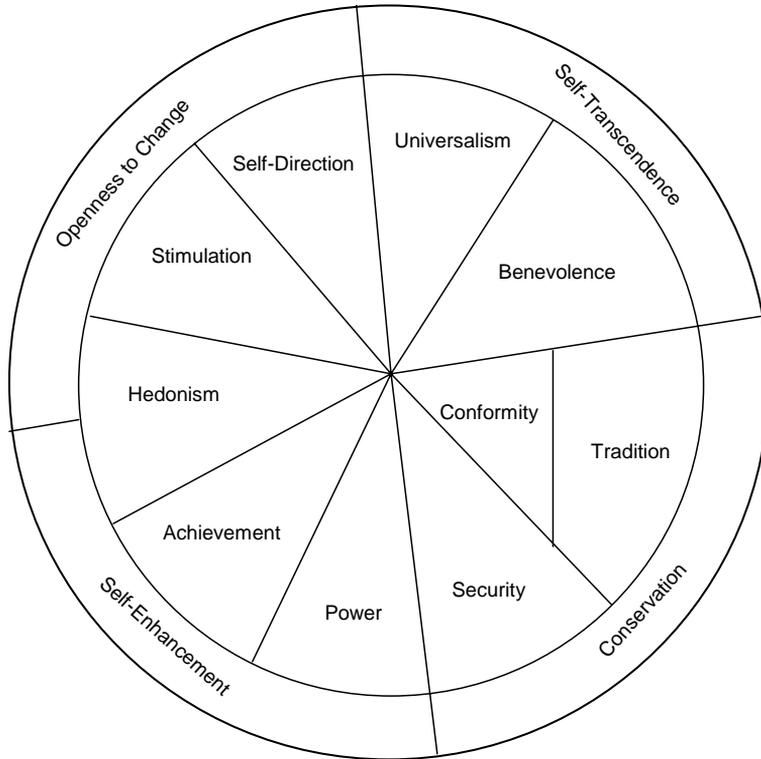
The Schwartz model has been tested innumerable times since its initial publication. With few exceptions (e.g., certain regions in China), individuals in all literate cultures appear to implicitly distinguish the 10 value types when assessing the importance of specific values as guiding principles in their lives. The model represented by the circle in Figure 2 appears to be an exhaustive and near-universal classification of motivational values. Schwartz and others have used the instrument and the configural model of value types to explore and explain cross-cultural differences in a host of domains and applications.



**Figure 2: The configural model of the structure of core human values. The circle represents the interrelationship between the ten value types. (From Schwartz, 1992, 1994).**

The ten value types can also be perceived as two bipolar dimensions (see Figure 3). One dimension is *openness to change* versus *conservation*. On the one side of the dimension, openness to change, novelty and autonomy are strived for. On the other side, conservation, tradition and conformity are prevailing values. The other dimension, *self-transcendence* versus *self-enhancement*, contrasts cooperation with others for the collective good against individual striving for individual gain.

In contrast with Hofstede's dimensions, the Schwartz model uses the natural variability between individuals' answers as a source of explanatory power. His model also provides a basis for generating hypotheses that link responses to his value survey to performance measures (dependent variables).



**Figure 3: The configural model of the structure of core human values. This second circle illustrates how two dimensions are embedded in the configural model. (From Schwartz, 1992, 1994).**

### *2.2.6 Culture's relation to cognition and communication*

Culture affects us in a fundamental way that is often difficult to verbalize, but that does not mean we cannot see or study the influences. Culture is tightly coupled to cognition and communication. In fact, Hutchins (1995, p. 354) argues that culture is a “human cognitive process that takes place both inside and outside the minds of people”, that is, our thoughts and actions are shaped by and mediated through our surroundings and the artifacts we use, and vice versa. An example mentioned earlier is Markus and Kitayama's (1991) study of how our subjective experience of the ‘self’ differs across cultures. These differences in self-perception lead us to think differently, to interpret behaviors of others and express and experience emotions differently, and to strive for different types of social relationships with

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others (Smith et al., 2006). As another example, Kim and Markus (1999) found that simple abstract geometrical figures were perceived differently by European Americans and East Asians (from Korea, Hong Kong, Taiwan and China) and concluded that cultural values “are appropriated by individuals as their own ideas and preferences, and these ideas and preferences influence the perception even of simple abstract figures.” (p. 790). It is therefore relevant to understand how culture is related to cognition and communication. Illustrating how culture influences and is influenced by cognition and communication can facilitate the analysis of how culture can pose barriers to collaboration and decision making.

How culture influences cognition can partly be revealed by studying language and communication. Discourse is often used as the unit of analysis when investigating culture’s impact on communication and cognition. The overlap in semantic content between languages is extensive. It can even be argued that most of the things a person could want to say can be said in any language (Foley, 1997). If one wants to see if the culture/languages used by two different groups of people influences their cognition in different ways, one can therefore look for words or topics where there is no semantic overlap. An example of a study of how language and cognition are intertwined is Boas’ famous discussion of the Eskimos’ many words for snow (*see* Foley, 1997). Boas was active during the first half of the twentieth century and was one of the anthropologists that founded what we today call *linguistic relativity*. He argued that cognitive capacity does not vary across cultures and that all languages are equally sufficient (insufficient) for the expression of thought. From this assumption it follows that any differences in linguistic sophistication between languages and cultures do not reflect cognitive differences, but only differences in emphasis in different cultures (Foley, 1997). Boas reasoned that Eskimos have a plethora of expressions to describe snow, which in turn influences how they perceive snow. In cultures that live in climates where there is no snow, there is only a few or perhaps no words to describe snow. Compared to Eskimos, people in cultures with few or no words for snow are therefore likely to perceive and think differently about snow if faced with it. Thus, there is a tight relationship between the environment and culture we live in, how we perceive information, the words we use, and how we think.

A striking example of how culture influences cognition through language is in the conception of space and spatial relations. In current cognitive science it is often argued that spatial conception is strongly influenced by innate, biologically based universals and therefore is more or less the same in all languages and cultures. During the last twenty years, however, research has shown that these claims are false (Foley, 1997). It has been demonstrated that there are at least two different ways to conceive and refer to spatial relationships: (1) in relative, egocentric terms like *left – right*, *up – down*, *front – back* - tied to body orientation; or (2) in absolute terms, fixed in geographical space, such as *uphill – downhill*, *east – west*. According to

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Foley (1997, p. 228) “These variations in linguistic description are systematically related to differences in cognition. Speakers of languages with relative terms regularly perform differently in psychological tests than do speakers of languages with absolute terms”.

Innumerable studies have compared communication patterns across cultures (*see e.g.* Di Luzio, Günthner & Orletti, 2001; Blum-Kulka, House & Kasper, 1989) and found obvious cultural influences on communication. Not only do we have different languages, but also different communication styles. There is evidence of significant differences in gesturing across cultures (Smith et al., 2006). Turn-taking also differs remarkably between cultures. For example, Swedes are known to quietly listen to the speaker and wait for their turn to talk (Daun, 1998; 1999b). It is impolite to interrupt a speaker and interest about what the speaker is saying is displayed through silent attention. In the Swedish language there is an expression called “att tala i munnen på någon annan” (*to speak in someone’s mouth*) which means to speak simultaneously with someone else. To speak simultaneously with another speaker is considered very impolite and is something Swedish children learn at an early age not to do (Daun, 1998; 1999b). Swedes, amongst others (*e.g.* Finish people, Navajos in North America), are widely known for being quiet people and for appreciating silence and solitude. In contrast, many south European cultures (*e.g.* Spaniards, Bosnians, Italians) encourage lively discussions where turn taking is less organized than in Swedish conversations and where the listener often shows his/her interest through talking aloud together with the speaker. In these cultures, there is no such expression as the Swedish ‘to speak in someone’s mouth’, because that is simply how they are comfortable talking. It is therefore not impolite; on the contrary, it can be impolite to listen quietly. A quiet listener signals boredom. This does not mean that Southern European people like to communicate more than Scandinavians, it just means that these cultures have diverse communication styles in which participation and interest is displayed very differently (Daun, 1998). These examples characterize Swedes and Southern Europeans generally and do not necessarily apply to specific individuals, but even so, they illustrate how conflicts in multicultural groups could arise. Consider a group of Swedes and Spaniards asked to work together with no prior experience of each other’s cultures. Their different communication styles would much likely initially pose barriers to efficient cooperation, since each might perceive the other’s communication style as insulting or rude. To conclude, Smith et al. (2006, p 171) argue that “successful communication rests on shared assumptions about politeness, how to handle threats to face, and the transience or permanence of particular relationships”.

### *2.2.7 Culture and decision making*

As we have seen above, people across different cultures differ in how they perceive their world, how they communicate with each other and what they value in life.

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These factors are very likely to influence decision making styles and strategies in multiple ways.

There is a large body of research on cross-cultural psychology. There is also a large body of research on decision making (within cognitive psychology, social psychology, industrial and organizational psychology and economics). But there has been very little research that investigates decision making across cultures (Weber & Hsee, 2000). Many researchers seem to appreciate that culture can influence decision making, but few investigate how culture actually does influence decision behavior. Ignoring culture's influence on decision making seems to be the rule rather than the exception.

Weber and Hsee (2000) have conducted a review of the literature on cross-cultural investigations of decision making behavior, focusing on probability judgments, risk perception, risk preference, and the use of different modes of decision making. Their extensive review indicates that cultural differences can be found in all these four topics. Even though the research within this area is still in its cradle and somewhat inconclusive (Weber & Hsee, 2000), we can still learn a lot from the studies conducted.

Studies concerned with probability judgments have repeatedly found that people in general are overconfident. An interesting result is that respondents in Asian cultures, often China, show evidence of strikingly higher degrees of overconfidence in their knowledge than respondents in other cultures (Yates, Lee, Shinotsuka, Patalano & Sieck, 1998; Yates, Lee & Shinotsuka, 1996). Concerning risk perception, there are cultural differences in what people conceive as risks, which in turn influences decision making. According to Douglas and Wildavsky (1982) every culture chooses its risks and ignores others. This is also reflected in how people prefer to avoid certain risks and not others (Weber & Hsee, 2000).

Strohschneider and Güss (1999) investigated strategic aspects of complex and dynamic problem solving, comparing German and Indian students. They found that the German students used a more active and control-oriented strategy and committed fewer strategic and tactical error than did the Indian students. The differences were ascribed to cultural differences in exposure to individual and independent problem solving. The German students were accustomed to make decisions themselves; the Indian students were not. Based on their results, Strohschneider and Güss (1999, p. 250) warn against ethnocentrism in decision making research: "Doing research in a monocultural fashion makes it impossible to differentiate strategic knowledge from the underlying processes and leads to theories of problem solving that are highly specific for the single culture". Similar thoughts are expressed by Chu, Spire and Sueyoshi (1999) and Chu, Spire, Farn and Sueyoshi (2005). These two studies compared how respondents from different cultures apply decision processes and use decision aids. The first study investigated

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decision making with American and Japanese students; the second study used Taiwanese and Japanese students. Results showed not only that the participants from different nations (cultures) used differing decision processes, such as weighing alternative choices, information seeking, and willingness to accept trade-offs. They also used decision aids differently. This illustrates the dangers of exporting Western theories and assuming that decision processes are universal. It also illustrates that two neighboring cultures may not be alike.

Mann et al. (1998) investigated how decision making strategies across Western and East Asian samples differed. They argue that what may differ across cultures is a set of factors that determine who makes the decision as well as the values and interests served by the decision. These factors include:

- (1) the authorities and entities invested with responsibility and control over decision making, as well as sources of expertise and advice,
- (2) whether it is an activity for the individual or the group,
- (3) the spheres in which individuals have freedom of choice, and
- (4) ideological principles and societal values that underlie decision rules and criteria for choice

According to Mann et al. (1998) similarities and differences in roles, rights and responsibilities of the individual in decision making has received little attention in the cross-cultural literature.

Even though differences in decision making styles can be found, Mann et al. (1998, p 326) propose that “despite apparent differences in complexity of decision problems across cultures, the core issues are essentially the same – fulfillment of human needs, protection of the individual, promoting group survival, and maintenance of community norms and standards”. One must therefore be careful not to put too much emphasis on the small differences found. A related issue is that of the limited sampling used in the studies reviewed by Weber and Hsee (2000). In nearly all studies, the respondents come from America and/or East Asia. There is relatively little applied decision making research conducted on people from other parts of the world. It is therefore not a surprise that Weber and Hsee conclude their article emphasizing the need for further research within the area.

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## 2.3 Group diversity and faultlines

When working in multinational teams, group diversity is an important issue. The term 'group diversity' typically refers to the degree to which members of a group/team have different attributes such as gender, nationality, ethnicity, profession, and educational background. Assuming that people are attracted to people who are similar to themselves (Byrne, 1971), these categorizations are thought to provide the foundation on which we interact and cooperate.

Lau and Murnighan (1998) introduced a concept called group faultlines to facilitate understanding and to explain the impact of diversity on the effectiveness of work groups. They argued that any analysis of diversity must go beyond the consideration of single characteristics, such as nationality, in isolation and investigate the effects of multiple characteristics and their interrelationships. Their article was the first to present a model for analyzing several characteristics simultaneously and has spawned a growing literature on group faultlines (e.g., Lau & Murnighan, 2005; Molleman, 2005; Thatcher et al., 2003).

Group faultlines are hypothetical dividing lines that may split a group into subgroups based on several characteristics simultaneously. According to Lau and Murnighan (1998), to understand a team and its dynamics, it is important to consider not only several characteristics at once but also the alignment of those characteristics. The faultline model maintains that an alignment of characteristics can encourage a group to split into subgroups. Further, multiple, cross-cutting alignments can encourage the development of a number of potential subgroups.

The first faultline model (Lau & Murnighan, 1998) focused mainly on faultlines based upon demographic characteristics such as sex, race, and age. Although group members can categorize themselves in many different ways, they can rarely deny or hide their demographic attributes, especially those physical characteristics that stand out. For better or worse, these visually evident features contribute strongly to the initial impressions formed by others. When the group is new, faultlines are most likely to form based on demographic attributes (Lau & Murnighan, 1998). As the group interacts, other attributes such as personality, values, and skills will become increasingly influential and may in turn lead to the development of new faultlines (Dyck & Starke, 1999; Lau & Murnighan, 2005). In short, depending on the similarity and salience of group members' attributes, groups may have many potential faultlines, each of which may activate. Active faultlines increase the potential for the team to split into subgroups composed of individuals with similar (aligned) attributes.

According to the model, the strength of group faultlines depends on three compositional factors: (1) the number of individual attributes apparent to group members, (2) their alignment, and, as a consequence, (3) the number of potentially

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homogeneous subgroups. Faultlines are weakest when attributes are not aligned and multiple subgroups can form (Lau & Murnighan, 1998). Lau and Murnighan (1998) hypothesized that groups with strong faultlines were relatively likely to split into subgroups. Further, they proposed that the rift, when activated, would likely become a source of friction and conflict that would reduce performance and group coherence.

The four hypothetical groups in Table 3 are designed to sketch demographic diversity and faultlines. Where there is minimal (Group 1) or extreme diversity (Group 4) in a group, members have only the group as such in common during the initial phase of their cooperation. In Group 1 all participants seem to be alike while in Group 4 they seem to have nothing in common that could become aligned and lead the group to split into subgroups. With repeated interaction, other attributes may align to lead either group to split into subgroups.

The second group in Table 3 consists of young students with different genders and nationalities. Because there are only two sexes and two nationalities, the diversity of the group is relatively low. Nevertheless, the diversity that exists suggests that the group may be cut by two weak faultlines. One aligns the characteristic gender, the other nationality. Depending upon which characteristic is the more salient to the group, one of the other of these faultlines might be activated and foster the formation of two subgroups.

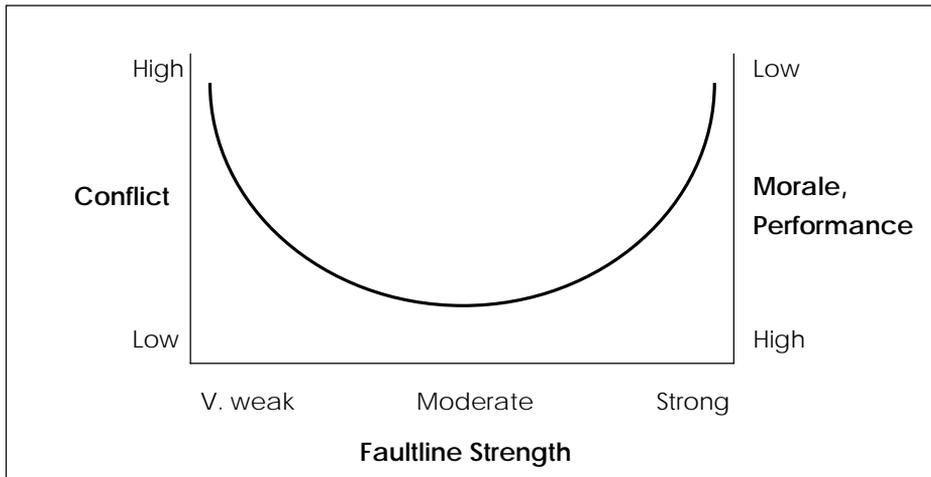
The third group could split into two subgroups that differ along all four characteristics - ethnicity, gender, profession, and age. The two teachers are older Swedish men and the two students are younger Iranian women. The differences in all four characteristics make the group moderately diverse. Their sharp alignment defines one very strong faultline. Lau and Murnighan (1998) argue that this is the type of group in which a faultline is most likely to activate, split the team into subgroups, and cause friction and conflict. One implication of this claim is that faultlines are most likely to form in groups of moderate, rather than high, diversity.

**Table 3: Illustration of faultlines and potential subgroup formation. The groups are ranked according to diversity (inspired by Lau & Murnighan, 1998).**

<b>Group 1</b>	Student Man 20 Swede	Student Man 20 Swede	Student Man 20 Swede	Student Man 20 Swede	Minimal diversity. No faultline.
<b>Group 2</b>	Student Man 20 Pakistani	Student Man 20 Swede	Student Woman 20 Swede	Student Woman 20 Pakistani	Low diversity. Two faultlines: Moderate faultline strength.
<b>Group 3</b>	Teacher Man 50 Swede	Teacher Man 55 Swede	Student Woman 31 Iranian	Student Woman 35 Iranian	Moderate diversity. One very strong faultline.
<b>Group 4</b>	Student Woman 20 Swede	Teacher Man 30 Bosnian	Nurse Woman 65 Iranian	Fireman Man 50 Indian	High diversity. Many very weak faultlines.

Since the introduction of the first faultline model several researchers have accepted Lau and Murnighan's (1998) challenge to conduct empirical tests of the impact of faultlines and of faultline strength on group work. The original article hypothesized that groups with strong faultlines are more likely to split into subgroups and that a rift would reduce both performance and group coherence. The tests, however, suggest that the relationship between faultlines and performance is not as linear and straightforward as predicted.

One of the first empirical tests of the faultline model was conducted by Thatcher et al. (2003). They developed an analytical tool to measure faultline strength. Their data suggest that the effect of faultlines on inter-group conflict and on group cohesion and performance traces a curvilinear (U-shaped) curve like that shown in Figure 4. Groups with either very weak or strong faultlines (e.g., Groups 4 and 3, respectively, in Table 3) experienced more conflict and lower morale and performed less well than homogeneous groups (Group 1) or groups with moderate faultline strength (Group 2).



**Figure 4: Diagram illustrating the U-shape of the relationship between faultline strength and conflict / performance/morale.**

According to Thatcher et al. (2003), a possible explanation of the curvilinear relationship between faultline strength and performance is that some of the members of a group with moderately strong faultlines are likely to belong to more than one subgroup. As team members move between the various subgroups they may create a communication link and thereby improve communication across subgroups. As a result, the group as a whole can experience less process and relationship conflict and higher levels of morale and group performance. Thatcher et al. (2003, p. 233) conclude that "... diversity in and of itself is not negative; it is the composition and arrangement of the diversity among members that ultimately influence group process and performance".

These results are in line with earlier research by Early and Mosakowski (2000) who investigated hybrid team cultures in transnational teams in three separate studies and found that moderate levels of heterogeneity (strong faultlines) rather than low or high levels led to poorer performance.

Molleman (2005) investigated whether faultlines based on demographic characteristics, abilities, and personality traits affect team functioning and found that strong demographic faultlines have negative effects on cohesion and lead to more conflicts. In addition, strong faultlines are especially detrimental to team functioning when team members expect to work autonomously.

Recently, Lau and Murnighan (2005, p. 654) conducted a field experiment that showed that members of strong-faultline groups "identified socially not with the group as a whole but with their demographically similar subgroups". This social identification in turn led to affect- and process based biases, that is, led people to view members of their own sub-group as more likeable and competent. Lau and

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Murnighan also showed that work-related communication differed between weak- and strong-faultline groups, where weak- to moderate-faultline groups were particularly effective.

Few studies seem to have covered the events that actually activate group faultlines and produce a rift that has the potential to split the group into subgroups. In their original article, Lau and Murnighan (1998) hypothesized that it is the nature of the group's task that is the most likely trigger in a well-established group. Dyck and Starke (1999), however, found that conflicts and fragmentation in groups whose members knew each other well were activated by outside events such as the introduction of important new group members. The new members introduced ideological rather than demographic faultlines.

To sum up the research on diversity and faultlines, it is clear that diversity is difficult to handle from a methodological point of view. The early research on diversity relied on overly simple measures of diversity, resulting in inconsistent results. The faultline research is still in its cradle and also suffers from some inconsistency regarding its results (Li & Hambrick, 2005), perhaps because of the immaturity of the theory itself or the use of too complex measures of diversity. It is, however, obvious from the faultline research conducted so far that team diversity can be beneficial for teams when the differences and similarities in the team are aligned in a way that makes overlap between potential subgroups possible (Thatcher et al., 2003).

The teams in Table 4 have five team members to illustrate overlap between subgroups. In Group 1 there is minimal diversity and no faultline. If this group were to split into subgroups, the split would probably be due to personal interests, ideology, or personality traits. Group 2 is an example of how an individual can belong to several subgroups. The Bosnian fireman can interact with his countrymen and he can also relate to the Swedes since they, too, are firemen. One can imagine how the one Bosnian fireman could become a conduit for information flow between the Bosnian physicians and the Swedish firemen.

Group 3 has one very strong faultline with four alignments: profession, sex, age, and nationality. It is likely that this group will split into two subgroups.

There are several very weak faultlines in group 4: there are two professions, two sexes, two generations, and three nationalities. The group could split along any one of these potential rifts. Nevertheless, everyone has something in common with everyone else making it relatively unlikely that any one faultline would rupture. For instance, the group could split based on gender, but then the two female physicians would still have the same profession and age as the one Bosnian man. Although the Indian man's nationality is unique, he and the Swedish man share a profession and are the same age. The multitude and weakness of faultlines

suggests that, if subgroups were to form, the boundaries between them would likely be quite fuzzy.

**Table 4: Potential faultlines.**

<b>Group 1</b>	Fireman Man 29 Swede	Fireman Man 35 Swede	Fireman Man 32 Swede	Fireman Man 31 Swede	Fireman Man 37 Swede	Minimal diversity. No faultline.
<b>Group 2</b>	Physician Man 35 Bosnian	Physician Man 30 Bosnian	Fireman Man 29 Bosnian	Fireman Man 32 Swede	Fireman Man 35 Swede	Low diversity. Two faultlines with moderate strength.
<b>Group 3</b>	Fire chief Man 50 Swede	Fire chief Man 55 Swede	Press officer Woman 31 Pakistani	Press officer Woman 31 Pakistani	Press officer Woman 35 Pakistani	Low diversity. One very strong faultline.
<b>Group 4</b>	Fireman Man 31 Indian	Fireman Man 33 Swede	Physician Woman 55 Swede	Physician Woman 52 Bosnian	Physician Man 50 Bosnian	High diversity. Many weak, imbricate faultlines.

The numerous overlaps of characteristics seen in Group 4 enable fluent subgroups, meaning that subgroups can form and re-form depending on the nature of the team's tasks. It is not likely that any strong subgroups will form in this group. Instead, the numerous weak group faultlines may, in fact, prove to be the glue that holds this multinational and multicultural team together. This hypothesis is presented in paper III and has yet to be tested empirically.

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## 3 METHOD AND RESEARCH PROCESS

This section describes the methods used in paper I-III. Figure 5 illustrates the research process behind this thesis. Paper I was written in the beginning of my work as a doctoral student. Since then, new ideas have crossed my path and my research interests have shifted slightly. After writing paper I, I conducted a literature review on culture. This review influenced paper II, which was written halfway through my licentiate project. After writing paper II, I conducted a literature review on group diversity and faultlines. Paper III includes theory on both culture and group faultlines. Given this addition of theory, I have reinterpreted the results reported in the first two papers. The first paper has been reinterpreted in relation to culture and faultlines. The observational work reported in paper II has been reinterpreted in relation to faultlines. The results of this reinterpretation are described in the section in which I address the research question (section 5).



**Figure 5: The research process.**

### 3.1 Method overview

Before turning to a detailed description of the research process I give an account for the methods used in the three papers respectively. For more information, I refer to the papers. Table 5 presents the methods of the two studies and the three papers.

#### 3.1.1 Paper I – Study I

The observation was exploratory and descriptive. I was one of two observer-participants. I sat in on the team's exercise and observed the team as it was working. The team's task was to respond to a simulated emergency. The team's work was videotaped and field notes were taken by both observers. I tried to make myself seen and heard as little as possible. The day after the exercise, an interview was conducted with a subpart of the participants. The objective of the interview was to clarify phenomena observed during the exercise and create a fuller understanding of how the team actually works. The interview was semi-structured and captured using a tape recorder.

The observation was analyzed using Fleishman and Zaccaro's (1992) taxonomy of team performance. The field notes taken by the two observers and the video recording was used to identify various team functions in relation to the use of ICT. The interview was transcribed and the transcription was used to create a background picture of the team and an understanding of their regular work.

**Table 5: Overview of the methods used in the studies and papers included in the thesis**

	STUDY I		STUDY II	
	Paper I	Paper II	Paper II	Paper III
<b>Study object</b>	A multi-organizational emergency management team of 6 emergency management professionals during a collocated emergency management exercise.	Groups of individuals. The participants are analyzed at both the individual and group levels. Study 1): 32 Swedish, 16 Indian and 8 Iranian students. Study 2): 8 emergency management professionals	Groups of individuals. The participants are analyzed at the group level.  Participants: 32 Swedish, 30 Indian, and 22 Bosnian students	
<b>Type of study</b>	Exploratory and descriptive observational study	Two studies: 1) A laboratory experiment, 2) An observational study Both are exploratory and descriptive	An exploratory and descriptive laboratory experiment.	
<b>Researcher role</b>	Participant observer.	1) Experiment designer, leader and observer 2) Participant observer.	Experiment designer, leader and observer	
<b>Method</b>	Observation and semi-structured interview. Data collection done by: (a) direct observation by two observers, (b) video recording of the team's workplace, (c) traces of artefact use (telephone, white-board, Internet), and (d) a transcript of a semi-structured retrospective interview with a subset of the observed participants.	1) Laboratory experiment: Microworld simulation Questionnaires. 2) Direct observation by one observer.	Laboratory experiment: Microworld simulation	
<b>Analysis</b>	Fleishmann and Zaccaro's (1992) taxonomy of team performance.	Time horizon and conflict avoidance in relation to Schwartz ten value types. Task allocation.	Task allocation. Email communication.	

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### *3.1.2 Paper II – Study II*

The paper reports on two things; 1) an experimental study using the C3Fire microworld to assess cultural differences in group behavior, and 2) an observational study of emergency management personnel during an OSOCC exercise.

The experimental study used the C3Fire microworld and the Schwartz Value Survey (Schwartz, 1992, 1994) as the main instruments to assess cultural influences on command and control decision making in a simulated emergency management setting. The participants had to deal with tasks resembling those they are likely to encounter in an OSOCC.

In order to identify cultural differences in communication and cooperation, the C3Fire microworld (Granlund, 2002) was used to simulate an emergency management task. C3Fire is a microworld (scaled-world) that provides an environment for the controlled study of collaborative decision making in a dynamic environment (Granlund 2002; Johansson, Persson, Granlund, & Mattson, 2003). C3Fire is a proven tool in research on network-based command and control (Granlund, 2003). In C3Fire participants can perform team tasks such as cooperation and coordination of actions and plans. The system generates a task environment that is as complex, dynamic and opaque as the cognitive tasks that people normally encounter in real-life emergency management situations (Brehmer, 2005; Brehmer & Dörner, 1993; Funke, 1993, 2001; Gray, 2002; Rigas, Carling, & Brehmer, 2002).

In C3Fire, the participants' tasks are similar to the tasks in an OSOCC in the sense that participants must 1) manage multiple and possibly conflicting goals; 2) allocate responsibilities; 3) develop a strategy for how to solve the problem; 4) take actions that implement the strategy; and 5) coordinate their actions and communicate.

C3Fire has monitoring capabilities that makes it possible to analyze the interaction between the participants. This paper gives an account of the first analysis iteration of data captured with C3Fire. The paper reports on results from Swedish, Indian and Iranian participants. The method is described in detailed in the section on the research process (see below). The analysis concerns participants' time horizon and conflict avoidance, and their preference of dividing roles and responsibilities in the simulation.

The observational study was conducted during a real-time exercise conducted by the SRSA and the Danish Emergency Management Agency. I observed as an international emergency management team took part of an exercise designed to prepare them for OSOCC work during international relief operations. The observational data was augmented with unstructured informal interviews with the exercise managers.

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### *3.1.3 Paper III – Study II*

The method reported in the third paper, *Identifying Cross-Cultural Group Faultlines* (Lindgren, Smith & Granlund, 2007), is almost identical to the experimental method reported in paper II. The study used the C3Fire microworld to assess cultural influences on communication and cooperation in groups engaged in a simulated emergency management task. The participants had to deal with tasks resembling those they are likely to encounter in an onsite operations coordination center (OSOCC). In the section on the research process (see below) a detailed account for the method is given.

This paper gives an account of the second analysis iteration of data captured with C3Fire. The paper reports on results from Swedish, Indian and Bosnian participants. The analysis concerns participants' email communication during the C3Fire game, and their preference of dividing roles and responsibilities in the simulation.

## **3.2 The research process**

Study I was conducted during a three day exercise conducted by the Swedish Rescue Services Agency and the Swedish Radio. Study II was planned, conducted, and analyzed over the course of two years (2005-2006). Therefore, Study II will be given more attention than Study I in this thesis.

### *3.2.1 Paper I – Study I*

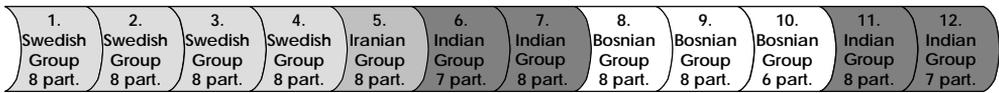
Permission to observe two groups of decision makers during the exercise was obtained by the Swedish Rescue Services Agency two weeks prior to the exercise. It turned out, however, that several companies involved in the exercise were reluctant to let researchers participate in the exercise. In spite of the permission from the SRSA and assurances that no information about the involved companies or individuals would be published, a couple of companies threatened to abandon the exercise the night prior to the exercise if we participated. Just before the exercise started, however, one of the groups of decision makers gave us permission to observe them. Because of the confusion, new schemes and objectives for the observation had to be made. The observation was successful but the last-minute turmoil serves as a reminder how difficult it can be to gain access to private companies.

### *3.2.2 Paper II and III - Study II*

The project “Bridging cultural barriers to collaborative decision making in onsite operations coordination centers” has been an exploratory and iterative process. The papers included in this thesis concern in total 12 experiments, illustrated in Figure 6. These experiments were conducted with participants from four different

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national cultures; Swedes, Bosnians, Iranians, and Indians. This section describes the research process for these experiments.



**Figure 6: Overview of the experiments**

The method used in the study has been modified over the course of running the experiments. The first four experiments, all with Swedish participants, were conducted in cooperation with two other researchers. In addition to studying collaborative decision making, the experiments were used to study constraint propagation (Woltjer, 2005) and flow (Murphy, 2005). The method satisfied the requirements to study collaborative decision making and constraint propagation but an extra questionnaire was used to complement the method in order to study flow. For the following 7 experiments changes to the procedure were made to fit the current group of participants. An account for how the procedure was changed to fit the specific groups of participants is given below.

Paper II was written when seven experiments had been conducted and therefore concerned data with Swedish, Iranian, and Indian participants. Paper III was written when twelve experiments had been conducted. Due to the low number of Iranian participants, in relation to the other national groups, the group was excluded from analysis in Paper III.

### **Our design of a cross-cultural investigation – avoiding the pitfalls**

The experimental procedure is designed to avoid the four pitfalls of cross-cultural research; (1) ethnocentrism, (2) finding the appropriate unit of analysis, (3) ignoring contextual confounds, and (4) replicability.

In order to minimize ethnocentric views in our experimental design we have followed Smith et al.'s (2006) advice and work in a multicultural research team. The original procedure of the experiment (see Appendix I) was designed in a multicultural team consisting of two Swedes, two Americans, and one Dutch researchers.

Our unit of analysis is either the team or the individual and since it is difficult to know exactly how to distinguish one culture from another based on something other than nationality, we too use nationality as a basis of culture in our study. We are aware of the difficulties in doing so, but since we wish to identify dimensions of behaviors based on differences in cultural backgrounds and have to work within our means, nationality is our best proxy for culture. We do not claim that the results from these individuals can be generalized to all individuals in their countries of origin. Rather, we assume that the differences in their behavior can be in part explained by their cultural heritage.

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In our experiments with homogenous national groups, we are avoiding potential demographic confounds by keeping the demographic characteristics of our participants as homogenous as possible. In each experiment group all participants (1) are the same sex; (2) are approximately the same age; and (3) come from the same country. Accordingly, we are using a matched group sample that facilitates comparison across the groups.

By adopting Schwartz's value survey, which has been shown to be both replicable and valid across cultures (Schwartz, 1992; Smith & Bond, 1999), we ground our work in existing theory. By using an experimental approach and a strict experimental procedure, we are also being sensitive to confounding factors in the environment, since much of the environment is controlled by the experiment itself.

The widespread acceptance of Schwartz's instrument and the explanatory power of his configural model of "value types" have led us to adopt the Schwartz model and methodology. The Schwartz model uses the natural variability between individuals' answers as a source of explanatory power. His model also provides a basis for generating hypotheses that link responses to his value survey to performance measures (dependent variables), in our case captured by C3Fire. Different participants have different value structures that, ideally, correlate with differences in their patterns of behavior.

We also generate data that reveal similarities and differences in roles and responsibilities in distributed collaborative decision making. By investigating how the different national groups choose to divide roles and responsibilities, how they set up goals in the game and what strategies they use to reach those goals, we can identify a number of dimensions of decision making behavior along which these national groups differ from each other.

By combining Schwartz's abstract level of measurement with our contextually specific measures from C3Fire, we generated hypotheses about cross-cultural differences that we plan to test in a second series of experiments and observational studies.

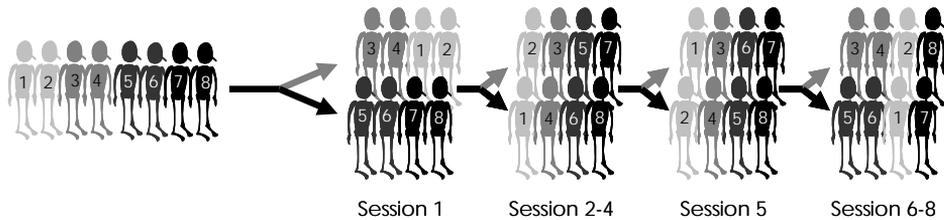
## **Procedure**

The participants reported to the laboratory in groups of eight. In the laboratory, the eight were randomly and anonymously assigned to two teams of four emergency management decision makers. The randomization process is described in Figure 7. The purpose of the random and anonymous assignment to teams was to minimize reputation effects and to emulate the ad hoc nature of the UN's onsite operations coordination center (OSOCC) team formation. In what follows, the word 'team' signifies the four participants in a simulated OSOCC and is the basic unit of analysis in the experiment. The word 'group' is reserved for all eight

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participants when the two teams are brought together or to the larger ethnic group with which they identify.

The two teams of four worked in parallel in two different simulated OSOCC. This arrangement made it possible to gather data on two teams (two units of analysis) simultaneously. It also provided the opportunity to periodically reassign participants to teams to minimize reputation effects.



**Figure 7: The randomization of participants.** A group of eight participants reports to the laboratory. The eight participants are anonymously and randomly assigned to two teams of four participants for the first session. For the second session, the eight participants are assigned to new teams of four. These two teams stay the same for session 3 and 4. For the fifth and sixth session, the eight participants are assigned to new teams of four.

### The cycle of activities

In the first part of each cycle, teams of four worked together across a computer network to coordinate emergency services operations posed by the C3Fire microworld. C3Fire recorded the actions they took and their email communication. The recordings of the teams' actions are the primary source for analyses of team behavior. Transcripts of the emails are one of the primary sources of data about patterns and content of team communication. The unit of analysis for these data is the team.

In the second part of each cycle, the team sat around a computer monitor, watched a replay of their C3Fire session, and engaged in an open-ended conversation about their play. During these after action reviews, most teams developed an organizational structure, allocated responsibilities, and debated alternative strategies for dealing with the emergencies posed by C3Fire. Their conversation was recorded using both a video camera and audio equipment to enable subsequent qualitative and quantitative analyses.

In the third part, members of the team individually filled out one or more of a series of questionnaires. The questionnaires were drawn from the literatures on social, clinical, and cultural psychology. The unit of analysis of these data is the individual.

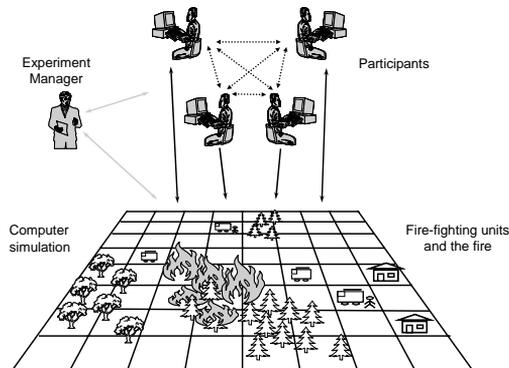
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## Activity 1 – C3Fire experimental trials

The C3Fire sessions were conducted over a server-client network of computers in a laboratory. Each of the eight participants sat at a separate client computer and was linked to his teammates by the C3Fire software. Two teams of four were connected to different server computers. The two servers independently ran the same C3Fire scenario concurrently. Each trial lasted until the participants completely suppressed the fire or 20 minutes elapsed, whichever came first.

In C3Fire the participants play the roles of fire chiefs. Teams of four are charged with the task to collaborate to fight fires in an experimentally-controlled setting under observation of an experiment manager (see Figure 8). The emergency situation is a forest fire. The speed of burning and spreading of the fire are functions of vegetation, terrain, the presence of buildings, and wind direction and speed, and are pre-set by the experiment manager. Participants can extinguish the fire by directing fire trucks to move to squares (in the map grid) that are on fire. The trucks are constrained by limits on the rates with which they drive, deploy, and fight the fire. These limits are set by the experimenter. One of the team's jobs is to dispatch the trucks. The only mode of communication is through email messages in the C3Fire system.

Interdependencies among decision makers arise whenever different classes of fire-fighting units are assigned to different participants in the simulated emergency management situation. For example, the locations and activities of water trucks and fuel trucks constrain the actions of fire trucks. If different people have control over these different resources, their actions are mutually constraining. This provides ample opportunity for conflicts to arise.



**Figure 8: Four participants engaged in the simulation. They sat at separate monitors and could communicate with each other via email. An experiment manager supervised and monitored the experiment.**

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### *Scenarios*

We created eight different experimental scenarios. The teams encountered scenarios designated A through D were on the first day of experimentation. They encountered scenarios E through H on the second day. Table 6 shows the systematic manipulation of three factors that generated the eight experimental scenarios. The factors are map, map rotation, and initial fire size. Two different maps (m1 and m2) with differing configurations of forests and houses, etc., form the foundation for the eight scenarios. Four scenarios use map m1 and four use map m2.

**Table 6: Dependent variables and their manipulation in the C3Fire scenarios.**

Scenario	Map	Map rotation	Fire size	Scenario	Map	Map rotation	Fire size	Changed variable
A	m1	0	2x2	E	m1	180	2x2	fire spread rate
B	m2	0	2x2	F	m2	180	2x2	vehicle speed
C	m1	90	3x3	G	m1	270	3x3	fighting time
D	m2	90	3x3	H	m2	270	3x3	fuel tank size

As shown in the third column of Table 6, map rotation was manipulated at four levels (0°, 90°, 180°, and 270°) to make the maps appear different. As no participant mentioned that the same maps had been used more than once, this manipulation appears to have been effective. Initial fire size refers to the size of the fire, in squares, at the beginning of the scenario. This was manipulated at two levels. The larger the fire, the greater the challenge.

Scenarios E through H were made more challenging by manipulating additional variables in C3Fire. The manipulations were a higher fire spread rate in scenario E, a lower vehicle speed in F, a longer fighting time in G, and a shorter burn-out time in H. The purpose of these manipulations was to keep the scenarios challenging, to keep the participants engaged, and to reduce the likelihood that participants would be able to predict how the emergency would develop.

It is not possible to make a priori statements about the comparative difficulty of scenarios with different maps m1 and m2 or of scenarios E-H with different manipulated variables. We did however intend scenario C to be more difficult than A, D more difficult than B, E and G more difficult than C and F, and H more difficult than D.

### *Anonymity*

One of the salient social characteristics of an OSOCC is that its members may not know each other when they arrive on site. They get to know each other as they

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work. There is no straightforward way to capture this emergence from anonymity in an experimental setting in which participants may indeed know each other. We crossed this hurdle by bringing eight participants into the laboratory at once and splitting them, randomly and anonymously, into two groups of four. Initially, no one on a team knew who the other three team members were. As the day advanced, they became better acquainted and had numerous opportunities to interact as a team.

Specifically, team membership is randomly assigned and unknown during the first, second, fifth, and sixth C3Fire session. There was no opportunity for consultation before the trial. As in a new OSOCC, the team had little common ground (other than their shared nationality) but had to attack the emergency immediately. After every assignment to new teams, the participants found themselves in a new OSOCC facing a new emergency.

### **Activity 2 – After action review sessions**

After the first session the entire group of eight participants gathered together to engage in a semi-structured interview about C3Fire and what they did in the first trial. The conversations focused on technical issues related to the C3Fire interface and on strategies for fire-fighting and logistical support. At the end of the discussion, participants were randomly and anonymously assigned to new teams of four.

After the second session, the newly-formed teams of four gathered together to watch and discuss a replay of their second C3Fire trial. At this point they were introduced to each other. This conversation gave them the opportunity to get to know each other. The teams formed worked together again in the third and fourth trials. After action reviews were held after the third and fourth trials as well. These sessions provided us with opportunities to observe the emergence of camaraderie and assess whether team behavior changed as a function of familiarity.

After the fifth session, the entire group of eight participants gathered together to engage in an after action review. After the sixth and seventh sessions, teams of four engaged in discussions.

Due to change of labs, and thereby change of external constraints on team communication, the after action reviews have not been analyzed in this study. We can unfortunately not ensure that the circumstances regarding the after action reviews were equivalent across the 12 experimental sessions. This makes comparison of participants' communication style (such as gestures, turn-taking, and spatial relations) inappropriate.

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### **Activity 3 – Questionnaires**

After each session, each participant filled out a questionnaire concerning the scenario just played. This questionnaire has been changed several times during the course of the study. It was originally designed for a study investigating flow (Murphy, 2005). The questionnaire then contained 75 questions to be filled in after each session in C3Fire. This procedure was time consuming. Prior to the experiment with the Iranian group, the questionnaire was shortened to 38 questions. The questionnaire still took much time and some of the questions were not relevant to the study of cross-cultural team behavior. When we conducted the first two experiments with Indian participants (experiment 6 and 7) the questionnaire was shortened to a 24-item questionnaire. Still the participants found it irritating and too time consuming to fill it in after each session. Finally, for the Bosnian and two last Indian groups, we shortened the questionnaire to only three questions: 1) Which vehicles did you maneuver during the current session? 2) Did you have a strategy for playing? and 3) Did your team have a strategy? Because of the repeated modification of this questionnaire, the questions were only used to assess what the participants thought about the game and if any participants regarded themselves as being leaders of their teams.

After playing and filling in the questionnaire concerning the game, the team that was not engaged in an after action review session filled out one of the questionnaires, in the questionnaire battery. The six questionnaires are listed here (and described in detail in Appendix II):

- 1) Demographic inventory.
- 2) NEO Five Factor Inventory (NEO-FFI) (Costa & McCrae, 1992).
- 3) Conflict Avoidance.
- 4) Tolerance for Uncertainty.
- 5) Time Horizon.
- 6) Schwartz Value Survey (Schwartz, 1992; 1994).

### **Pilot study**

All three activities in the cycle of experimentation were initially tested in a pilot study. Four Swedish males drawn from a convenience sample volunteered to participate in exchange for movie tickets. They engaged in three cycles consisting of (1) a session with C3Fire immediately followed by (2) team discussion and (3) questionnaires.

Play with C3Fire in the pilot study led us to revise aspects of the experimental scenarios to make them progressively more challenging. The pilot study was also used to test the utility of C3Fire's replay function during the team discussion

sessions in an attempt to encourage fruitful discussion about organization, strategies, and tactics. Participants found it easier to talk about the C3Fire session if they were able to watch it at the same time. The after action reviews were a success and became a standard part of the experimental procedure.

After modifying the C3Fire scenarios and upgrading some of the equipment used to record the audio and video data, we began to solicit volunteers to participate our experiments with ethnically-homogeneous groups.

## Experiments

The running of the 12 experiments and the modifications to the experimental procedure are summarized by Figure 9. The grey blocks represent a timeline of the experiments. The dotted and whole line underneath the timeline indicates whether the experiment was run during one or two days. The dotted line represents experiments conducted over the course of two days. The continuous line represents experiments run during one day. Due to reconstruction of our laboratory facilities at Linköping University and a lack of suitable participants in Linköping alone, the experiments were conducted in three different laboratories. Figure 9 indicates in which laboratory the experiments were run. Finally, the figure also reveals whether the sessions run on C3Fire were ‘modified’ or ‘unmodified’. The modified sessions contained the ‘changed variables’ to scenario 5-8 indicated in Table 6. These modifications made the game more difficult to play. Some participants became discouraged and their attention to the experiment decreased. We therefore decided to make the game a little easier by removing the modifications to scenarios 5-8 for the four last experimental groups (experiment 9 to 12). By doing this we thought that the participants would have a more enjoyable C3Fire experience. However, our change of scenario design did not appear to make any difference in playing behavior and performance.

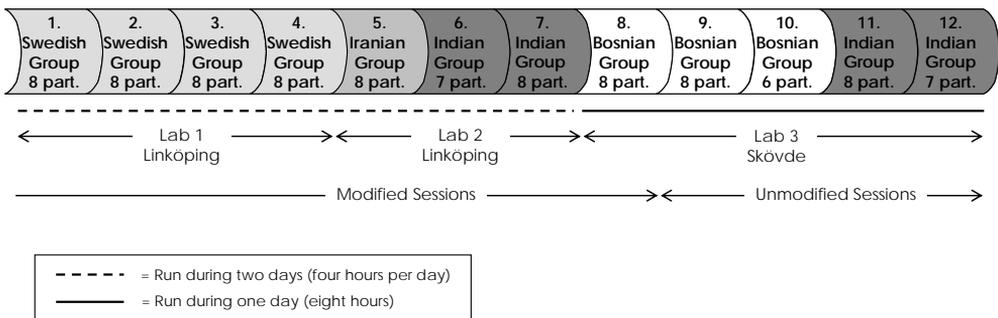


Figure 9: Overview of the 12 experiments (order, duration, laboratory, and session mode).

In Table 7 the changes in the procedure across the 12 experiments are marked as ‘X’. After the first experiment, the instructions were altered. It turned out that the instructions were too long and time consuming. For the seventh experiment, the instructions were translated into English using back translation to ensure conformity with the original Swedish.

**Table 7: Changes done in the experiment procedure and instruments (a change is indicated by ‘X’).**

Change	Experiment											
	1	2	3	4	5	6	7	8	9	10	11	12
Instructions		X					X					
Questionnaires:												
Order of the questionnaires					X	X			X			
Demographic Questionnaire concerning the game					X	X		X				
Schwartz					X							
C3Fire scenarios									X			

The order in which questionnaires were given to the participants was altered a number of times. During the experiments with the Swedish participants (experiment 1-4), the questionnaires were given in random order. This led to unforeseen problems because the questionnaires had different lengths. Some questionnaires took only a few minutes to fill in and others up to twenty minutes. The participants finished with their questionnaires at different times and had to wait for each other. This was experienced as frustrating by the participants. For the Iranian participants (experiment 5) we gave the questionnaires in the same order to all participants. For the sixth and ninth experiments this order was altered to fit the time needed for filling in the questionnaire to the schedule for the experiment.

When conducting the first four experiments, we had not yet access to the Schwartz Value Survey. The survey was included in the procedure for the fifth experiment.

As mentioned earlier, the scenarios in C3Fire were altered for the ninth experiment.

The following sections provide brief account for how the participants were recruited for the experimental sessions with the three national groups and how the procedure was modified for the specific groups.

### *The experiments with Swedes*

The 32 Swedish participants were recruited using email invitations sent to students in the Mechanical Engineering and Cognitive Science programs at Linköping University. They reported to the experiment in groups of eight. After the first group, the instructions were shortened. The Schwartz Value Survey was sent to the

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participants via mail in a stamped return envelop. Of 32, 23 replied (72% response rate).

### ***The experiments with Iranians***

The Iranian participants were recruited with the assistance of an Iranian student at Linköping University. Unfortunately, that group seemed to consist of the only Iranian young men in the Linköping area interested in participating in the study. We failed in finding additional groups of participants from Iran.

The demographic questionnaire was modified to fit the participants' Iranian background. The Schwartz Value Survey was included in the experimental procedure and the questionnaires were given in the same order to all participants. As explained previously, the questionnaire concerning the game was shortened.

### ***The experiments with Indians***

Two groups of Indian participants (15 participants) were recruited at Linköping University via a social group for Indian exchange students in Linköping. Two other groups of Indian students (15 participants) were recruited at Skövde Högskola.

The participants were not immigrants but students on temporary visas. Because they came from all over India, English was their only common language. Accordingly, the experiment was run in English rather than Swedish and all material was translated into English. In addition, the teams were instructed to speak (and write emails) only in English. The participants had no problem following this instruction. The demographic questionnaire was altered to reflect their temporary status.

The procedure used during the Swedish experiments was used for the experiments conducted in Linköping. For the two groups participating in Skövde, however, the experiment was conducted during one eight-hour session per group.

### ***The experiments with Bosnians***

The Bosnian participants were recruited in Skövde by personnel at Skövde Högskola with Bosnian heritage. All three Bosnian experiments were therefore conducted at Skövde Högskola. The first two groups were made up by eight men each. The third group consisted of six women.

The experiments with the Bosnian groups were conducted during one eight-hour session per group. The demographic questionnaire was altered to fit the participants' background.

Due to the move of the experiment to Skövde högskola we wanted to run the two four hour sessions during one day. The procedure was therefore modified to fit one day's trial instead of two. We also changed the demographics questionnaire so that it would fit for the Bosnian participants' background.

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## How to find participants – lessons learned

Trying to recruit participants to the experiments was very difficult. The difficulty was not to find persons who were interested in participating; it was to administer eight persons to come to the lab at the same time – either twice or for an entire eight hour day. When contacting Swedish students it was pretty straightforward. Familiarity with Swedish culture makes it easy to predict what ‘kind’ of people would volunteer. Most of the participants studied computer-related subjects and played computer games in their spare time. The few Swedish participants who were not active students had been studying at university not too long ago.

In contrast, recruiting the Bosnian participants was different; we did not know what to expect from the participants beforehand. We knew their age and time spent in Sweden, but that was all. Recruiting the Iranians and Indians was slightly easier, and since both the Iranian and Indian groups were composed of students it was relatively easy to know what to expect of them (young men that are used to working in groups, use computers a lot and play games).

All the international participants were recruited through a contact person. While this facilitated finding enough participants, there were many disadvantages with this method. Foremost, we had little control over the selection of participants. Even though we explained thoroughly to the contact person what kind of people we were interested in having participate in our study, in the long run all recruitment and selection was left to the contact person’s judgment.

When planning additional studies of this kind, experimenters must make sure that all participants have the requisite language skills and the computer experience needed for playing with C3Fire. In short, experimenters need to retain full control over the recruiting process. Unfortunately, this is easier said than done as recruitment with a contact person is much less time consuming and easier than recruiting participants from a foreign culture.

## 4 THE EMPIRICAL STUDIES

This section gives an overview of the results found in the three included papers. A summary is given in Table 8.

**Table 8: Overview of the three papers.**

	<b>STUDY I</b> <b>Paper I</b>	<b>STUDY II</b> <b>Paper II</b>	<b>Paper III</b>
<b>Aim</b>	To describe how ICT is used during collocated multi-organizational emergency management training and its possible implications for distributed emergency management.	To identify clusters of behavioral differences in collaborative decision making that can be expected to be encountered during an international operation.	To identify cultural differences in collaborative behavior that might form faultlines that in turn may split a multinational team into subgroups.
<b>Results</b>	The change of work setting – from distributed to collocated - contributed to a mismatch in the use of ICT between the collocated exercise and the team’s real, distributed work situation. It is therefore questionable whether the knowledge obtained during the collocated training will transfer as intended.	Culturally-driven differences in planning and leadership style can pose potential barriers to efficient decision making in multicultural command-and-control centers.	The three groups’ norms for communication and task allocation differ along 14 dimensions along which group faultlines could form.
<b>Contribution</b>	Collocated versus distributed training in relation to ICT use.	A method for studying cultural influences on cooperation.	There are two salient contributions: a) the introduction of the group faultlines concept to the cross-cultural research community and (b) the extension of the group faultline tradition beyond demographic characteristics to dimensions of cultural diversity.

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## 4.1 Paper 1 – Study I

Paper I, *A case study of information and communication technology in emergency management training*, (Woltjer, Lindgren, and Smith, 2006) addresses the role of Information and Communication Technology (ICT) in training for effective emergency management and inter-organizational coordination. This topic is interesting to the emergency management community because of an increased reliance on ICT mediated and distributed work procedures. The paper reports on an observational study of a multi-organizational emergency management team during a full-scale, real-time exercise. The observations were augmented with a semi-structured interview.

The exercise was designed to facilitate cooperation among electricity and telecommunications companies. From a societal point of view, there is a need for these companies to cooperate when an emergency occurs (such as an extensive power black out). There are, however, few objectives for the companies to do so due to competition and differences in organizational cultures.

The exercise scenario was similar to the January 2005 windstorm that left much of southern Sweden without electricity or telephone service and revealed the need for better cooperation among utility providers. During the exercise, the observed team worked in a collocated manner, i.e. they shared the same physical location. During real emergencies, however, the team works distributed, meaning that all team members stay at their home offices.

Collocation is said to encourage the development of common ground and trust and, in turn, greater efficiency and effectiveness. Building on the literature on collocated and distributed work, the paper makes three claims:

- (1) Considering the advantages of collocated work, the team assembled for the utilities' exercise is likely to benefit from being able to communicate face-to-face, that is, from the opportunity to develop trust and common ground about the task of emergency management coordination.
- (2) A linked benefit is the ability to refer to the same artifacts while communicating face-to-face and to develop patterns of interaction that may transfer to distributed work and, hence, enhance operations.
- (3) However, considering the potential for a mismatch between collocated training and distributed work, the communication and artifact (ICT) use during collocated training may not readily transfer to distributed work during actual emergency management operations. In short, while there are clear benefits of collocation, these benefits may not extend to the mismatch in ICT use.

The observational study sheds light on the first and the last of the three claims. We have no data to document any transfer of benefit to the team's actual

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distributed work setting. The observations suggest that while collocation is clearly beneficial, a mismatch in ICT use between collocated training and distributed emergency management operations is likely to be detrimental for preparedness.

## 4.2 Paper II – Study II

Paper II, *Using microworlds to understand cultural influences on distributed collaborative decision making in C2 settings* (Lindgren and Smith, 2006), concerns two studies: 1) a microworld study of cultural influences on decision making and 2) an observational study of an onsite operations coordination center training exercise. Both studies are exploratory and descriptive. The units of analysis in the experimental study are groups of individuals responding to a microworld simulation of an emergency situation. In the observational study, the unit of analysis is a team of multinational emergency management professionals responding to a full-scale simulated emergency played out in real-time.

The experimental work was done as a part of the SRSA-funding project “Bridging cultural barriers to collaborative decision making in onsite operations coordination centers”. The observation was conducted in order to get some background information to how people work in the type of coordination center to which the results from the experimental study are supposed to generalize.

The microworld study and the observation converge to identify four clusters of team behavior:

- Risk-averse egalitarian hierarchies – reflects preferences for a relatively traditional hierarchic team structure. The team has a leader who oversees all of the team’s activities. Each team member has a clear role that is determined either by convenience or preference. That partitioning of roles is largely adhered to. Part of the leader’s job is to promote internal harmony and minimize uncertainty.
- Risk-tolerant hierarchies – reflects preferences for a somewhat hierarchic team. The team has a leader but roles, while specified, are not rigid. Team members can take on or drop responsibilities in response to changes in the task demands. The option to flex may be associated with a willingness to tolerate both ambiguous information and inter-team conflict.
- Risk-averse egalitarian teams – reflects preferences for a leaderless organization of equals. The team works together to promote internal harmony and minimize uncertainty.
- Risk-tolerant inchoate groups – reflects preferences for behaviors that appear to some to be chaotic. Harmony is not a concern.

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### 4.3 Paper III – Study II

The third paper, *Identifying Cross-Cultural Group Faultlines* (Lindgren, Smith and Granlund, 2007) discusses the findings of the microworld study “Bridging cultural barriers to decision making in onsite operations coordination centers”. The unit of analysis and method are identical to the experiment described in paper II.

This paper gives an account of the second analysis iteration of data captured with C3Fire. The paper reports on results from Swedish, Indian and Bosnian participants. The analysis concerns participants’ communication patterns and preference of dividing roles and responsibilities in the simulation in relation to the potential of group faultlines. As discussed previously, the term group faultlines (Lau & Murnighan, 1998) refers to hypothetical dividing lines that have the potential to divide a group into homogeneous subgroups.

Results show how the team behavior of the three national groups is similar and how it is different across 14 dimensions. Amongst these dimensions are task allocation structure, frequency of communication, and explicit versus implicit requests. The alignment of these differences and similarities has the potential to either split the group or become the glue that keeps the group members together.

The results shed light on the importance of cultural awareness in multicultural teams. We hypothesize that culturally driven differences in behavior have the potential to split a group into several subgroups. In the article we suggest several directions for future study.

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## 5 ADDRESSING THE RESEARCH QUESTION

In this section I summarize the results from the three papers and discuss how they contribute to answering the research question. As stated in the introductory section, the research question reads as follows:

*Is the faultline concept a viable theoretical vocabulary for addressing cultural differences in communication and cooperation (in the domain of emergency management)?*

By addressing this question I am doing three things: 1) I am introducing the concept of group faultlines to the cross-cultural research community, 2) extending the group faultline tradition beyond demographic characteristics to dimensions of cultural diversity, and 3) supplying the emergency management community with input for multinational training. Thus, this research is covering new ground that should make a significant contribution to both literatures and the domain of emergency management.

### 5.1 Paper I

Woltjer, Lindgren and Smith (2006) discuss ICT use in emergency management training in relation to collocated and distributed work. The taxonomy of seven classes of team functions formulated by Fleishman and Zaccaro (1992) is used to justify the claim that while collocation is clearly beneficial for emergency management training, a mismatch in ICT use between collocated training and distributed emergency management operations is likely to be detrimental for preparedness. The important issue here is not the ICT use in itself, but rather whether the team's functions are fulfilled by ICT use.

In their article, Fleishman and Zaccaro's (1992) write that they do not expect their classification of team functions to be the final version. As researchers apply the classification, new functions may or may not emerge. Considering that the studies that have laid the foundation for their classification are made by Western researchers, and therefore are examples of monocultural studies, new functions may emerge if the functions are applied on a broader variety of cultures. What I believe to be certain, nevertheless, is that the relative emphasis placed on the various team functions will differ across cultures.

The first class of team functions, *orientation functions*, is concerned with internal and external information exchange and team task priority assignment. Given that people across different cultures prefer different communication styles and cooperate in different manners, orientation function may allow many faultlines to form. This is illustrated in the data reported in paper II and III, which show how communication patterns and task allocation behavior differ across cultural groups. Further, it is reasonable to expect that information exchange, both internally and externally, will differ between strictly hierarchical organizations and flat, egalitarian

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organizations. Functions such as *resource distribution* and *timing* are also likely to have different meanings and relative importance in different cultures. Sub-categories to these functions include matching team resources to the requirements of the situation and load balancing. Hofstede's (1980) claim that some cultures put more emphasis on age than on formal competence, and vice-versa, serves as an example of how difficulties regarding these functions could emerge. In a multicultural team in which some people value age and other value formal education, there is potential for conflict regarding task allocation, the orientation functions of setting team task priorities and the resource distribution function of load balancing.

The fourth and fifth classes of team functions are *response coordination* functions and *motivational* functions. Regarding response coordination, the goals of the team's work in an emergency management setting could differ remarkably. An example is seen in Study II in which not all groups actively sought to put the fire out. Some groups chose to focus on particular objects in the world (houses and schools). Such differences in goals will surely steer and constrain how resources are coordinated. Concerning motivational functions, Hofstede's (1980) distinction between collectivistic and individualistic cultures suggests that motivational functions are likely to define dimensions along which faultlines could form when team members come from different cultures. In collectivistic societies, the interpersonal relationships between members of the team might be considered more important than the actual performance and outcome of the team's work. A source of motivation could therefore be to have a cohesive, harmonious group. In individualistic societies, the opposite is likely the case. A source of motivation could therefore be for the team to perform efficiently and effectively.

*Systems monitoring* and *procedure maintenance* functions are classes of functions that are likely to be prioritized differently depending upon cultural norms for the responsibility the individual takes for his/her actions in the team. Strohschneider and Güss (1999) found that German and Indian students differed in regard to complex and dynamic problem solving. They hypothesized that the difference could be derived from the difference in exposure to individual and independent problem solving. In many western cultures, individuals are given much responsibility for their own actions and are also held liable for their actions. In contrast, in collectivistic cultures in which there are strong hierarchies, such as India, individuals are not exposed to individual responsibility in the same manner. This means that in some cultures, individuals are accustomed to monitoring themselves and taking independent actions for which they are also responsible. In other cultures, leaders are fully responsible for a group's work and therefore exercise strict control. The individuals do what they are told and are used to being monitored by someone else.

The examples given above of how the team functions can have different meanings and implications across cultures are just a few out of innumerable examples found

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in the textbooks on culture and management (e.g. Smith et al., 2006). **It is my hypothesis that the team functions described by Fleishman and Zaccaro (1992) are likely loci for faultlines.**

## 5.2 Paper II

This reinterpretation of paper II concerns the observational part of the study only because the review of the experimental part is subsumed in the discussion of paper III. In retrospect, it is clear that I observed the activation of dormant faultlines.

In paper II it is reported that the team members had various professional backgrounds. Faultline formation depends upon the similarity and alignment of attributes like profession (Lau & Murnighan, 1998). An example of one such faultline was seen during the observation to form between team members with a military background and team members with a fire brigade background.

Another salient attribute that is likely to form faultlines, and that was observed during the exercise, is language. English was the official language in the group. Even though the team had language difficulties, all team members were on the same level in the sense that no member had English as a mother tongue. All members had to rely on English to communicate with the other team members. If instead the team had consisted of team members that spoke either English or Russian, and a translator was needed (which is indeed the case during many international operations), the language barrier would constitute a faultline with the potential for profoundly splitting the team.

The open conflict between the two fire chiefs, one being from the north part of Europe and one being from the south of Europe, was a clear illustration of how faultlines can be observed in naturalistic settings. The two men had similar backgrounds but different expectations for how the leadership should be managed and how task related matters should be discussed in the team. During meetings, the southern fire chief became more and more isolated from the rest of the group as the exercise progressed. The rest of the team members' expectations on leadership seemed to match the northern fire chief's. During informal conversations, however, the southern fire chief was not isolated from the rest of the team.

The main contribution of the reinterpretation of paper II is that it reveals that **naturalistic observation of emergency management training is an advantageous approach for studying group faultline formation and activation.** Emergency management personnel are accustomed to being observed during their training since the instructors often function as observers. Because few team members have met prior to the exercise, the training sessions are ideal for the study of team formation and faultlines. During exercises of this kind the researcher can ascertain the participants' demographic backgrounds prior to the exercise. It is therefore possible to set up hypotheses for faultlines prior to the exercise based on

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information about the participants' age, gender, language, cultural and professional backgrounds, and so on. By observing the participants' interactions during the team formation process, it should be possible to test those hypotheses. It should also be possible to test hypotheses on what makes faultlines activate. To my knowledge, no such study has yet been conducted.

### 5.3 Paper III

The data and analysis in paper III implies that members in multinational teams, in which members come from various cultures, will have culturally driven norms for communication and cooperation that are similar across some dimensions and different across others. Depending on the alignments of these similarities and differences, the team can potentially split into relatively homogeneous subgroups. In paper III it is hypothesized, in line with Thatcher, Jehn and Zanutto (2003), that weak group faultlines may form subgroups that overlap each other. In such groups, one or more members function as liaisons and information channels between subgroups.

This paper merges theory from cross-cultural psychology (e.g. Schwartz, 1992, 1994; Smith Bond and K, 2006; Triandis, 1996) and the literature on faultlines (e.g. Lau and Murnighan, 1998, 2005; Thatcher, Jehn and Zanutto, 2003). This merge could potentially have consequences for both fields. The faultline literature, which derives from the management literature and is somewhat applied in its orientation, has focused on several demographic characteristics simultaneously. The contribution of this paper is that faultlines also can be found based on culturally driven behavior. The different dimensions found regarding communication and cooperative behavior can be aligned in the same way as demographic characteristics such as profession, age and gender. This is a new idea in relation to the faultline research conducted so far. In contrast to the faultline literature, the literature produced by the cross-cultural psychology community has relatively little applied emphasis. The emphasis is rather on building theoretical frameworks for understanding differences and universals across cultures on various topics (such as values, communication, and child rearing). There is little effort to produce applicable concepts and models that could be used in practice. **I believe that the faultline concept has the potential to take cross-cultural research into the applied domain so that its findings can be made relevant to people in multinational organizations.**

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## 6 CONCLUSION AND FUTURE RESEARCH

The empirical testing of Lau and Murnighans' (1998) faultline concept is still in its cradle. It is, however, obvious from the faultline research conducted so far that team diversity can be beneficial for teams when the differences and similarities in the team are aligned in a way that makes overlap between potential subgroups possible (Thatcher et al., 2003). Merging this idea with theories from cross-cultural psychology (e.g. Schwartz, 1992, 1994; Smith et al., 2006) has the potential to take cross-cultural research into the applied domain. In doing so, twenty years of predominantly theoretically oriented research on cross-cultural similarities and differences and its findings can be made relevant to people in multinational organizations in a viable manner.

It is also my hope that the ideas presented in this thesis can work as inspiration for emergency management instructors to start looking for signs of faultlines. This could be a powerful tool in training. In training, it is sometimes desirable for team members experience a bit of conflict, so that the team can learn how to handle tension within the team. Often, however, conflict might be detrimental to learning procedures and facts and should therefore be avoided. When designing a multinational team and its tasks, faultlines could be manipulated. If the team's task is to learn how to resolve conflicts, the team could be composed of individuals who form two homogeneous subgroups (e.g. the third group presented in Table 4) and let them perform tasks that enhance their differences. If cohesion is desirable, the team could be designed so that an overlap of demographic or cultural characteristics is created (e.g. the fourth group presented in Table 4). Knowing general dimensions along which faultlines could form (e.g., along demographic and cultural characteristics) could indeed be a powerful pedagogical tool.

The work done for this thesis has identified a number of paths which I intend to explore in the future. Considering the three papers together produces a set of hypotheses for future research.

Considering the first paper, I suspect that the relative emphasis placed on the various team functions in the Fleishman and Zaccaro (1992) taxonomy will differ across cultures. In the section on addressing the research question, I give several examples of how the team functions can have different meanings and implications across cultures. These are just a few out of innumerable examples that can be found in textbooks on culture and management (e.g. Smith et al., 2006). It is therefore my hypothesis that the team functions described by Fleishman and Zaccaro (1992) are likely loci for faultlines and that these team functions would serve as an excellent scoring scheme during observations of multinational teams in action.

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In the discussion of the second paper, in the section on addressing the research question, I suggest that naturalistic observation of emergency management training is an advantageous approach for studying group faultline formation and activation. To test this idea, it would be necessary to (1) gain access to multinational groups, to observe their interactions, communication, and cooperation, (2) ask them to fill out a battery of questionnaires designed to assess the strength of group faultlines and perceived cultural diversity, (3) calculate a measure of faultline strength, (4) predict relative levels of conflict and performance, and (5) test the predictions with observations of the teams performance, morale, and conflict. Several such questionnaires exist. Thatcher et al. (2003) have formulated an appropriate formula for calculating faultline strength. Confirmation of the hypotheses would support the development of guidelines for the design of multinational teams. I hypothesize that by assessing the participants' age, gender, language, cultural and professional backgrounds, and so on prior to the observation, it should be possible to formulate several hypotheses to be tested during the observation. In doing so, it should also be possible to test hypotheses on, not only what faultlines will be activated, but also what makes these faultlines activate. To my knowledge, no such study has yet been conducted.

The idea that numerous, weak group faultlines may form subgroups that overlap each other (through one or more members of the group) and serve as the glue that holds the larger group together is a novel idea that deserves continued research. I hypothesize, in line with Thatcher et al. (2003), that groups with moderate diversity, in which there are overlaps of characteristics and numerous, weak faultlines will experience more cohesion and better flow of information than groups with either strong faultlines, weak faultlines, or nonexistent faultlines.

In sum, based on the three papers it is my hypothesis that the team functions described by Fleishman and Zaccaro (1992) are likely loci for faultlines and that naturalistic observation of emergency management training is an advantageous approach for studying group faultline formation and activation. By extending the faultline concept to include culturally-driven behavior and scoring these using the Fleishman and Zaccaro's taxonomy, faultlines can serve as a viable vocabulary for addressing cultural differences in communication and cooperation in the domain of emergency management, and elsewhere. I believe that the faultline concept has the potential to take cross-cultural research into the applied domain so that its findings can be made relevant to people in multinational organizations and, in turn, help to mitigate cultural barriers to communication and cooperation.

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## 7 FINAL COMMENTS

In this thesis I have concentrated on small groups and teams engaged in emergency management. The results of this study could, however, easily be transferred to any multicultural cooperation. Examples include multinational business, negotiation between heads of state, international education programs, and so on.

I also consider the results presented here relevant to domestic emergency management. It is an unfortunate fact that many immigrants to Sweden are quite isolated from mainstream Swedish society. In large cities such as Stockholm, Malmö and Göteborg, large areas have emerged where almost only first and second generation immigrants live. These areas are characterized by relatively high unemployment and isolation from the rest of the Swedish society. Many inhabitants in these areas might not know a word of Swedish (Hagström & Sundelius, 2003). An unfortunate byproduct of this isolation is that it can serve as an incubator of faultlines. Since the inhabitants in these areas lead their lives quite independently from the rest of the Swedish society, their expectations for entire classes of behavior may differ remarkably from the expectations of the Swedish people in general. Support for this claim comes from the fire in a discotheque in Göteborg in 1998 in which many young people died. The fire and the following rescue operation was an eye-opener for the Swedish emergency management system. Many of the victims of the fire were immigrants or second generation immigrants. The rescue operation became very problematic due to language difficulties and cultural differences in expectations for the interaction between rescue personnel and the people in the discotheque (Hagström & Sundelius, 2003).

We often find it easy to ascribe cultural values and behaviors to specific nations and their inhabitants. What is important to remember with any cross-cultural study, however, is that every human being acts according to his or her own personal qualities and background. Every person must be understood and seen as an individual with individual characteristics rather than a representative for a culture or group (Herlitz, 1994). The generalizations we make across societies must be seen as pedagogical tools rather than 'truths' to help people interact across different cultures. It is also important to keep in mind that each culture and society formulates its rules and traditions in a way that corresponds to what is important and valuable to them. We all have an equal right to our ways of life. One culture is not better or worse than the other. Cultures are just different. And most of the time, they are not even different at all. But when they are different, we need a vocabulary to describe it, discuss it, and train people to recognize it. My aspiration is that group faultlines will serve that purpose in the future.

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## 8 REFERENCES

- Adler, N. J. (1997). *International Dimensions of Organizational Behavior*. Third Edition. South-Western College Publishing.
- Artman, H. (1999). *Fördelade kunskapsprocesser i ledningscentraler vid nödsituationer*. Unpublished PhD Thesis, Linköpings Universitet, Linköping.
- Berthlin, P-A (2006). Räddningsinsatser i internationell miljö. In Fredholm, L. & Göransson, A-L. *Ledning av räddningsinsatser i det komplexa sambället*. Räddningsverket.
- Blum-Kulka, S., House, J. & Kasper, G. (Eds) (1989) *Cross-Cultural Pragmatics: Requests and Apologies*. Norwood, NJ: Ablex.
- Bond, M.H., (2002). Reclaiming the individual from Hofstede's ecological analysis – a 20-year odyssey: comment on Oyserman et al. (2002). *Psychological Bulletin*, 128 (1), 73-77.
- Brehmer, B. (2005) Micro-worlds and the circular relation between people and their environment, *Theoretical Issues in Ergonomics Science*, 6, 1, 73-93.
- Brehmer, B., & Dörner, D. (1993). Experiments with computer-simulated microworlds: Escaping both the narrow straits of the laboratory and the deep blue sea of the field study. *Computers in Human Behavior*, 9(2-3), 171.
- Byrne, D. (1971). *The attraction paradigm*. Academic Press, New York.
- Chu, P.C., Spires, E.E., and Sueyoshi, T. (1999). Cross-cultural differences in choice behavior and use of decision aids: a comparison of Japan and the United States. *Organizational Behavior and Human Decision Processes*, 77 (2), 147-170.
- Chu, P.C., Spires, E.E., Farn, C.K., and Sueyoshi, T. (2005). Decision processes and use of decision aids – comparing two closely related nations in East Asia. *Journal of Cross-Cultural Psychology*, 36 (3), 304-320.
- Costa, P.,T., Jr and McCrae, R.R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor (NEO-FFI) Inventory professional manual*. Odessa, FL: PAR Inc.
- Daun, Å. (1999a). *Det allmänmänskliga och det kulturbundna*. Bokförlaget Prisma, Stockholm.
- Daun, Å. (1999b). *It's Rude to Interrupt! Swedish Communication Styles*. In Daun, Å. & Jansson, S. (Eds) *Europeans: Essays on Culture and Identity*. Nordic Academic Press, Lund.
- Daun, Å. (1998). *Svensk mentalitet*. Rabén Prisma, Stockholm.
- Di Luzio, A.D., Günthner, S. & Orletti, F. (Eds) (2001). *Culture in Communication - - Analyses of intercultural situations*. John Benjamins Publishing, Amsterdam.
- Douglas, M. & Wildavsky, A. (1982). *Risk and Culture – an essay on the selection of technological and environmental dangers*. University of California Press, Berkeley.
- Duranti, A. (1997). *Linguistic anthropology*. Cambridge University Press.

- 
- Dyck, B. & Starke, F. A. (1999). The formation of breakaway organizations: observations and a process model. *Administrative Science Quarterly*, 44, 792-822.
- Early, P. C., & Mosakowski, E. (2000) Creating hybrid team cultures: An empirical test of transnational team functioning. *Academy of Management Journal*, 43 (1), 26-49.
- Fleishman, E. A. & Zaccaro, S. J. (1992) Toward a taxonomy of team performance functions. In Swezey, R. W. & Salas, E. (Eds.) *Teams: Their Training and Performance*. Norwood, NJ, Ablex Publishing Corporation.
- Foley, W. A. (1997). *Anthropological linguistics – An Introduction*. Blackwell Publishing Ltd.
- Funke, J. (1993). Microworlds based on linear equation systems: A new approach to complex problem solving and experimental results. In G. Strube & K. F. Wender (Eds.), *The Cognitive Psychology of Knowledge*. Amsterdam: Elsevier.
- Funke, J. (2001). Dynamic systems as tools for analysing human judgement. *Thinking and Reasoning*, 7(1), 69-89.
- Geertz, C. (1973). *The interpretation of cultures*. Basic Books, Inc., Publishers. New York.
- Granlund, R. (2002). *Monitoring Distributed Teamwork Training*. Unpublished PhD Thesis, Linköpings Universitet, Linköping, SE.
- Granlund, R. (2003). Monitoring experiences from command and control research with the C3Fire microworld. *Cognition, Technology & Work*, 5(3), 183-190.
- Gray, W. D. (2002). Simulated task environments: The role of high-fidelity simulations, scaled worlds, synthetic environments, and laboratory tasks in basic and applied cognitive research. *Cognitive Science Quarterly*, 2, 205-227.
- Hagström, A-Z. & Sundelius, B. (2003). *Krishantering på göteborgska: en studie av brandkatastrofen i Göteborg den 29-30 oktober 1998*. Försvarshögskolan.
- Herlitz, G. (1994). Kulturmöten. In Åstedt, I-B (Ed.). *Antologi om flyktingbarn och deras föräldrar – bakom bergen lämnade vi allt*. Liber utbildning, Borås.
- Hofstede, G. (1980). *Culture's Consequences – International differences in work-related values*. Sage Publications
- Hofstede, G. (2001). *Culture's Consequences – Comparing values, behaviors, institutions and organizations across nations*. 2<sup>nd</sup> Edition. Sage Publications
- Hofstede, G & Hofstede G. J. (2005). *Cultures and organizations: software of the mind*. 2<sup>nd</sup> Edition. McGraw-Hill, London.
- Hogg, M.A. & Vaughan, G.M (2002). *Social Psychology*. 3<sup>rd</sup> Edition. Pearson Education Limited, UK.
- Hutchins, E. (1995). *Cognition in the Wild*. MIT Press, Massachusetts.
- Johansson, B., Persson, M., Granlund, R., & Mattsson, P. (2003). C3Fire in command and control research. *Cognition, Technology & Work*, 5(3), 191-196.

- 
- Kanagawa, C., Cross, S. E., and Markus, H. R. (2001). "Who Am I?" *The Cultural Psychology of the Conceptual Self*. *Personality and Social Psychology Bulletin*, vol. 27(1), pp.90-103.
- Kim, H. & Markus, H.R. (1999). *Deviance or Uniqueness, Harmony or Conformity? A Cultural Analysis*. *Journal of Personality and Social Psychology*, vol 77(4), pp. 785-800.
- Lau, D. C. & Murnighan, K. J. (1998). Demographic Diversity and Faultlines: the Compositional Dynamics of Organizational Groups. *Academy of Management Review*, 23 (2), 325-340.
- Lau, D. C. & Murnighan, K. J. (2005). Interactions within groups and subgroups: the effects of demographic faultlines. *Academy of Management Review*, 48 (4), 645-659.
- Li, J. & Hambrick, D. C. (2005) Factional groups: a new vantage on demographic faultlines, conflict, and disintegration in work teams. *Academy of Management Journal*, 48 (5), 794-813.
- Lindgren, I. & Smith, K. (2006). *Using Microworlds to Understand Cultural Influences on Distributed Collaborative Decision Making in C2 Setting*. Conference paper from the 11th International Command and Control Research and Technology Symposium , Cambridge, UK, 26-28 Sept.
- Lindgren, I., Smith, K. & Granlund, R. (2007). *Identifying Cross-Cultural Group Faultlines*. Manuscript.
- Mann, L., Radford, M., Burnett, P., Ford, S., Bond, M., Leung, K., Nakamura, H., Vaughan, G. & Yang, K. (1998). *Cross-cultural Differences in Self-reported Decision-making Style and Confidence*. *International Journal of Psychology*, 33(5), 325-335.
- Markus, H. R. & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion and motivation. *Psychological review*, 98 (2), 224-253.
- Matsumoto, D. (2003). *The Discrepancy between Consensus-Level Culture and Individual-Level Culture*. *Culture & Psychology*. Vol. 9(1): 89-95.
- Molleman, E. (2005) Diversity in demographic characteristics, abilities and personal traits: do faultlines affect team functioning? *Group Decision and Negotiation*, 14, 173-193.
- Murphy, L. L. (2005). *An Hedonomic Evaluation of Pleasurable Human-Technology Experience: The Effect of Exposure and Aesthetics on the Experience of Flow*. Unpublished PhD dissertation. Orlando, FL: University of Central Florida.
- Rigas, G., Carling, E., & Brehmer, B. (2002). Reliability and validity of performance measures in microworlds. *Intelligence*, 30, 463-480.
- Schwartz, S. H. (1992). *Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries*. *Advances in Experimental Social Psychology*, vol 25, pp. 1-65.
- Schwartz, S. H. (1994). Are There Universal Aspects in the Structure and Contents of Human Values? *Journal of Social Issues*, 40 (4), 19-45.
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- Schwartz, S. H. & Bilsky, W. (1987). Toward a psychological structure of human values. *Journal of Personality and Social Psychology*, 53 (3), 550-562.
- Schwartz, S. H. & Bilsky, W. (1990). Toward a theory of the universal content and structure of values: extensions and cross-cultural replications. *Journal of Personality and Social Psychology*, 58 (5), 878-891.
- Smith, P.B. & Bond, M. H. (1998). *Social Psychology Across Cultures*. London, Prentice Hall Europe.
- Smith, P. B., Bond, M. H. & Kağitçibaşı, Ç. (2006). *Understanding Social Psychology Across Cultures – living and working in a changing world*. Sage Publications, London.
- Spencer-Oatey, H. (2000). *Introduction: Language, Culture and Rapport Management*. In Spencer-Oatey, H (Ed) *Culturally Speaking – Managing Rapport Through Talk Across Cultures*. Continuum, London and New York.
- Stiwne, D. (1995). Vad är en grupp? Om att definiera gruppbegreppet. *Nordisk psykologi*, 47 (3), 182-196.
- Strohschneider, S. & Güss, D. (1999). The fate of the Moros: A cross-cultural exploration of strategies in complex and dynamic decision making. *International Journal of Psychology*, 34 (4), 235-252.
- Thatcher, S. M. B., Jehn, K. A., & Zanutto, E. (2003) Cracks in diversity research: the effects of diversity faultlines on conflict and performance. *Group Decision and Negotiation*, 12, 217-241.
- Triandis, H. C. (1996). *The Psychological Measurement of Cultural Syndromes*. *American Psychologist*, vol 51, no 4, pp.407-415.
- Van de Vijver, Fons J.R. & Leung, Kwok (2000). *Methodological Issues in Psychological Research on Culture*. *Journal of Cross-Cultural Psychology*, Vol 31, (1), 33-51.
- Weber, E.U. & Hsee, C.K. (2000). Culture and individual judgment and decision making. *Applied Psychology: and international review*, 49 (1), 32-61.
- Woltjer, R. (2005). *On how constraints shape action*. Licentiate of Engineering Thesis, Linköpings universitet, Sweden. LiU-Tek-Lic-2005:73.
- Woltjer, R., Lindgren, I. & Smith, K. (2006). A Case Study of Information and Communication Technology in Collocated Emergency Training. *International Journal of Emergency Management*, 3 (4), 332-347.
- Yates, F.J., Lee, J-W., Shinotsuka, H., Patalano, A.L., and Sieck, W.R. (1998). Cross-cultural variations in probability judgment accuracy: beyond general knowledge overconfidence? *Organizational Behavior and Human Decision Processes*, 74 (2), 89-117.
- Yates, F.J., Lee, J-W., & Shinotsuka, H. (1996). Beliefs about overconfidence, including its cross-national variation. *Organizational Behavior and Human Decision Processes*, 65 (2), 138-147.

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## **8.1 Other sources**

Krajic, Wolfgang (2006) Personal communication during a SRSA organized emergency mangagement exersice in May 2006. Mr. Wolfgang Krajic is a UN-OCHA veteran.

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# APPENDIX I: Experimental procedure for the study reported in Papers II and III

Table AI: An overview of the first procedure. It was used during the four experiments with the Swedish and the Iranian groups. This table illustrates the procedure of the first day (first four hours) of the experiment.

## Experimental procedure – day 1 / or first half of the eight hour session

### Introduction

The participants are seated. Informed consent forms are handed out, explained, and signed.

The participants are told not to talk about the game or their identities with each other until the experimenters have given their approval.

Demographic questionnaire

### Instructions and training

Reading the instructions.

C3Fire training scenarios 1 and 2: Individual training

The 8 participants are split into 2 teams of 4 randomly and anonymously and work as teams.

C3Fire training scenario 3.

### Cycle 1

The group is randomly and anonymously divided into two new teams and is told so.

C3Fire scenario A.

Questionnaires on flow

Structured group discussion and coffee break:

1 How did it go?

2 Did anything unexpected happen? What?

3 Why was it unexpected?

4 If you had additional information would it have been easier for you?

5 Did you use the email system? Did you have any trouble with it?

6 What information does the team need to share?

### Cycle 2

The group is randomly and anonymously divided into two new teams and is told so.

C3Fire scenario B.

Questionnaires on flow

Team replay and discussion / questionnaires

### Cycle 3

The teams are in the same as in scenario 2 and are told so.

C3Fire scenario C.

Questionnaires on flow

Team replay and discussion / questionnaires

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**Cycle 4**

The teams are in the same as in scenarios 2 and 3 and are told so.

C3Fire scenario D.

Questionnaires on flow

Team replay and discussion / questionnaires

**Thank you and good bye!** Reminders to return for the second session  
**Or lunch break.**

**Table AII: An overview of the first procedure. It was used during the four experiments with the Swedish and the Iranian groups. This table illustrates the procedure of the second day (hour 5-8) of the experiment.**

**Experimental procedure – day 2 / second half of an eight hour session****Cycle 5**

The group is randomly and anonymously divided into two new teams and is told so.

C3Fire scenario E.

Questionnaires on flow

Structured group discussion and coffee:

**Cycle 6**

The group is randomly and anonymously divided into two new teams and is told so.

C3Fire scenario F.

Questionnaires on flow

Team replay and discussion / questionnaires

**Cycle 7**

The teams are in the same as in scenario 2 and are told so.

C3Fire scenario G.

Questionnaires on flow

Team replay and discussion / questionnaires

**Cycle 8**

The teams are in the same as in scenarios 2 and 3 and are told so.

C3Fire scenario H.

Questionnaires on flow

**Thank you and good bye!**

Payment

Open discussion about the game and the participants' experiences of the C3Fire software and the experiment.

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# APPENDIX II: Information on the battery of questionnaires

## Demographic inventory

The demographic inventory is a 16-item self-report questionnaire with both open-ended and forced-choice questions that assess the participants' (1) personal, academic and work related background, (2) international experiences, (3) estimated language skills, (4) experiences of military, emergency service or police work, and (5) experiences of using computers, especially word processing and chat programs.

## NEO Five Factor Inventory (NEO-FFI)

The NEO-FFI is designed to measure the 'Big Five', five domains of adult personality: extraversion, agreeableness, conscientiousness, emotional stability, and intellect/openness. It gives us valuable insights in the participants' personalities and facilitates differentiation between individual and cultural differences. It is one of our main tools for fending off objections that our data may be dominated by individual rather than cultural differences.

The NEO-FFI is a 60-item personality inventory (Costa & McCrae, 1992). We have obtained a license to administer the inventory and are paying its copyright holder a per-participant fee. The NEO-FFI has adequate internal consistency, construct, and discriminative validity across diverse samples (Ball, Rounsaville, Tennen, Kranzler, 2001; Costa & McCrae, 1992).

## Conflict Avoidance

We have created a conflict avoidance instrument consisting of 23 items that assesses a person's disposition to react to conflict. The scale is comprised of items from the ICAPS, the ROAD, and an additional conflict avoidance scale taken from Tjosvold (1985) and Barker, Tjosvold, and Andrews (1988). The index derived from these items allows us to if our participants find conflicts stressful or not.

## Tolerance for Uncertainty

People react differently to situations in which they feel unfamiliar or without complete information. We designed a 24-item instrument that assesses the degree of comfort in making decisions with incomplete information and in unfamiliar situations. The instrument is comprised of items adopted from the Need for Cognitive Structure scale (NCS; Bar-Tal, 1994), the Revised NEO Personality Inventory (NEO-PI-R, Costa & McCrae, 1992) and the Uncertainty Response Scale (URS; Greco & Roger, 2001). The URS is comprised of three factors, Emotional Uncertainty (EU), Desire for Change (DC), and Cognitive Uncertainty (CU). All three sources have satisfactory internal consistency and test-retest reliability across diverse samples (Ball et al., 2001; Bar-Tal, 1993, 1994; Greco & Roger, 2001).

## Time Horizon

We designed an 18-item instrument that assesses how far people plan in advance, the time frame of their goals, and how far ahead they look to justify their actions. The scale is

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comprised of items from the Uncertainty Response Scale (URS; Greco & Roger, 2001), the PFI, the "Time Orientation" dimension of the Value Orientation Method Survey (VOM; Kluckhohn & Strodtbeck, 1961; Kluckhohn Center, 1995), and the Ability to Achieve Cognitive Structure Scale (AACS; Bar-Tal, 1994). The AACS has both satisfactory internal consistency and test-retest reliability (Bar-Tal, 1993, 1994).

### **Schwartz Value Survey**

The Schwartz Value Survey is a 57 item questionnaire, aimed at testing Schwartz's claims (presented in the Culture section). The survey asks respondents to rate 57 values "As a guiding principle in my life," using a nine-point scale. The values are presented in two lists: the first contains nouns (e.g., equality, freedom, excitement in life); the second contains adjectives (e.g., humble, helpful, curious). This splits the survey into two manageable parts. Prior to rating the values on each list, respondents are instructed to read the whole list, and to choose and rate the value most important to them, and then to choose and rate the value they most oppose. This procedure serves to anchor the 9-point scale and to encourage introspection when rating the values.

The Schwartz Value Survey provides us with a measure of what values our participants find important and gives us the opportunity to test if these values are considered unequally important across our national groups.

### **References**

- Ball, S. A., Rounsaville, B. J., Tennen, H., Kranzler, H. R. (2001). Reliability of Personality Disorder Symptoms and Personality Traits in Substance-Dependent Inpatients. *Journal of Abnormal Psychology*, 110 (2), 341-352.
- Barker, J., Tjosvold, D., & Andrews, I. R. (1988). Conflict approaches of effective and ineffective managers: A field study in a matrix organization. *Journal of Management Studies*, 25, 167-178.
- Bar-Tal, Y. (1993). The effect of need and ability to achieve cognitive structure on certainty. Paper presented at the 10<sup>th</sup> general meeting of the European Association of Experimental Social Psychologists. Lisbon, Portugal.
- Bar-Tal, Y. (1994). The effect on mundane decision-making of the need and ability to achieve cognitive structure. *European Journal of Personality*, 8, 45-53.
- Costa, P.,T., Jr and McCrae, R.R. (1992). Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor (NEO-FFI) Inventory professional manual. Odessa, FL: PAR Inc.
- Greco, V. & Roger, D. (2001). Coping with uncertainty: The construction and validation of a new measure. *Personality and Individual Differences*, 31, 519-534.
- Kluckhohn Center. (1995). *User's manual for the Value Orientation Method*. Kluckhohn Center for the Study of Values: Bellingham, WA.
- Kluckhohn, F. & Strodtbeck, F. (1961). *Variations in value orientations*. Evanston, Illinois: Row, Peterson and Company.
- Tjosvold, D. (1985). Implications of controversy research for management. *Journal of Management*, 11, 21-37.