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## Same Fight, Different Player: An Insight Into Culture, Information Sharing, And Team Performance

Cecily McCoy-Fisher  
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SAME FIGHT, DIFFERENT PLAYER: AN INSIGHT INTO CULTURE, INFORMATION  
SHARING AND TEAM PERFORMANCE

by

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A dissertation submitted in partial fulfillment of the requirements  
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## ABSTRACT

The purpose of this study was to examine the relations among culture, information sharing, and performance among culturally-homogeneous NATO Officer teams. Forty-eight teams participated from five countries, namely, Bulgaria, Netherlands, Norway, Sweden, and USA. Teams of four participants were randomly assigned to a role and the task was an interdependent computer-based mission using an adapted version of *Neverwinter Nights™* (Bioware, 2003), where they had to communicate among teammates and with non-human players to find weapons caches and other mission objectives. Not one individual had all of the information needed to perform the tasks; thus, they needed to share information with each other. The results of the study suggested that total information sharing was related to both team performance and cultural values (Power Distance, Individualism, and Uncertainty Avoidance). Specifically, Situation Update was the information sharing dimension that was significantly related to team performance. In addition, culture moderated the relations between information sharing and team performance. Specifically, there were hypotheses regarding Individualism moderating the relations between (a) Supporting Behavior, (b) Information Exchange, and (c) Reinforcement / Punishment and team performance. The results were that for high Individualists, the more supporting behavior, the better the teams performed. For low Individualists, the more supporting behavior, the worse the teams performed—a finding that was in the opposite direction than hypothesized. In support of the hypotheses, for high Individualists, as Information Exchange and Reinforcement / Punishment increased, team performance also increased. Conversely, for low Individualists, as Information Exchange and Reinforcement / Punishment increased, team performance decreased. A Task Direction x Power Distance interaction was also hypothesized and supported. Task Direction was positively related to team performance for high-

Power Distance teams. For low-Power Distance teams, an increase in task direction was associated with a decrease in team performance. In addition, the effective teams exchanged more information and communicated similarly during the beginning, middle, and end of the missions. Moreover, high-Individualist teams were more successful and spent more time communicating about Planning in the beginning, and Situation Update for both the middle and end of the task. In contrast, teams low on Individualism spent more time communicating about Planning for all three phases of the task. There were also interesting rank differences in Information Sharing between senior and junior Norwegian Officers that are noteworthy. Study limitations, contributions, and practical implications for military teams and similar career fields were discussed.

This dissertation is dedicated to my son, Braxton Cayo McCoy Fisher.

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This journey would not be possible without the sacrifices and diligence of my parents, Cecil and Ismay McCoy. I thank my father for making me breakfast every school day even when I would leave it on the table, for the trips in the park and running in the rain, and for not letting me play if I hesitated in the providing the correct answer to his multiplication quiz. I thank my mother for allowing me to try every extracurricular activity, allowing me to see the world at a young age, and for providing an example of elegance and professionalism. My parents changed previously-thought obstacles into opportunities and provided an outlook that through hard work, persistence, and a plan, anything was possible. At this moment, I appreciate that they never doubted my abilities and encouraged every step of the way, even in difficult times. I am gracious and indebted to them for their foundation and for being the ultimate champions.

For the past five years, my husband, Dr. Brian Fisher has held my hand down this doctoral journey as he was completing his degree. With the late nights and weekends being filled with explosive conversations of statistical findings, theoretical underpinnings, “so what?” moments, and dreams of changing the world, he has been my true partner and a voice of solid encouragement during times of extreme doubt. The road would have more potholes without him. However, we did allow for the most indescribable detour—our son, Braxton Fisher, who has redefined the meaning of life for us. At just six months of age, I am gracious to him for letting me read publications to him instead of nursery rhymes and for sharing precious family moments with his dog brother “Scotch” and his sister “The dissertation”.

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## **LIST OF ACRONYMS / ABBREVIATIONS**

DFCS	Decision Functions Coding System
HFM	Human Factors & Medicine Panel
IS	Information Sharing
IC	Individualism / Collectivism
I/O	Industrial & Organizational Psychology
MF	Masculinity-Femininity
MM	Mental Model
NATO	North Atlantic Treaty Organization
PD	Power Distance
SME	Subject Matter Expert
SMM	Shared Mental Model
SSTR	Stability, Security, Transition, and Reconstruction
TDT	Team Dimensional Training
UA	Uncertainty Avoidance
UAI	Uncertainty Avoidance Index

## CHAPTER ONE: INTRODUCTION

Currently, organizations are adopting innovative ways to restructure their organizational layout to respond to globalization, competition, and technological advances. One commonly-noted solution is to synchronize human capital by forming teams. Teams are defined as “two or more people assigned specific roles or functions to perform dynamically, interdependently, and adaptively toward a common and valued goal, object, and mission” (Salas & Fiore, 2004 as cited in Johnson et al., 2007, p. 437). Using teams, organizations have been able to accomplish cognitively-demanding tasks that require more than one individual (e.g., decision making, customer service; Bell, 2007; Johnson et al., 2007). The extensive use of teams in the 1990s has resulted in flattened-organizational hierarchies, increased flexibility, and improved net profits for the organization (Jehn, Northcraft, & Neale, 1999; Johnson et al., 2007). To understand this new paradigm, researchers have attempted to diagnose predictors of effective team performance. Research conducted in recent decades have contributed to the “golden age” of team research (Salas, Cooke, & Rosen, 2008, p. 541), with Salas and colleagues (2007) citing as much as 130 models, frameworks, or components of teamwork. And although their presence has consumed the industrial / organizational psychology domain, the extant models of teamwork do not sufficiently address teams whose members are not from Western societies or teams with a heterogeneous cultural composition (Salas, Cooke, & Rosen, 2008).

Nowhere have we seen more changes in how work is organized in response to environmental changes than in the U. S. military. The military’s shift to smaller, highly-coordinated teams was primarily used for mission success (e.g., combat teams, training teams,



and quality teams; Knouse, 2001; Salas, Cannon-Bowers, Church-Payne, & Smith-Jentsch, 1998), though multinational coalition teams have proven to be more useful with the dawn of the 21<sup>st</sup> Century. The September 11, 2001 attacks and the subsequent global war on terror have required a major shift in how the military organizes work. No longer do the missions enunciate clear military objectives, nor is mission success solely defined by utilizing traditional weaponry and kinetic forces to seize territory and thwart the enemy strategy in nation-to-nation warfare, as expected in industrial war (Essens & van Loon, 2008; McGinn, Weaver, McDonald, van Driel, & Hancock, 2008). Instead, the current military is faced with more complex missions, requiring a new approach that involves all command levels understanding the non-U.S. political and social challenges in influencing local leaders, governments, agencies, and Non-Governmental Organizations to foster a trusting environment conducive to nation building (Essens & van Loon, 2008). Further, not one individual possesses all of the information, nor one nation maintains all of the human and financial resources needed for contemporary, global military actions—thus, coordination with internal team members and multinational networks is critical for global warfighting and peacekeeping solutions. Examples include counterinsurgency operations, Humanitarian Assistance and Disaster Relief and Stability, Security, Transition, and Reconstruction (SSTR) missions that have been underway in Iraq and Afghanistan (Burke, Wilson, & Salas, 2008). The primary objective of SSTR missions and the focus of the most recent military training, is to “leave behind a stable indigenous population with the capacity to uphold law and maintain essential services, while developing a viable market economy and democratic political institutions” (p.497, Hughes, McCoy, & Johnston, 2009; Department of Defense, 2005)—demanding cooperation and collaboration, most often from multinational

coalition teams. Missions in both Operation Iraqi Freedom and Operation Enduring Freedom have benefited from the military might of these multinational coalition teams.

The North Atlantic Treaty Organization (NATO), for example, has supported coalition efforts in Iraq and Afghanistan. NATO is an alliance of 26 North American and European countries, which was established in 1949 ([www.nato.int](http://www.nato.int)). The mission of NATO is to “safeguard the freedom and security of its member countries by political and military means” ([www.nato.int](http://www.nato.int)), in accordance with the signed North Atlantic Treaty. NATO Officers representing 12 countries (e.g., United States, United Kingdom, the Netherlands, Norway, Italy, Poland, Bulgaria, Romania, Hungary, Turkey, Canada, and Denmark) have supported the Multinational Security Transition Command-Iraq by assisting the Iraqi government to train, mentor, and prepare its security forces (Zabaldo, 2004). In Afghanistan, NATO’s role is “to assist the Afghan Government in exercising and extending its authority and influence across the country, paving the way for reconstruction and effective governance. It does this predominately through its UN-mandated International Security Assistance Force” (“NATO’s role in Afghanistan”, n.d.). NATO’s operations are not narrowly focused in the Middle East. More recently, NATO warships have been deployed off the shores of Somalia to reinforce the battle against pirates and to protect ships from the United Nations’ World Food Program delivering relief supplies to the country (Smith, 2010). Thus, employing military teams to collaborate with culturally-diverse teams has been essential in maintaining an adaptive force.

Although the armed forces have transitioned to using multinational configurations, it has underscored challenges within military operations. This change has driven researchers to shift their attention to understanding effective multicultural collaboration. One important issue is: how do we create effective teams when the people brought to the team have different abilities,

knowledge, skills, and even cultural backgrounds? In this context, culturally-diverse teams pertain to individuals from different nations joining forces, with one specific definition of multicultural teams being “a collection of individuals, small in number, who have representatives from more than one national background among them, who are interdependent and mutually accountable for accomplishing a set of objectives, and who recognize themselves as a team” (Burke, Wilson, & Salas, p. 18-1, 2008; Gibson & Grubb, 2005).

The existing research suggests that the use of heterogeneous team members can be advantageous to problem solving and team performance. In theory, teams with diverse members have varied perspectives, and with this skill fusion, they should be able to effectively complete the team task (Knouse, 2001). “Diverse teams can also have greater cultural and language skills for deployment in international settings” (Knouse, 2001, p. 4; Cox, 1993; Keller, 2001; Simons, Pelled, & Smith, 1999; Thompson & Gooler, 1996).

Conversely, heterogeneous teams can also pose certain disadvantages to team performance. The same diversity that can allow for divergent views for more successful decision making can result in deficiencies in acknowledging the commonalities needed to establish cohesion, trust, communication, and coordination (Knouse, 2001). In a nutshell, diverse teams may find it challenging to achieve mission success and team effectiveness (for a thorough review on the advantages and disadvantages of cultural diversity in teams, please refer to Stahl, Maznevski, Voigt, & Jonsen, 2010 and Stahl, Mäkelä, Zander, & Maznevski, 2010).

Literature published within the past twenty-five years has found that effective team performance is dependent, in part, upon team members engaging in efficient information sharing (IS), which is “a central process through which team members collectively utilize their available informational resources” (Smith-Jentsch, et al, 2001). Most of the literature on team

performance models is derived from studies conducted in the United States and Western populations (Salas, Cooke, & Rosen, 2008). The team research to date has suggested that teams share more information in three cases: when (a) all team members already know the information, (b) members are all able to make accurate decisions on their own, and (c) all members are highly similar to one another (Mesmer-Magnus & DeChurch, 2009). These results suggest that IS is likely to be a challenge for culturally-diverse teams.

More recent research on multicultural or multinational teams has focused on those operating in overseas subsidiaries of multinational corporations, with participants being either locals, expatriates, or third country expatriates (e.g., Elron, 1997); those working in geographically distributed teams (e.g., Hinds & Mortensen, 2005); and those participating in global virtual teams (e.g., Riopelle et al., 2003). However, to fully understand the multicultural team dynamic, one must focus on the unique team processes that occur within each culture (e.g., a team of all Chinese members compared to a team composed of only Brazilian members). The prerequisite of gaining full appreciation of heterogeneous teams is to empirically compare homogeneous teams.

To directly compare the performance of teams from different cultures, the members of the NATO Research Task Group 138 focusing on “Adaptability in Multinational Coalitions” conducted a computer-based experiment using the Situation Authorable Behavior Research Environment (BBN Technologies, 2006). Based on the computer game, “Neverwinter Nights™”, the experiment called for 56 four-person teams of volunteer NATO Officers and the computer-based mission involved the collaboration of efforts to find simulated weapons caches while maintaining positive relationships with the local populace portrayed by avatars. The participants were from five countries—eight teams from Bulgaria (32 individuals), eight teams from the

Netherlands (32 individuals), 16 teams from Norway (64 individuals), nine teams from Sweden (36 individuals), and seven teams from the United States (28 individuals). Additionally, there were also eight mixed-culture teams (32 individuals). The scenario was developed to represent a true team task as the participants each had access to unshared information that would require information sharing to achieve their shared mission. The main hypothesis proposed was that homogeneous-culture teams perform better than mixed-culture teams. Although the preliminary analyses have been mixed, the Research Task Group did not specifically examine information sharing patterns (beyond frequency) among the in culturally-homogeneous teams—providing an important research opportunity for the current study.

This study will expand the research on information sharing and team performance by enunciating a more sophisticated understanding of how this relation is moderated by culture. Specifically, I will examine the association between culture and information sharing in culturally-homogeneous teams from different countries. In doing so, I will test the proposed model that specifies that the relation between information sharing content and team performance is moderated by Individualism, Power Distance, and Uncertainty Avoidance (See Figure 1).

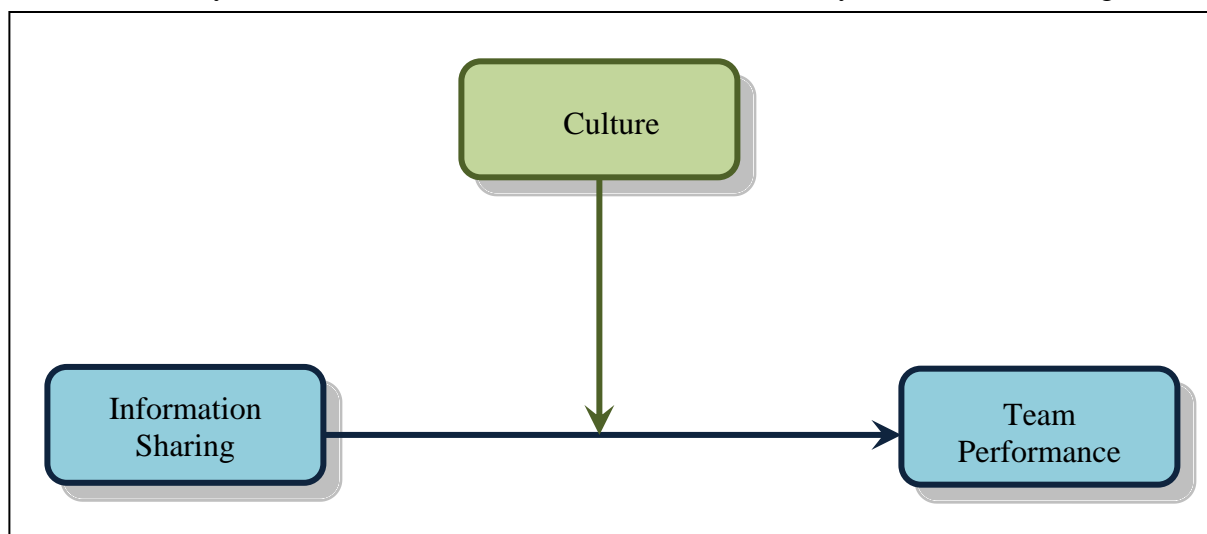


Figure 1. The Moderated Relation between Information Sharing and Team Performance.

The present study will examine similarities and differences in information sharing in a team performance task using teams from different cultures, which will offer several contributions. First, because all teams had the same team performance task, my study will be among the first to directly compare information sharing content on performance in teams across five different cultures. Second, because the participants are military personnel, they are a true representation of the population to which I wish to generalize. Finally, the countries included in this study differ on cultural values and at least one non-Western culture is represented in this sample, thereby making it possible to begin to examine whether traditional Western notions about the relation between information sharing and team performance apply to non-Western teams.

In Chapter 2, the literature on information sharing that is related to team performance will be presented followed by an overview of culture in teams. Then, research examining how culture affects team information sharing will be explained. Finally, the chapter will conclude with a summary of the current research study.

## CHAPTER TWO: LITERATURE REVIEW

It was July, 1988. U. S. Naval forces operating in the Persian Gulf were already notified from Intelligence reports that Iranians may be planning an attack on the United States around Independence Day. These reports may have heightened the anticipation of U. S. Naval personnel and biased their observations and perceptions of benign events that would follow.

On July 3, 1988, a helicopter operating on the USS *Vincennes* (a guided missile cruiser for the Navy) reported that Iranian gunboats fired in their direction, resulting in a gun battle with the Iranian Revolutionary Guard Corps. The gun battle increased noise levels and stress among the USS *Vincennes* operating personnel. In turn, a *Vincennes* crewmember incorrectly identified an unknown aircraft as a threat. The aircraft was positioned within the commercial air corridor, just not in the strictly-obeyed centerline traditionally taken by commercial planes flying in that air space. Further, the aircraft appeared to be approaching the *Vincennes*. The unidentified aircraft did not provide any data supporting its commercial status, multiple warnings were not answered, and no changes in course were acknowledged. As a result of the correct, unknown, and incorrect information that was shared amongst the command information center of the *Vincennes*, the decision made was to fire at the aircraft. As a result, the U. S. Navy was responsible for mistakenly shooting down an Iranian civilian aircraft over the Persian Gulf, killing 290 passengers. The decision time span from takeoff to the disaster was only 7 minutes.

The events that led to this fatal error have been well studied to design and implement training aimed at improving decision making under stressful situations for the military (Fogarty, 1988; Cannon-Bowers & Salas, 1998). The results of the investigation suggested that ineffective information sharing was a cause in the poor decision.

Many other military fatal accidents in history could be attributed to poor information sharing, especially when coordinating among international teams. Further, current military missions are heavily focused on stability operations, requiring increased interactions with the local populace. Our primary intelligence sources abroad are directly linked to the ability to negotiate, build relationships and foster trust with individuals from other cultures.

Communicating in a cross-culturally appropriate way is a crucial skill that is gaining more research and practical attention for the U.S. military. Furthermore, international coalition teams also operate to support the global war on terror.

Although information sharing between international team members is vital for multinational cooperation and mission success abroad, few empirical studies have examined differences in communication patterns among teams outside of the United States. Evaluating how Bulgarian team members interact with each other, for example, is a critical, preliminary step in understanding how Bulgarians would interact with teammates from Sweden, the United States, and Norway. In other words, it is important to understand the unique, within-culture communication patterns that are utilized among homogeneous team members before extrapolating this information to mixed-culture teams. Thus, the primary objective of this study is to examine information sharing patterns and team performance among culturally-homogeneous teams from different nations. In the following literature review, I will first discuss information sharing in teams and then introduce how culture will be expected to change this process. These sections will provide the backbone for the study objectives and research hypotheses.



## Teams

In the 21<sup>st</sup> Century, the United States military services have transitioned into utilizing smaller, more highly coordinated teams (Salas, Cannon-Bowers, Church-Payne, & Smith-Jentsch, 1998). For clarity, a team is defined as “a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform, and who have a limited life-span of membership” (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000, p. 273; Morgan, Glickman, Woodard, Blaiwes, & Salas, 1986; Smith-Jentsch, Mathieu, & Kraiger, 2005). Orasanu and Salas (Cox, 1993) provided the following characteristics of a team: “(a) teams make decisions in the context of a larger task; (b) team members have specialized knowledge and skills relevant to the task and decision; and (c) task conditions under which teams operate often include high workload and time pressure” (van Vliet & van Amelsfoort, 2008). Teams are most useful when the tasks are complex so that members divide the work, monitor the performance of others, and build an expertise on some tasks (Mathieu, Heffner, Goodwin, Salas & Cannon-Bowers, 2000). Further, the use of teams are advantageous in situations where, like in the military, collective insight is needed to make effective and expeditious decisions in order to prevent errors that would lead to severe consequences—specifically, when there are lives at stake (Salas, Cooke, & Rosen, 2008). The use of decision-making teams is supposed to increase the likelihood of selecting the most effective decision in comparison to when the individuals are deciding a course of action without the collaboration of a team. The major reason to expect better decision making is that members bring different information and resources to the team. These different perspectives are then pooled to form a team knowledge stock. With this new understanding, the team can produce a

team decision that is of higher quality than they would have if they did not have the pooled information (Gigone & Hastie, 1993). Consequently, sharing information among team members is a critical process in making quality decisions. Moreover, sharing the needed information to the right team member influences whether or not the most effective decision is chosen by the team. The following section will discuss how the exchange of information within a team can influence decision making and performance. Within this review, hypotheses regarding information sharing content will be presented.

### Information Sharing

#### *Information Sharing and Team Performance*

As previously stated, teams differ from groups because of their need to work interdependently. “Although they assign roles, differentiate responsibilities, and hire members with complementary skills, the purpose of teams is to coordinate work toward a common goal” (Hinds & Weisband, 2003, p. 21). A plethora of research has been dedicated to understanding how to improve team performance (see Gist, Locke, & Taylor, 1987; Mathieu, Heffner, Goodwin, Salas & Cannon-Bowers, 2000; Salas, Dickinson, Converse, & Tannenbaum, 1992). The commonality among the studies is that for team members to efficiently and effectively coordinate their efforts, they need to develop a shared understanding of both the goal and what is needed to accomplish it (Hinds & Weisband, 2003). The initial stage in developing this shared understanding is not possible without much explicit information sharing. Generally, decision making teams are faced with a set of choices (e.g., to fire or not to fire at the aircraft). When possible, the team members formally convene to discuss the alternatives and determine the final decision. Each member usually comes to the discussion with pre-existing information about the decision choices available. Then, the team members share their input and come to a consensus

on the decision. “In principle, pooling information permits a group decision that is more informed than the decisions of members acting individually” (Stasser & Titus, 1985, p. 1467). That is, individually, people may have incomplete information—whether biased or partial, but combining all of the team members’ information together, they can prevent errors. However, Stasser and Titus proposed a biased sampling model of group discussion that suggests that “group members often fail to effectively pool their information because discussion tends to be dominated by (a) information that members hold in common before discussion and (b) information that supports members’ existent preferences” (Stasser & Titus, 1985, p. 1467). This group polarization effect is exaggerated when team members are performing under stressful conditions and have to make life-or-death decisions while faced with severe time pressures—conditions often faced by military members. Consequently, the results of the discussion usually focus on the biases that team members hold instead of correcting their biases with other information that are provided to the team members. Moreover, pre-discussion information will shape the preference of one decision choice because of the increased discussion of biased information—leading to either an effective or ineffective decision. This informational bias has underscored the need to further understand how this phenomenon influences effective decision making and team performance. Stasser and Titus’ (1985) study on pooling partial and biased information has laid the foundation for contemporary research on information sharing in teams.

Stasser and Titus (1985) proposed two extreme distributions: (a) *shared* information—data familiar to all group members, and (b) *unshared* information—data only held by one member. Some researchers refer to these distributions as *common* or *unique* information (Mesmer-Magnus & DeChurch, 2009; Hinzs, Tindale, & Vollrath, 1997). The commonality-uniqueness dimension may resemble research derived from the social psychology research

domain referred to as *group polarization* (Burnstein & Vinokur, 1977). Stasser and Titus' information sampling model posits that the degree of *shared* pre-discussion information that the team members hold will have an influence on the decision choice selected. Empirical research has shown that team discussions consists more of shared information rather than unshared information (Cramton & Orvis, 2003; Mesmer-Magnus & DeChurch, 2009; Stasser & Titus, 1985). Additionally, discussions are swayed by the present preferences of the team, that is, dissenting information is less likely to emerge in discussions (Stasser & Titus, 1987).

Stasser and Titus' (1985) experiment investigated the effect of information sharedness on decision making. Specifically, they designed profiles of political candidates who were campaigning for student body president. Each candidate's profile contained 16 items of information that differed in proportions of positive, neutral, and negative items (e.g., biographical data, academic policies, student social life, etc). The profile for Candidate A had eight positive, four neutral, and four negative items. The authors also included two candidates (Candidates B and C) who had four positive, eight neutral, and four negative items. Essentially, Candidate A was the most favorable candidate. To examine if Candidate A would be selected, the authors implemented three experimental conditions—(a) shared condition: all the information about each candidate was shared amongst all team participants; (b) unshared/consensus: only eight items were shared and the information presented to each team member was biased against Candidate A and in favor of Candidate B; (c) unshared/conflict: only eight items were shared and half of the team members received information in favor of Candidate B over Candidate C, whereas the other team members were provided with information in favor of Candidate C over Candidate B.

Although the information in the unshared groups was biased toward either Candidates B or C, the total pooled information still was in favor of Candidate A, a concept that is referred to as *hidden profiles*. The participants were given these descriptions and instructed to convene in a political caucus to determine the best candidate. The results were that the participants' preferences before the group discussion were consistent with the biased sampling conditions and exacerbated in the post-group discussion attitudes. Thus, group discussion simply perpetuated initial opinions rather than correcting them. The authors also found that Candidate A was most often chosen in the shared condition than the unshared and Candidate B was chosen more often in the unshared conditions than in the shared conditions. Further, Candidate C was more often chosen in unshared/conflict condition than the unshared/consensus condition. This seminal study on sharedness of information and decision making supports that more accurate decisions are made when more data are shared among team members.

More recently, Henningsen and Henningsen (2007) examined Stasser and Titus' information bias and included the concept of a *masked profile*. In contrast to hidden profiles, masked profiles are when the group members receive identical information about the candidate. However, the identical information does not include the full data to make the preferential decision. The authors provided the following example to compare hidden profiles to masked profiles. Take a decision set of nine decision criteria, with six in favor of Option A (e.g., Items  $a_1, a_2, a_3, a_4, a_5, a_6$ ) and three in favor of Option B (e.g., Items  $b_1, b_2, b_3$ ). For individuals with full information, each team member would be provided with all nine decision items. For individuals in a hidden profile, they would collectively have all of the information. Hypothetically, Person X would have decision items  $a_1$  and  $a_2$ , along with  $b_1, b_2$ , and  $b_3$ . Person

Y would have decision items  $a_3$  and  $a_4$ , along with  $b_1$ ,  $b_2$ , and  $b_3$ . Person Z would have decision items  $a_5$  and  $a_6$ , along with  $b_1$ ,  $b_2$ , and  $b_3$ .

To contrast, for masked profiles, all team members would receive identical information, but the data provided would resemble a hidden profile. For example, all individuals would receive decision items  $a_1$  and  $a_2$ , along with  $b_1$ ,  $b_2$ , and  $b_3$ . Therefore, the data support Option B, even though Option A is the optimal alternative. Moreover, all members in the group do not have the information to make a decision that would go against the initial decision preference bias of Option B (Henningsen & Henningsen, 2007). When comparing full information groups (i.e., groups with shared information) to masked and hidden profile groups, the authors hypothesized that the full information groups should prefer the optimal decision choice. Using a similar experimental design as Stasser and Titus (1985), they found that the full information groups preferred the optimal decision over the suboptimal choice before convening with the group. As hypothesized, the opposite trend was found for both the hidden and masked profiles. The full information groups selected the optimal candidate over the inferior, whereas the hidden profile and masked profile groups chose the inferior candidate more often. Moreover, in the hidden profile group, no group selected the best candidate. The results of this study not only underscore the importance of information sharing in team decision making quality, but support that the fewer the number of people share information, the more likely decision errors will be committed.

To further understand the information sharing-team performance relation, I lean on the results from Mesmer-Magnus and Dechurch's (2009) meta-analysis of 72 independent studies. The results supported that information sharing positively predicted team outcomes—team performance, cohesion, member satisfaction, and knowledge integration. Overall, these results,

along with aforementioned studies, support that information sharing is important for team decision making and performance. Thus, I hypothesize the following:

*Hypothesis 1: Information sharing is expected to positively predict team performance.*

Although there is are many studies supporting the frequency of information sharing among teams—that is, the more information sharing that occurs among the team, the more that the team excels—there is less support in understanding the intricacies of the information sharing that makes it so influential on team performance. It is also important to note that as the team becomes more familiar with the members and task, they engage in more sophisticated, implicit coordination (Blickensderfer, Reynolds, Salas & Cannon-Bowers, 2010). However, for this study, the focus is on the introductory stages of ad-hoc virtual teams, and in turn, explicit information sharing. Therefore, it is in my interest to empirically understand what type of information exchange is prominent for selecting a successful decision. To do so, I will examine content of information sharing among members and hypothesize how it is expected to relate to team performance. As the team members in this study communicated via computer, in the following section, I will provide an overview of the literature concerning the content of information sharing among virtual team members and how it has been referenced to impact team performance.

### Information Sharing Content in Virtual Teams

The majority of team research has been conducted among team members who interact face-to-face in Western societies. However, with globalization in the forefront, more and more individuals are working virtually with team members across the world. As a result of ignoring time zones, language barriers, and traditional five day work-week, previously established team

dynamics are changing rapidly to accommodate these new role expectations. In response, there is an emerging literature sub-domain examining global virtual teams.

Virtual teams heavily depend on information technology—email, phone calls, voicemail—for knowledge sharing. When team members depend on electronic mediums, information can get lost in translation causing delays in critical problem solving, disagreements, and frustration (Hinds & Weisband, 2003). Further, cultivating a shared mental model becomes a challenge for virtual teams (Hinds & Weisband, 2003). Thus, effective information sharing is even more necessary for goal accomplishment in virtual teams. Many teams within the military now require members to interact across time zones for mission success. Thus, additional research on how virtual teams interact is necessary to help the Warfighter. Because members of virtual teams cannot rely on the nonverbal communication (e.g., body language) that overwhelming represents most of communication and how individuals derive meaning through the interaction, it is a key objective within this study to understand what information sharing content is most influential to team performance. In the current study, the participants are restricted to a virtual environment, thus they are limited to using only text-like communication and email. The results of this experiment can then lead to a better understanding of information sharing within virtual teams as they differ greatly from face-to-face teams.

Cramton and Orvis (2003) denoted that there were three content areas of information sharing that are relevant to virtual teams—task, social, and contextual information. Task information refers to information about the processes needed to perform the objective (e.g., how to use a tool, what resources are available, when products or reports are due, alternative approaches to performing the task, the status of the work). Social information is communication about individuals and their relationships with each other (e.g., personal motives and goals,



personality traits, where individuals grew up and were educated, their philosophical outlook). Team members use social information to help them interpret the behavior of others. Finally, contextual information is sharing information about the milieu or environment that surrounds tasks, individuals, and groups. It is hypothesized that the abovementioned content areas are important for team performance because they address both the task- and social-related aspects of team performance. However, capturing these content areas may not be possible when the virtual teams are ad-hoc and together for a short period of time. For example, a Marine who is directed to work with a team to manage the transport of a day-long convoy may not have too much opportunity to engage in the social-related information sharing. Instead, it is plausible that the majority of the communication with his/her team may be solely focused on task-related information sharing.

Serfaty et al developed an information-sharing content framework that can be adopted for ad-hoc virtual teams developed for a short-term task. Their framework was three-dimensional, including general information (e.g., time of accident), action and task (e.g., telling a teammate to correct an error), and problem-solving and planning (e.g., reviewing the strategy to rescue hostages). Like Serfaty et al.'s framework, Rosen's (2010) content coding does not include the social-related communication that is less likely to occur in ad-hoc virtual teams; however, it goes beyond three content areas. This more recent coding system was adapted by leveraging from past systems in the literature, specifically, Poole and Roth's (1989) Decision Functions Coding System. The Decision Functions Coding System (DFCS) was a combination of two others: Bales' (1950) Interaction Process Analysis system and Fisher's (1970) Decision Proposal coding System. The categories and definitions for the DFCS are found in Table 1.

Table 1. Poole's (1989) Decision Functions Coding System

	Communication Code	Description
Problem Activity	<i>Problem Analysis</i>	Statements that define or analyze the problem
	<i>Problem Critique</i>	Statements that support or criticize problem analysis
Executive Activity	<i>Orientation</i>	Statements that direct the group's process or help the group to do its work
	<i>Process Reflection</i>	Solutions or proposals
Solution Activity	<i>Solution Analysis</i>	Review of issues to date, review of the design or schedule, restatement of issues, alternatives, criteria
	<i>Solution Design</i>	Statements that propose solutions
	<i>Solution Elaboration</i>	Statements that alter or amend solutions
	<i>Solution Evaluation</i>	Statements that support (+), criticize (-), or offer evaluation (/) of solutions.
	<i>Solution Confirmation</i>	Votes or offer final confirmation of decisions
	<i>Other</i>	Disorganized or non-focused discussion.
Tangents		Moving to an unrelated subject
Simple Agreement		Statements that express agreement
Simple Disagreement		Statements that express disagreement

To accommodate his data, Rosen (2010) added two additional coding dimensions to his adapted system: Team Information Exchange and Team Knowledge Sharing. Rosen's final coding system is referenced in Table 2. To summarize, Rosen (2010) reported that the only simple linear relation found between a coding dimension and team performance was supported by Team Knowledge Sharing—suggesting that teammates who engaged in more knowledge sharing performed better. A finding, contradicting what is typically reported in literature (e.g., Mesmer-Magnus & DeChurch, 2009), was a significant negative relation between Team Information Exchange and team performance, when Simple Agreement was statistically controlled. This finding maybe due to the coding definition of Team Information Exchange not including Acknowledgments, in that the data would suggest that higher-performing teams have a stronger relation between information exchange and acknowledgements than their lower-performing counterparts. Moreover, if information exchange occurred without

acknowledgement, this information sharing connection would weaken its association with team performance. However, upon further examination, when the ratio of Team Information Exchange to Team Knowledge Sharing was analyzed, he reported a significant negative relation—teams that shared less information in proportion to knowledge sharing performed better. Other findings from this include a positive relation between Simple Agreement and team performance and an inverted-U curvilinear relation between Team Process and Plan Regulation and team performance.

Table 2. Rosen's (2010) Coding System

Process	Code	Brief Description
<i>Team Information Exchange: Sharing relevant information with team members</i>	Information Provision	Utterances containing facts about the task environment or situation—simple information that can be accessed from one source in the displays and ‘one bit’ statements.
	Information Request	Question utterances asking for a response of simple information about the task environment or situation, or questions asking for repetition of immediately preceding information.
<i>Team Knowledge Sharing: Communicating explanations and interpretations of information</i>	Knowledge Provision	Statements about the task environment or situation that provide either 1) an integration of more than one pieces of simple information, or 2) an evaluation or interpretation of the meaning, value, or significance of information within the current operation.
	Knowledge Request	Question utterances that request a complex information response about the task environment or situation: to answer the question, the response should provide either 1) an integration of more than one piece of simple information, or 2) an evaluation or interpretation of the meaning, value, or significance of information within the current operation.
<i>Team Solution Option Generation: Offering potential solutions to a problem</i>	Option Generation–Part	Statements that provide an incomplete solution—a sequence of actions (i.e., moving resources) intended to meet a given operation objective—or ask for further refinement and clarification of a solution. This includes proposing a general area for a safe base.
	Option Generation–Full	Statements explicitly proposing a complete or near complete solution— a sequence of actions intended to meet a given operation objective. A complete solution includes locations, resources, and vehicles except for solutions proposed for objective 2 (finding a safe location).

Process	Code	Brief Description
<i>Team Evaluation and Negotiation of Alternatives: Clarifying and discussing positive and negative consequences of potential solution options</i>	Solution Evaluation	Utterances that 1) compare different potential solutions on the basis of speed, cost, or ease of execution, 2) provide support or criticism of a single potential solution, or 3) ask for an evaluation of a potential solution.
<i>Team Process and Plan Regulation: Critiquing the team's process</i>	Goal / Task Orientation	Utterances directing the team's process or helping it do its work by proposing questioning, or commenting on goals for the team or specific actions team member's need to take to address a goal. These statements direct what the team should do next or later in the future. This includes self-references for an individual.
	Situation Update / Request	Statement's that provide or ask about what the team is currently doing or what is currently happening with the simulation.
	Reflection	Utterances that provide or ask for a critique or evaluation of the performance of the team as a whole or of individual members.
<i>Other</i>	Simple Agree / Disagree / Acknowledgement	Simple agreement/disagreement utterances are expressions of agreement or disagreement with no rationale provided. Acknowledgements are utterances providing recognition of receipt of communication.
	Incomplete / Filler / Exclamation	Incomplete utterances are statements that have no explicit meaning because they are missing one or more critical components of grammar: subjects, verbs, or objects. Fillers are sounds or words that are spoken to fill gaps between utterances. An exclamation is an utterance that has no grammatical connection to surrounding utterances and emphatically expresses emotion.
	Tangent / Off-task	Non-task related statements including jokes, sarcastic comments, comments on the nature of the experiment, and statements that have nothing to do with the task at hand.
	Uncertainty	Uncertainty statements explicitly express either general or specific uncertainty about the roles, tasks, situations, or anything else task-related.

Although there is much strength to the Rosen (2010) study, the research is still unclear on which information sharing content is most influential for team performance, providing the slight inconsistencies in research. Thus, the following exploratory research question is proposed:

*Research question: Which information sharing content area(s) relate to team performance?*

Further, the literature has not addressed whether and how cultural context may shift or change the relations altogether. More specifically, do the data support that cultural values moderate the relation between information sharing and team performance? Thus, in this study, I will examine how culture may relate to information sharing and team performance. In turn, a review of literature on culture follows.

### Culture

As in civilian corporations, NATO operations often involve international collaboration and intercultural interactions with allied countries. This is the current reality for American corporations as well, due to the dependence on international employees, customers, suppliers, and competitors (Javidan, Dorfman, de Luque, & House, 2006). To expand how the globalized market has been affected, “foreign sales by multinational corporations have exceeded \$7 trillion and are growing 20 percent to 30 percent faster than their sales of exports” (Javidan et al., 2006, p. 67). Although the need to operate in multicultural environment to remain competitive mirrors that of the military, the consequences of not understanding the culture of other nations for servicepersons operating abroad, and in multicultural teams, are often more critical, and sometimes, life-threatening. Thus, there is a need to research how national cultural differences influence organizational and team processes and outcomes.

It has been noted by many researchers that “culture affects our knowledge structures, beliefs, and how we understand the world around us, make attributions, behave, communicate, etc.” (12-1, Bjornstad; Hewstone, 1989; Hofstede, 1991; Hofstede, 2001; Javidan, et al., 2006; Miller, 1984; Smith & Bond, 1993; Triandis, 1976; Triandis, Vassiliou, Vassiliou, Tanaka, &

Shanmugan, 1972). It is a “unique meaning and information system, shared by a group, and communicated from one generation to the next” (Matsumoto, 2009, p. 12; Matsumoto & Juang, 2007). Moreover, cultural differences can affect the overall military mission success at both the commanding and platoon levels. Working at both levels requires seamless interactions and negotiations with the local population, authorities, law enforcement, and military personnel. Failure to gain the trust of the people can result in compromised intelligence information, increased insecurity, unwarranted danger, and overall mission jeopardy (Van Meer, Veldhuis, & Schwerzel, 2008). Knowledge and fluency in the host country culture is necessary to win the hearts and minds of the people and to facilitate partnerships, cooperation, and coalitions (Van Meer, Veldhuis, & Schwerzel, 2008). Furthermore, a concrete awareness of culture should be engaged by both military and non-military teams that are involved in multinational operations.

### Defining Culture

One challenge in culture research is discriminating between cultures. The root of the struggle has been identified as the definition of culture – it has continuously changed over time and across disciplines (i.e., psychology, anthropology, and sociology domains). Most people have an idea of what ‘culture’ is, with connotations ranging from literature, education, and the arts to what anthropologists refer to patterns of thinking, feeling, and acting (Smith, 2008; Hofstede, 1991). Hofstede refers to the former as ‘culture one’—“culture in the narrow sense” and the latter as ‘culture two’ (Hofstede, 1991, p. 5). The focus of this study will be exploring ‘culture two’.

Arriving at a single definition of culture becomes even more difficult because there are many forms of culture—such as ethnicity, nationality, religion, region, language, geographical area, ecology, age, hobbies, lifestyles, strength of kinship bonds, social class, and corporate

culture (Cohen, 2009; Smith, 2008; Doney, Cannon, & Mullen, 1998). Thus, the culture definition used varies from study to study. Consequently, readers interested in influences of “culture” on various outcomes can be easily misled.

Many definitions of culture have been offered, all developed from the Latin derivation referring to the “tilling of the soil” (p.4, Hofstede, 1991). Kroeber and Kluckhohn (1952) gathered 164 definitions of culture (please see Table 1 for an abridged list of culture definitions). After more than five decades since the Kroeber and Kluckhohn compilation, more definitions have been offered. The most referenced authors in the cross-cultural domain are Hofstede, Kluckhohn, and Triandis, with each researcher providing their own perspective on culture. Hofstede (1991) defined culture as “the collective programming of the mind that distinguishes the members of one group or category of people from another” (p. 5). Kluckhohn’s (1951) definition was that “culture consists in patterns of thinking, feeling, and reacting...” (p.86). Triandis (2004) specified that culture develops in adaptive interactions, it includes commonalities, and it is shared through time and generations. Hofstede’s definition focuses on the cognitive facets, whereas Kluckhohn includes cognitive, affective, and behavioral aspects of culture in his definition. Triandis concentrates on the ascribed function of culture—that it is learned and shared over time. In total, culture is a “(a) collective, not individual attribute, (b) not directly visible but manifested in behaviors, and (c) common to some but not all people” (Hofstede & McCrae, 2004).

Table 3. Definitions of Culture

Sources	Definition
Fiske (2002, p.85)	A culture is a socially constructed constellation consisting of such things as practices, competencies, ideas, schemas, symbols, values, norms, institutions, goals, constitutive rules, artifacts, and modifications of the physical environment.
Boyd & Richerson (1985, p. 33)	Culture is information capable of affecting individuals' phenotypes which they acquire from other conspecifics by teaching or imitation.
Lumsden (1989, p.15)	A system of socially learnable knowledge shared among members of a society.
Smith & Bonds (1999, p. 39)	A culture is a relatively organized system of shared meanings.
Hofstede (2001, p. 1)	"The collective programming of the mind that distinguishes the members of one group or category of people from another"
Kluckhohn	Culture consists in patterns of thinking, feeling and reacting, [...]; the essential core of culture consists of traditional [...] ideas and especially their attached values".
Matsumoto (Hughes et al., 2009)	"A unique meaning and information system, shared by a group, and communicated from one generation to the next".
Shirayev and Levy (2007)	Culture is "a set of attitudes, behaviors, and symbols shared by a large group of people and usually communicated from one generation to the next" (p. 4).

Each of the aforementioned definitions still oversimplifies the sophistication that this construct denotes. To capture the complexity, researchers have identified dimensions of culture to refine and test the construct. In the following section, I will provide an overview of the cultural frameworks most often cited in the literature.

#### Cultural Frameworks

It has been documented that people from different cultures behave differently. Researchers have dedicated effort to diagnosing the important variables that leads to behavioral differences. In doing so, they have developed various cultural frameworks; detailing aspects of



culture that have been theorized to have relations with behavior (please see Table 4 for a list of different cultural frameworks). Within the past five years, there have been at least 45 cultural dimensions identified in the literature; however, providing details about each dimension is beyond the scope of this study (please see Salas, Burke, Wilson-Donnelly, & Fowlkes, 2004 for an overview). The most widely accepted dimensions of culture were those developed by Hofstede (1980), but many frameworks have followed, some of which will be discussed further, namely those from Trompenaar, Schwartz, the GLOBE project, and the Cultural Mosaic.

### *Hofstede's Cultural Values*

Arguably, the most researched cultural dimensions are Hofstede's five cultural dimensions— Power Distance, Individualism / Collectivism, Masculinity / Femininity, Uncertainty Avoidance, and Long-Term / Short-Term Orientation. This seminal research that spearheaded the original four dimensions (excluding Long-Term / Short-Term Orientation, which was added in the late 1980s) was conducted by Geert Hofstede by analyzing data from IBM employees from 40 countries (Hofstede 1984; Hofstede & McCrae, 2004). Power Distance is the degree to which unequal power distribution in a society is tolerated (Hofstede, 2006; Spector, Cooper, & Sparks, 2001). Specifically, it is the extent to which the less powerful members of society accept and expect that there is an unequal distribution of power (Hofstede, 1980; 1991). The Individualism / Collectivism dimension is the most researched cultural dimension from Hofstede's framework, focusing on the extent to which individuals are integrated into groups. In more individualistic societies, there is more importance placed on protecting the self and immediate family. In contrast, collectivist cultures emphasize being a part of a cohesive group and looking after members of an extended family "in exchange for unquestioning loyalty" (Hofstede & McCrae, 2004, p. 63; Hofstede, 1980; 1991). Masculinity /

Femininity is a continuum indicating the distribution of gender roles, with the assertive pole named “masculine” and the modest, caring pole named “feminine” (Hofstede & McCrae, 2004). Moreover, it is the extent to which stereotypical masculine objectives of wealth, assertiveness, competitiveness, and recognition are esteemed instead of focusing on modesty and caring for others (Hofstede, 1980; 1991; Paulus, Bichelmeyer, Malopinsky, Pereira, & Rastogi, 2005). Uncertainty Avoidance refers to the tolerance for risk and ambiguity (Hofstede & McCrae; Paulus, et al., 2005). Cultures that score high in uncertainty avoidance attempt to minimize ambiguous situations by implementing strict laws and safety/security precautions. Individuals living in uncertain avoiding cultures are often more expressive and anxious and tend to be viewed as more “busy, fidgety, emotional, aggressive, active” (Hofstede, 1991, p. 115). Long-Term / Short-Term focuses on “fostering virtues that are oriented toward future rewards versus emphasis on immediate gratification” (Paulus, Bichelmeyer, Malopinsky, Pereira, & Rastogi, 2005, p. 44). Long-Term Orientation suggests an inclination for planning whereas short-term orientation indicates a tendency for action (Lichacz, 2008).

#### *Trompenaar’s Waves of Culture*

Hofstede’s study sparked additional cross-cultural studies examining differences in behavior. Trompenaars conducted research on over 30,000 managers representing 30 multinational corporations from 55 countries. His work resulted in a similar taxonomy of values that was proposed by Hofstede, however, he provides additional insight on a couple of dimensions (i.e., dividing power distance into status that is warranted by achievement or by inherited by birth). Trompenaars’ cultural framework has seven dimensions, each posing their own dilemma—Universalism – Particularism (what is more important – rules or relationships?), Individualism – Communitarianism (do we function in a group or as an individual?), Specific –

Diffuse cultures (how far do we get involved?), Affective – Neutral cultures (do we display our emotions?), Achievement – Ascription (do we have to prove ourselves to receive status or is it given to us?), Sequential – Synchronic (do we do things one at a time or several things at once?), and Internal – External Control (do we control our environment or work with it?). Due to the overlap with Hofstede’s Big Five (e.g., Trompenaars’ Communitarism and Hofstede’s Collectivism), Trompenaars’ framework allows for more feasible conceptual integration (Carr, 2004) with Hofstede’s empirically-supported framework, reinforcing the maintenance of Hofstede’s dimensions in cultural research.

#### *Schwartz Value Survey*

Most of the cross-cultural research has used business managers and personnel for their sample to help generate their dimensions. However, Schwartz (Thompson & Gooler, 1996) provided a paradigm shift from the conventional method. He investigated value preferences of secondary school teachers and students from 64 nations ([www.imo-international.de/index\\_englisch.htm?/englisch/html/svs\\_info\\_en.htm](http://www.imo-international.de/index_englisch.htm?/englisch/html/svs_info_en.htm)). His rationale for using this sample instead of managers was that the classroom is a central location where cultural values are passed on. The results of the Schwartz Value Survey yielded ten individual-level motivational values and goals and seven cultural orientations. The ten cultural orientations include conservatism, intellectual autonomy, affective autonomy, hierarchy, egalitarianism, mastery, and harmony. Details about these cultural orientations are featured in Table 4. Again, Schwartz’ framework has yet to replace Hofstede’s name on the cultural framework marquee.

### *The GLOBE Project*

Similar to previous cross-cultural studies, the researchers for the Global Leadership and Organizational Behavior Effectiveness project examined approximately 20,000 managers in over 60 countries, ranging from Albania to Zimbabwe (Javidan & House, 2001; Grove, 2005). The results from the project yielded nine ecological factors that are related to leadership behavior. The factors are Performance Orientation, Assertiveness, Future Orientation, Human Orientation, Institutional Collectivism, In-group Collectivism, Gender Egalitarianism, Power Distance, and Uncertainty Avoidance (see Table 4 for more details on each dimension). Some of these dimensions echo those from Hofstede's Big Five (e.g., power distance and uncertainty avoidance); however, integration of study results should be cautioned as the criterion for the GLOBE project was leadership behavior instead of general work behavior. Nonetheless, the overlap in dimensions supports consistency in the research across different methodologies, nations, and criteria.

### *The Cultural Mosaic*

The most comprehensive framework of culture is Chao and Moon's (2005) Cultural Mosaic. In essence, they describe a person's or a nation's culture as being comprised of multiple tiles—demographic, geographic, and associative characteristics (more details are found in Table 3). Although the Cultural Mosaic encompasses a multidimensional approach to the culture construct, it has not yet been empirically validated.

Table 4. Cultural Frameworks

Source	Framework
<p>Hofstede (1980) – Cultural Values</p>	<ul style="list-style-type: none"> <li>• <b>Power distance:</b> the prevailing norms of inequality within a culture.</li> <li>• <b>Individualism – Collectivism:</b> the extent to which the identity of members of a given culture is shaped primarily by personal choices and achievements of by the groups to which they belong.</li> <li>• <b>Masculinity – Femininity:</b> in masculine cultures, values such as “competition, success, and performance are relatively more prevalent than in feminine cultures, where there is relatively more emphasis on values such as warm social relationships, quality of life, and care of the weak.</li> <li>• <b>Uncertainty Avoidance:</b> the degree to which members of a culture are uncomfortable with uncertainties in life.</li> <li>• <b>Long-term orientation – Short-term orientation:</b> fostering virtues that are oriented toward future rewards versus emphasis on immediate gratification</li> </ul>
<p>Trompenaars and Hampden-Turner (2005)</p>	<ul style="list-style-type: none"> <li>• <b>Universalism versus Particularism</b> – “people from universalistic cultures focus more on rules, are more precise when defining contracts and tend to define global standards for company policies and human resources practices. Within more particularistic national cultures, the focus is more on the relationships; contracts can be adapted to satisfy new requirements in specific situations and local variations of company and human resources policies are created to adapt to different requirements.”</li> <li>• <b>Individualism and Communitarianism</b> – “this dimension classifies countries according to the balance between individual and group interests. Generally, team members with individualist mindsets see the improvements to their groups as the means to achieve their own objectives. By contrast, the team members from communitarian cultures see the improvements to individual capacities as a step towards the group prosperity”.</li> <li>• <b>Specific versus Diffuse Cultures</b> – “Specific cultures exhibit more ‘directness’, whereas diffuse cultures are more indirect and have blurred boundaries (e.g., work and leisure).”</li> <li>• <b>Achievement versus Ascription</b> – “people from achievement-oriented countries respect their colleagues based on previous achievements and the demonstration of knowledge, and show their job titles only when relevant. On the other hand, people from ascription-oriented cultures use their titles extensively and usually respect their superiors in hierarchy.”</li> <li>• <b>Neutral versus Affective</b> – “In affective cultures, the expression of emotion by individuals is taken as more natural and indeed admired by others in these cultures. On the other hand, in neutral cultures, the expression of emotion is restrained to give the impression of objectivity and ‘being in control’”.</li> </ul>

Source	Framework
<p style="text-align: center;">Schwartz Value Survey Seven Cultural Orientations and Value Types</p>	<ul style="list-style-type: none"> <li>• <b>Conservatism:</b> the person is viewed as embedded in a collectivity, finding meaning in life largely through social relationships and identifying with the group. A cultural emphasis on maintenance of the status quo, propriety, and restraint of actions or inclinations that might disrupt the solidarity group or the traditional order. (Social order, respect for tradition, family security, wisdom).</li> <li>• <b>Intellectual Autonomy:</b> the person is an autonomous, bounded entity and finds meaning in his / her own uniqueness, seeking to express own internal attributes (preferences, traits, feelings) and is encouraged to do so. Intellectual Autonomy has a cultural emphasis on the desirability of individuals independently pursuing their own ideas and intellectual directions (curiosity, broadmindedness, creativity).</li> <li>• <b>Affective Autonomy:</b> the person is an autonomous, bounded entity and finds meaning in his/her own uniqueness, seeking to express own internal attributes (preferences, traits, feelings) and is encouraged to do so. Affective Autonomy promotes and protects the individual's independent pursuit of own affectively positive experience (pleasure, exciting life, varied life).</li> <li>• <b>Hierarchy:</b> a hierarchical, differential allocation of fixed roles of resources is the legitimate, desirable way to regulate interdependencies. People are socialized to comply with the obligations and rules sanctioned if they do not. A cultural emphasis on the legitimacy of an unequal distribution of power, roles and resources (social power, authority, humility, wealth).</li> <li>• <b>Egalitarianism:</b> individuals are portrayed as moral equals, who share basic interests and who are socialized to transcend selfish interests, cooperate involuntarily with others, and show concern for everyone's welfare (equality, social justice, freedom, responsibility, honesty). People are socialized to as autonomous rather than interdependent because autonomous person have no natural commitment to others (equality, social justice, freedom, responsibility, honesty).</li> <li>• <b>Mastery:</b> groups and individuals should master, control, and change the social and natural environment through assertive action in order to further personal or group interest. A cultural emphasis on getting ahead through active self-assertion (ambition, success, daring, competence).</li> <li>• <b>Harmony:</b> the world is accepted as it is. Groups and individuals should fit harmoniously into the natural and social world, avoiding change and self-assertion to modify them (unity with nature, protecting the environment, world of beauty).</li> </ul>

Source	Framework
<p>Chao &amp; Moon (2005) – Cultural Mosaic</p>	<ul style="list-style-type: none"> <li>• <b>Demographic tiles</b> of the cultural mosaic – inherited physical characteristics and social identities (e.g., age, ethnicity, gender, race)</li> <li>• <b>Geographic tiles</b> of the cultural mosaic – physical characteristics of the land (natural or man-made) that can influence group identities (e.g., climate, temperature, coastal/inland, urban/rural, regional/country)</li> <li>• <b>Associative tiles</b> of the cultural mosaic – all groups (informal and formal) with whom the person identifies (e.g., family, religion, employer, profession, politics, avocations).</li> </ul>
<p>Six Dimensions of National Culture - (Sutton &amp; Gundling, 2005)</p>	<ul style="list-style-type: none"> <li>• <b>Independence / Interdependence:</b> Shapes a preference for individual initiative and action, or for a more group-oriented approach emphasizes the interests of the team as a whole</li> <li>• <b>Egalitarianism / Status:</b> Shapes a preference for mutual consultation in decision-making, or for greater deference to rank and hierarchy</li> <li>• <b>Risk / Restraint:</b> Shapes a preference for rapid action and risk-taking, or for more cautious and calculated actions based on ample information</li> <li>• <b>Direct / Indirect:</b> Shapes a preference for open and explicit communication, or for careful attention paid to context or to implicit meanings in a given message</li> <li>• <b>Task / Relationship:</b> Shapes a preference for immediate attention to getting the job done, or for establishing strong and trusting personal relationships first</li> <li>• <b>Short-term / Long-term:</b> Shapes a preference for making choices based upon a narrow time horizon, or for considering the impact that choices will have over a longer span of time</li> </ul>
<p>World Values Survey</p>	<ul style="list-style-type: none"> <li>• <b>Traditional / Secular-Rational:</b> "...[this] dimension reflects the contrast between societies in which religion is very important and those in which it is not... Societies near the traditional pole emphasize the importance of parent-child ties and deference to authority, along with absolute standards and traditional family values, and reject divorce, abortion, euthanasia, and suicide. These societies have high levels of national pride, and a nationalistic outlook. Societies with secular-rational values have the opposite preferences on all of these topics" (<a href="http://www.worldvaluessurvey.com">www.worldvaluessurvey.com</a>).</li> <li>• <b>Survival / Self-Expression:</b> "The unprecedented wealth that has accumulated in advanced societies during the past generation means that an increasing share of the population has grown up taking survival for granted. Thus, priorities have shifted from an overwhelming emphasis on economic and physical security toward an increasing emphasis on subjective well-being, self-expression and quality of life" (<a href="http://www.worldvaluessurvey.com">www.worldvaluessurvey.com</a>).</li> </ul>

Source	Framework
<p style="text-align: center;"><b>Global Leadership and Organizational Behavior Effectiveness (GLOBE)</b></p>	<ul style="list-style-type: none"> <li>• <b>Performance Orientation:</b> “the degree to which a collective encourages and rewards (and should encourage and reward) group members for performance improvement and excellence.”</li> <li>• <b>Assertiveness:</b> “the degree to which individuals are (and should be) assertive, confrontational, and aggressive in their relationships with others.”</li> <li>• <b>Future Orientation:</b> “the extent to which individuals engages (and should engage) in future-oriented behaviors such as delaying gratification, planning, and investing in the future.”</li> <li>• <b>Human Orientation:</b> “the degree to which a collective encourages and rewards (and should encourage and reward) individuals for being fair, altruistic, generous, caring, and kind to others.”</li> <li>• <b>Institutional Collectivism:</b> “the degree to which organizational and societal institutional practices encourage and reward (and should encourage and reward) collective distribution of resources and collective action.</li> <li>• <b>In-group Collectivism:</b> “the degree to which individuals express (and should express) pride, loyalty, and cohesiveness in their organizations or families.”</li> <li>• <b>Gender Egalitarianism:</b> “the degree to which a collective minimizes (and should minimize) gender inequality.</li> <li>• <b>Power Distance:</b> “the degree to which members of a collective expect (and should expect) power to be distributed equally.”</li> <li>• <b>Uncertainty Avoidance:</b> “the extent to which a society, organization, or group relies (and should rely) on social norms, rules, and procedures to alleviate unpredictability of future events.”</li> </ul>



Source	Framework
<p style="text-align: center;"><b>Cultural Lens Model</b></p>	<ul style="list-style-type: none"> <li>• <b>Time Horizon:</b> "...describes how far ahead people set goals and look to justify their actions" (Klein, 2004, p. 12).</li> <li>• <b>Achievement vs. Relationship:</b> "For achievement groups, work related activities are a central focus and accomplishment a defining goal" (Klein, 2004, p. 15). "In relationship groups, cultures, interpersonal dynamics, and nurturing relationships are central focus" (Klein, 2004, p. 15).</li> <li>• <b>Mastery vs. Fatalism:</b> "A mastery orientation is based on the belief that people are dominant over nature and can control their environment" (Klein, 2004, p. 13). "Those who hold a fatalistic orientation respect the external factors that control their lives" (Klein, 2004, p. 13).</li> <li>• <b>Tolerance for Uncertainty:</b> "...describes how people function in the face of uncertainty" (Klein, 2004, p. 17).</li> <li>• <b>Power Distance:</b> "...describes the extent to which all members in a group expect and accept that power will be distributed unevenly" (Klein, 2004, p. 16).</li> <li>• <b>Hypothetical vs. Concrete Reasoning:</b> "Hypothetical thinkers use mental representations of future events to consider alternate outcomes" (Klein, 2004, p. 18). "People who engage in concrete reasoning respect the constraints imposed by context and carefully integrate those constraints into their thinking" (Klein, 2004, p., 18).</li> <li>• <b>Attribution:</b> "...focuses attention and narrows the selection criteria for approaches or remedies" (Klein, 2004, p. 19)</li> <li>• <b>Differentiation vs. Dialectical Reasoning:</b> "Differentiation reasoners work to understand contradictions by separating, analyzing, and evaluating distinct qualities" (Klein, 2004, p. 20). "Dialectical reasoners evaluate ideas by seeking their connections rather than sharpening distinctions" (Klein, 2004, p. 20).</li> </ul>

### Cultural Framework for this Study

There have been many cultural frameworks proposed (see Table 4) in the literature over the years; however, Hofstede's five domains have been the most widely used by researchers, but it is not without criticism. First, the dimensions were developed based on data from employees within one organization—IBM. Even though there were participants from various countries, the employees worked in a U. S. multinational organization. “Individuals who work for an American multinational are likely to have been carefully chosen for their ability to adapt to American policies/procedures, and undoubtedly work in an environment that is somewhat different from that in locally owned companies” (Spector, Cooper, & Sparks, 2001, p. 280). So, the data may reflect the culture variation within one [American] organization (hence, controlling for organizational differences) and may be different if the employees were representing local organizations. Second, the data from the Hofstede study were collected almost 30 years ago (Smith, 1992); it is plausible that cultural values have shifted over time. Nations change over time and due to access and exposure to new ideas and knowledge (Klein, 2004). This may have implications for the construct validity of the dimensions, as there has been less agreement with the original results from later studies (Spector, Cooper, & Sparks, 2001). Another concern related to the original study is that Hofstede reported the means for the countries—undermining the variation within each country (Smith, 1992). Also, there may be more between-nation variation that may have been missed because they were not featured in Hofstede's questionnaire. The final critique is that there are gender differences observed for the MF scale, leading to disagreement with the original Hofstede data simply due to the gender composition of the participants.

Although the criticisms cannot be ignored, Hofstede's VSM-94 provides many contributions that have proliferated cultural research. "Hofstede's concepts continue to provide the best available basis for thinking about cross-national differences in many aspects of organizational performance" (Smith, 1992, p. 41). For the past three decades, the Hofstede dimensions have been the most featured and researched cultural framework for countless studies and across career fields. To date, it is the only known culture operationalization that has been validated in over 70 countries. And although other frameworks have been theorized since then (e.g., the Cultural Mosaic), they do not have the empirical support as does Hofstede's five dimensions. Thus, for this study, I will focus on Hofstede's dimensions as the operationalization of cultural values. In applying cultural dimensions in research, many authors have chosen to use nationality as a proxy for culture to investigate cultural frameworks shown to relate to behavior. This strategy will be discussed in turn.

#### Nationality as a Proxy for Culture

Traditionally, researchers have focused on a top-down approach to studying culture, targeting aggregated levels of analysis, like the individuals' nationality, which serves as a simplistic conceptualization aimed at describing a multidimensional construct (e.g., Chao & Moon, 2005). Nationality is considered an alternative for studying culture because, generally, individuals from the same country often use the same language, have a similar history, share a geographic location; thus, they are assumed to share a "foundation on which a culture can emerge and maintained" (Smith, 2008). Also, research has supported that national culture accounted between 25 and 50 percent of variation in attitudes (Burke, Wilson, & Salas, 2008; Gannon, 1994).

Although using nationality is convenient and a common practice, there is one main shortfall—underestimating the diversity within the country (Matsumoto, 2003). As a result, researchers also collect and report demographic information to measure the similarities and/or representativeness of the country’s participants.

Though using nationality as culture’s surrogate presents this weakness, it is a practical measure for basic cultural research. Understanding the basic cultural dynamics among teammates is vital—that is, how people from different nationalities interact with each other in teams. More specifically, do Americans working in teams with other Americans interact differently than teams solely composed of individuals from Bulgaria? The answers to these questions regarding the expectations of homogeneous team interactions can then be used to develop research hypotheses and practical recommendations for heterogeneous team interactions.

In this study, the participants are from Bulgaria, Netherlands, Norway, Sweden, and the United States. After examining the most recent culture values from these and neighboring countries, it provided more support for their inclusion and national-level comparisons. Although cross-cultural psychology researchers often focus on the national level of culture, they operationalize the construct via underlying, empirically-supported values (e.g., Hofstede’s cultural values). For example, House, Hanges, Javidan, Dorfman, and Gupta (2004) examined the societal practice and value scores of In-Group Collectivism, Power Distance, and Uncertainty Avoidance in the Global Leadership and Organizational Behavior Effectiveness (GLOBE) study. Of the five countries examined in this study, the GLOBE researchers examined the cultural differences among the Netherlands, Sweden, and the U. S. The countries’ scores on In-Group Collectivism, Power Distance, and Uncertainty Avoidance were banded into separate groups based on mean scores. For In-Group Collectivism practice scores, all three countries were

banded together; however, their value scores (index analogous to Hofstede's values) were all separated in different bands (see Appendix B for GLOBE study values). For Power Distance, the U. S. and Sweden were banded together and separated from the Netherlands for both their practice and value scores. Finally, the Netherlands and the U. S. were banded together for Uncertainty Avoidance practice scores. This pattern was not mirrored in their value scores as all three countries were in separate bands for their value scores. The results of this study provide support for using nationality as a proxy for culture, especially for the countries included in this study. Moreover, nationality accounted for 25% to 50% of variance in attitudes (Burke, Wilson, & Salas; Gannon, 1994). However, nationality is considered the outer layer of culture with the underlying cultural values as a deeper layer. Thus, an examination of the cultural values that have sustained the literature over time will be further discussed in the following section.

### Cultural Values and Teams

In the current study, the teams were composed of Military Officers from the same nation. The cultural values developed by Hofstede are well suited for this study as they originated with the purpose of targeting nationality differences and have been linked to team processes and outcomes. In this study, only Individualism – Collectivism, Power Distance, and Uncertainty Avoidance will be considered, with explanations of their inclusion in the sections that follow. For collectivism, there is an identity of “we”, which would lend a more conducive environment for team processes and outcomes. Bond and Smith (Thompson & Gooler, 1996) reported that Individualism / Collectivism and Power Distance statistically predicted compliance with group norms beyond various demographic variables (Bond & Smith, 1996; Carr, 2004). Of all Hofstede's cultural dimensions, Power Distance and Uncertainty Avoidance were cited as the

two that can hinder group performance (Paulus, Bichelmeyer, Malopinsky, Pereira, & Rastogi, 2005; Van Hook, 2000). However, Hofstede (1991; 2001) stressed that only Power Distance holds influence on team relationships (Paulus, Bichelmeyer, Malopinsky, Pereira, & Rastogi, 2005). House, Hanges, Javidan, Dorfman, and Gupta (2004) clarified a possible theoretical relation between Collectivism, Power Distance, and Uncertainty Avoidance. The authors stated that collectivism may be an uncertainty avoidance strategy, that is, with more people they can overcome any uncertainty presented—“united we stand, divided we fall” (p. 625). In support of these proposed relations, Hofstede reported a significant negative correlation between UAI and Individualism ( $r = -.35, p < .05$ , across 40 countries; 1984, p. 213; House, Hanges, Javidan, Dorfman, and Gupta, 2004, p. 625). Further, the GLOBE Uncertainty Avoidance practices and Institutional Collectivism practices were positively related ( $r = .40, p < .01$ , across 61 cultures; House, Hanges, Javidan, Dorfman, & Gupta, 2004, p. 626). Also, the GLOBE study authors posited that presenting structure, organization, rules and protocol may be a defense for uncertainty, such that when faced with a novel dilemma, expectations are already in place to address the situation. The authors also noted a strong negative correlation between GLOBE Uncertainty Avoidance practices and Power distance values. This finding suggests that highly-structured societies no longer support power hierarchies in their current practices. Most importantly, Sutton, Pierce, Burke, and Salas (2006) stated that three cultural dimensions influence multicultural teamwork: Power Distance, Uncertainty Avoidance, and Individualism / Collectivism. The relations among Individualism, Power Distance and Uncertainty Avoidance will be examined in this study in order to explore whether the relations among these variables reflect those of Hofstede three decades later.

Although this study provides a valuable opportunity to explore three of Hofstede's culture variables as they relate to team performance, two of his culture variables, Long-Term / Short-Term Orientation and Masculinity / Femininity, will not be examined. Long-term orientation will be excluded because the team task was a short-term task. Masculinity/Femininity is excluded because I do not expect a large amount of variability on Masculinity/Femininity in a sample of male NATO officers. Thus, in the following section, I will summarize the research on the influences of Individualism, Power Distance and Uncertainty Avoidance on information sharing and team performance.

### Cultural Dimensions, Information Sharing and Team Performance

#### *Culture and Information Sharing*

To date, there are few empirical studies examining the contributors to communication in multicultural teams (Riedel, 2008). "However, understanding the differences in world views between cultures is essential to good communication" (p. 6-4). Klein and Steele-Johnson (2002) conceptualized the Cultural Lens Model, which posits that life experiences (with families and the environment) shape how people think, their perceptions of the world, and interactions with others. According to the authors, in general, people from the same national culture share a cultural lens –having the tendency to view the world in a similar way. Thus, the cultural lens provides significance in how people understand others' words, gestures, and intentions when communicating that goes beyond language barriers (Riedel, 2008). Further, it should be expected that individuals working within homogeneous teams should have less miscommunication because, not only is language not an issue, they share a similar cultural lens. People within a culture tend to adopt the attitudes, customs, and beliefs characteristic of their culture (Riedel, 2008, p. 6-5). Studying these homogeneous teams from various countries will

provide (a) empirical support for understanding how other cultures communicate in teams and (b) implications for working in multicultural teams.

Triandis (2000) contends that the cultural dimensions proposed by Hofstede (1980) and those of others “are important in communication because a culture’s position on the dimensions influences cues in the communication interaction to which the person pays attention” (Riedel, 2008, p. 6-6). One of the problems that lead to miscommunication in multicultural environments is information sharing—thus, it is important to see how homogeneous teams exchange information. “A problem that plagues [multinational teams] is the inability or unwillingness of team members to share mission-related information with team members of other cultures” (p. 6-3). Assuming this is true, could it not be assumed that teams with lower variance in cultural values would engage in more information sharing than in teams with greater variance? Additionally, would there be more unique, rather than open, information sharing occurring? Will differences across cultures in information sharing yield similar team performance? The answers to these questions will help in understanding the role of culture with information sharing in homogeneous-culture teams.

As previously mentioned, a lack of information sharing within teams has been shown to degrade the quality of mental models and jeopardize mission success. But, can it be possible that some cultures do not engage in active verbal information exchange in ad-hoc teams and still attain mission success? I will examine the basic communicative interaction patterns within teams from five different cultures, describing how the patterns differ across cultures, and they relate to team performance. In the following sections, I will provide an overview of how Hofstede’s Individualism-Collectivism, Power Distance and Uncertainty Avoidance dimensions are expected to relate to information sharing in teams.



### *Individualism – Collectivism: Me Versus We*

The Individualism-Collectivism cultural continuum has received the most research attention across disciplines (Gudykunst & Ting-Toomey, 1988; Hofstede, 1980; Triandis, 1986). Its attention has accelerated and pressed researchers to revisit the construct. As a result, Individualism and Collectivism constructs have been coined and tested—“Gesellschaft” and “Gemeinschaft” (Tonnies, 1887; 2002), “Agency” and “Communion” (Bakan, 1966), “Independent” and “Interdependent” (Markus & Kitayama, 1991; Sutton & Pierce, 2003) . The premise of this dimension is that in different societies, there is more emphasis on the role of the individual as compared to the needs of the group (Hofstede, 1980). Hofstede refers to societies that give priority to the group as collectivist, and those who cater to the individual as individualist. Interestingly, the vast majority of the world’s population lives in collectivist cultures, where it is expected that children are raised with their extended family. Within the collectivist cultures, the power is deferred to the group. “Group membership in a collectivist culture is much less a matter of choice than in an individualist culture, whether that choice be determined by one’s family of origin or by the organization for which one works” (Smith, 1992, p. 41). Hence, decisions are made in the interest of the collective. Therefore, in teams, the accountability in collective societies is for the team (Hofstede, 1980).

On the contrary, in individualist societies, children are raised with their close family members—parents and siblings—referred to as the nuclear family. There is less contact with extended family members, therefore a reduced concern for these individuals. Individuals in these cultures are expected to be accountable for only themselves, with less regard for others if working on a team. Team objectives maintain clear individual responsibilities, so that when

team performance is sub-par, it is evident where the responsibility lies. As implied, the power is deferred to the person in individualist teams. Further, when team decisions are being made, each team member is concerned about self-promotion. (Hofstede, 1980).

Some research has regarded the IC dimension as the most important cultural dimension that explains differences, as well as similarities, in communication (Gudykunst & Mody, 2002; Riedel, 2008). There are some theories developed in the social psychology literature that will lend support for the I-P-O model and hypotheses presented in this study, specifically Social Identity Theory, Low- versus High-Context Cultures, and Direct and Indirect Communication. Each will be detailed in the following paragraphs.

**Social Identity Theory.** According to Myers (2005), individuals not only consider personal identity in their self-concept, but also define themselves by their groups. For example, I consider myself as a woman, a Belizean-born US citizen, a classically-trained dancer, a UCF PhD student, and a daughter in the McCoy family. People carry similar group identities when answering “Who am I?”. Social identity theory suggests that three trends occur: (a) categorization, (b) identification, and (c) comparison. During categorization, people place labels on others to reduce cognitive overload; that is, saying someone is a PhD student or an American provides inferences about the person’s qualities. When identifying people, individuals are connected to certain groups, considered the in-group. As a consequence, individuals compare themselves with other groups (out-groups), resulting in more favorable evaluations of those within the in-groups:

*“Having a sense of ‘we-ness’ strengthens our self-concepts. It feels good. We seek not only respect for ourselves but pride in our groups”* (Myers, 2005, p. 351; Smith & Tyler, 1997).

The tendency to view one's in-group more favorably is referred to as in-group bias. In-group bias has implications for group communication and team performance. When favoring one's own in-group, it can be assumed that individuals would share more information within the group to ensure its success. This is especially true when the individuals have a strong identity connection with the group—they will have a higher self-esteem and a sense of belonging, and feel superior to those in the out-group.

By definition, individual goals trump group goals in individualistic cultures, whereas, collectivists, by nature, tend to be more group oriented with their identity centered around “we”. They make clear distinctions between in-groups and out-groups, whereas individualistic people do not acknowledge a wide psychological distance between in-groups and out-groups. In fact, the interdependent identity maintained by the collectivists embraces loyalty to group members, but discourages being a member of many in-groups. Moreover, “collectivists tend to impose a large psychological distance between in-group and out-group members, and in-group members are expected to have unquestioning loyalty to their group” (Riedel, 2008, p. 6-7). They even have more favorable evaluations of those in their in-group. Furthermore, this differentiation between groups results in the tendency to have “less interaction and communication with the out-group members, less information sharing, less value placed on their contributions, and fewer assignments given to those perceived as out-group members” (Riedel, 2008, p. 6-7; Salas et al., 2004). Leveraging from the literature, it is expected that collectivists would engage in more supporting behavior within teams, considering that their driving goal is to achieve team objectives, leaving individual motivations aside. Thus, I propose the following hypothesis:

*Hypothesis 2a: Individualism is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between*

*supporting behavior and team performance is expected for teams scoring lower on Individualism than for teams scoring higher on Individualism.*

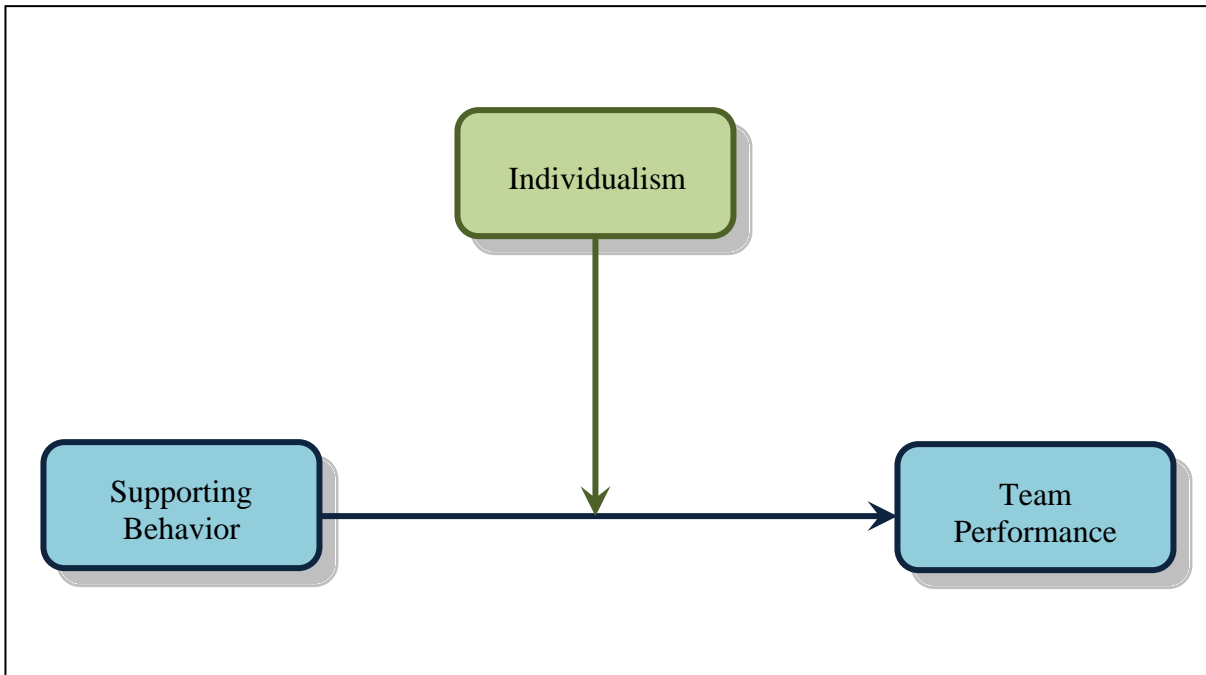


Figure 2. Hypothesis 2a: Individualism moderating the relation between Supporting Behavior and Team Performance

**Low- versus High-Context Cultures.** Hall and Hall (1990) explained the difference between low- and high-context cultures. According to the authors, there is an overlap with IC, in that the high- and low-context communication styles are more represented in collectivist and individualistic cultures, respectively. Riedel (2008) named the United States, Germany, Sweden, and the United Kingdom as low-context countries. The languages spoken in these countries abound in proverbs and sayings that confirm the importance of these characteristics—“There is no learning without questioning” (Israel), “the squeaky wheel gets the grease” (United States), “He who stirs another’s porridge burns his own” (Germany), “Little is done where many command” (Netherlands) (Reynolds & Valentine, 2004, p. 5). This preference can be echoed in Edward Hall’s “low context” communication style, where there is a partiality for unambiguous and active verbal communication. Buddhist, Hindu, Japanese, African-American, Latino

cultures are considered high-context. In contrast, collectivism has been associated with intuitive, indirect, and complex communication, requiring people to “read between the lines”. Proverbs from collective cultures illustrate these values: “The nail that stands out will get hammered” (Japan), “The duck that squawks gets shot first” (China), “Behind an able man there are always other able men”, (Korea), “The sheep that’s separated from the flock is eaten by the wolf” (Turkey), “There is no wisdom without the group” (Mongolia), “When the spider webs unite, they can tie up a lion” (Africa) (p.8, Reynolds & Valentine). Similar relations can be found for high-context communication, in which people rely on implicit communication.

In low-context cultures, there is less appreciation for the non-verbal context of communication; there is more reliance on explicit and direct communication. People in these cultures “seek information that emphasized personal or individual aspects rather than social or group aspects” (Riedel, 2008, p. 6-10; Ting-Toomey, 1988). Conversely, high-context cultures depend more on coded language and non-verbal cues. More importantly for information sharing, high-context cultures respond favorably to silence. Because individualists are expected to more vocal about their agreements, as well as disagreements, and uncertainties, it is expected that their information sharing content would reflect more of a proportion of these exchanges than teams that are more collectivistic. Therefore, the following hypothesis is presented:

*Hypothesis 2b: Individualism is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between information exchange and team performance is expected for teams scoring higher on Individualism than for teams scoring lower on Individualism.*

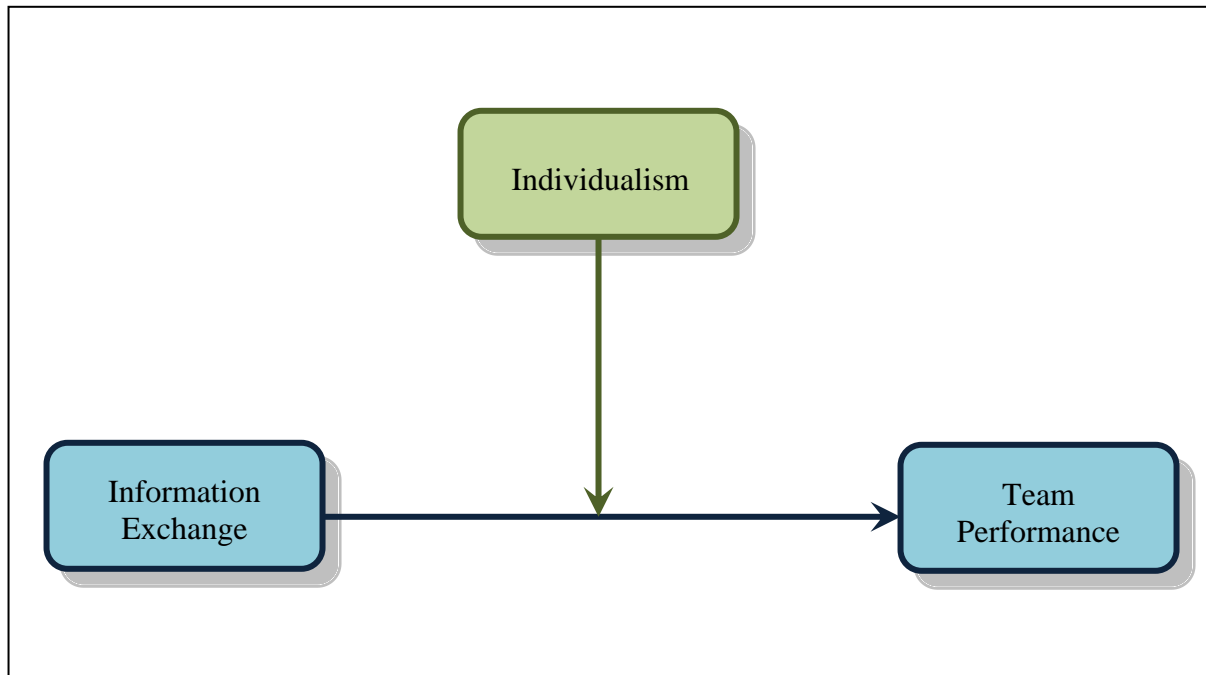


Figure 3. Hypothesis 2b: Individualism moderating the relation between Information Exchange and Team Performance.

**Direct versus Indirect Communication.** The research supports that collectivists prefer indirect communication—“implicit language carefully imbues messages within a more positive tone to decrease the chances of unpleasant encounters, direct confrontations, and disagreements” (Riedel, 2008, p. 6-7; Gudykunst, Matsumoto, Ting-Toomey, Nishida, Kim, & Heyman, 1996). However, they more often speak using words of uncertainty like “maybe”, “perhaps”, and “somewhat” and avoid negative reactions when communicating to avoid losing face (i.e., self-respect or pride) and maintain harmony within the group. Because maintaining relationships are esteemed in collectivist cultures, avoiding confrontation is critical. Further, in Conyne, Wilson, Tang, and Shi’s (1999) study, they reported that collectivist team members displayed more hesitancy to speak when sharing information. The authors posited that this was due to an indecision to speak that was primarily influenced by culture. Not only are collectivists hesitant to speak, but they are also less likely to ask questions, whereas individualists “value self-

expression, see speaking out as a means of resolving problems, and are likely to use confrontational strategies when dealing with interpersonal problems” (Riedel, 2008, p. 6-8). Individualists value clarity and directness—a “say what you mean and mean what you say” communication style. With their focus on understanding the task, rather than building and maintaining relationships, individualists perceive directness as valuable in information sharing and accomplishing goals. With individualist team members expected to be less concerned about losing face and more vocal about how the performance of team members, whether good or poor, the following hypothesis is proposed:

*Hypothesis 2c: Individualism is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between team reinforcement/punishment and team performance is expected for teams scoring higher on Individualism than for teams scoring lower on Individualism.*

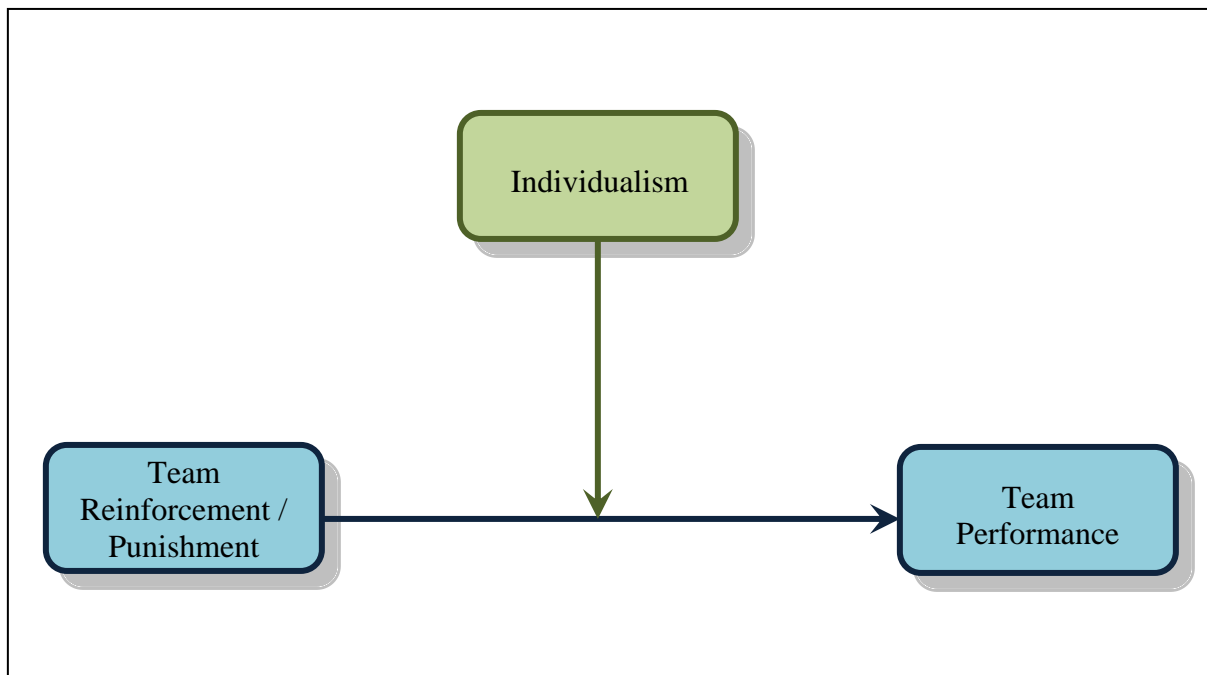


Figure 4. Hypothesis 2c: Individualism moderating the relation between Team Reinforcement / Punishment and Team Performance

### *Power Distance: Examining Social Inequalities*

Hofstede defined Power Distance as “the extent to which the less powerful members of institutions and organizations with a country expect and accept that power is distributed unequally. ‘Institutions’ are the basic elements of society like the family, school, and the community; ‘organizations’ are the places where people work” (Hofstede, 1991, p. 28). This construct is conceptualized from the perspective of the less powerful members, suggesting that the degree of inequality within the society is endorsed by the subordinates as well as the leaders. The power distance index measures the dependence relationships in a particular country; ranging from lower Power Distance countries (e.g., United States, Great Britain) where one could expect that subordinates would approach and / or contradict their bosses without anxiety to higher Power Distance countries (e.g., Latin European and Latin American countries, Asian, and African countries) where one would expect that subordinates understand their lower position on the ladder, making it unlikely for them to approach their superiors directly (Hofstede, 1991).

With regard to information sharing, low Power Distance individuals use less formal modes of communication; they challenge ideas in unconventional ways to find innovative answers to problems. They do not find it offensive to question power holders, emphasize their personal rights, and defend their beliefs so that their point is heard. Thus, the hierarchical protocol established within the organization does not thwart them from asserting vital information to improve performance.

These information sharing trends are not reflected in high Power Distance teams. For example, Smith and his colleagues have reported that managers working in high Power-Distanced societies report using more formal rules in their daily operations (Smith, Peterson & Misumi, 1994; Smith, Peterson & Schwartz, 2002). Within these societies, subordinates are also



fearful of questioning or disputing their managers (Adsit, London, Crom, & Jones, 1997), relying more on following orders. More importantly, subordinates may fail to provide critical information to leaders, believing it is the leader's responsibility to make decisions (Helmreich, 2000; Riedel, 2008). Or they may fail to challenge a commander's decision, even if it could result in catastrophic consequences. Due to the differences in superior-subordinate interactions that Power Distance can present, this cultural dimension can be problematic for team outcomes, but the results are empirically clear. The theoretical propositions would suggest that as the distance in power widens, there would be increases in formal protocol and more emphasis on providing direction to team members to ensure superior task performance than for teams that perceive the power distance to be more shared (or shortened). Therefore, the following hypothesis is presented:

*Hypothesis 3: Power Distance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between directing tasks and team performance is expected for teams scoring higher on Power Distance than for teams scoring lower on Power Distance.*

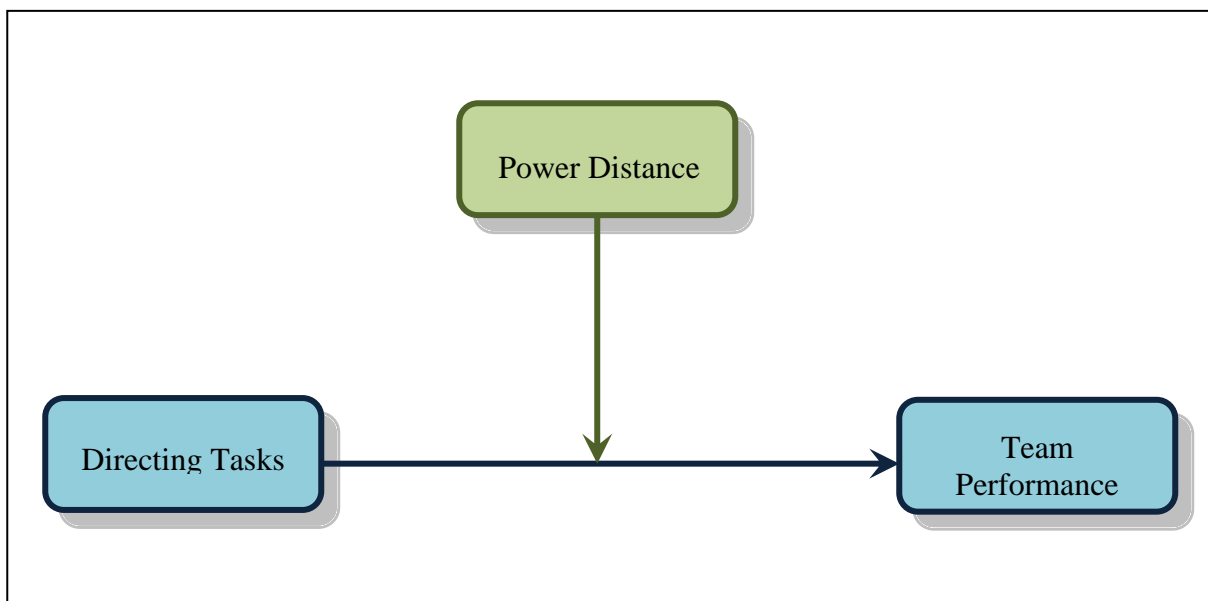


Figure 5. Hypothesis 3: Power distance moderating the relation between directing tasks and team performance

### *Uncertainty Avoidance: Adapt or Not to Adapt?*

Uncertainty avoidance refers to the extent to which “a society feels threatened by uncertain and ambiguous situations and tries to avoid these situations by providing greater career stability, establishing more formal rules, not tolerating deviant ideas and behaviors, and believing in absolute truths and the attainment of expertise” (Hofstede, 1980, p. 45).

Unstructured situations are more accepted in societies that are characterized by low uncertainty avoidance, like Canada, United Kingdom, Denmark, India, France, Hong Kong, Sweden, and the United States (Riedel, 2008). People from low uncertainty avoidance cultures tolerate disagreement and healthy conflict. Individuals are able to adapt easily, are able and willing to manage change without much stress. Moreover, rules and protocol are not formalized and inflexible as in high uncertainty avoidance cultures. Individuals cope with the ever-changing and unpredictable environment by enforcing few rules and accepting of other people’s opinions. Further, dissent and conflict are seen as natural and effective making the ability to cope and change with the uncertainty easier in these societies. “Low uncertainty avoidance cultures are characterized by low stress, acceptance of dissent, high level of risk-taking, and few rituals” (Riedel, 2008, p. 6-9). Risk-taking and few rituals also characterize this culture, which can breed more flexibility, unique perspectives, and higher gains of performance. However, team leaders who are low on uncertainty avoidance may not provide enough structure and details regarding the mission—perhaps withholding pertinent information needed for the team to do the tasks.

In contrast, societies that are high on uncertainty avoidance employ strict rules and norm expectations that are weaved into a belief of absolute Truth to reduce the probability of engaging

in novel situations. Countries that are said to be high on uncertainty avoidance include Argentina, Belgium, Chile, Egypt, Greece, Japan, and Mexico (Riedel, 2008).

In a study by Rifkind and Harper (1993), they found that employees in high Uncertainty Avoidance cultures preferred transparent instruction, specialized jobs and cooperation with others. Team members who are high on Uncertainty Avoidance tend to ask for excessive amount of guidance and information, stifling creativity and innovative input for the task (Riedel, 2008). Team leaders may attempt to control the situation so much to avoid uncertainty that the dialogue is not sufficient to develop situational awareness. In this case, the team leader might be better off completing the task him/herself.

Teams comprised of Uncertainty-Avoidant members aim at reducing uncertainty by developing a strategy, although the plan can provide problems later if it needs modification. Another unsettling characteristic is the tendency to ignore information that does not correspond to initial thought and feel threatened when the plan has to change (Ilgen, LePine, & Hollenbeck, 1997). Further, high Uncertainty-Avoidant members may prevent the team from adapting because they are limiting access to dissenting cues and stifling innovative solutions. Interactions that are considered critical for team performance—consensus building, and considering all data, even dissenting information—were negatively related to high need for structure—a construct that is greatly correlated with high Uncertainty Avoidance. Another team performance hindrance presented by high Uncertainty Avoidance is the reluctance to engage in risk-taking. However, in the military, many of the missions are characterized by a consistent uncertain environment. It could be suggested that when working in these military teams, it is beneficial to have some individuals who are low on Uncertainty Avoidance as to prevent mission jeopardy. To summarize, team members who score higher on Uncertainty Avoidance tend to engage in more

planning to reduce the feeling of ambiguity, avoid dissenting information, and are reluctant to take risks. Because developing a solid strategy is key to Uncertainty Avoidant cultures, the following hypothesis is proposed:

*Hypothesis 4a: Uncertainty Avoidance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between planning and team performance is expected for teams scoring higher on Uncertainty Avoidance than for teams scoring lower on Uncertainty Avoidance.*

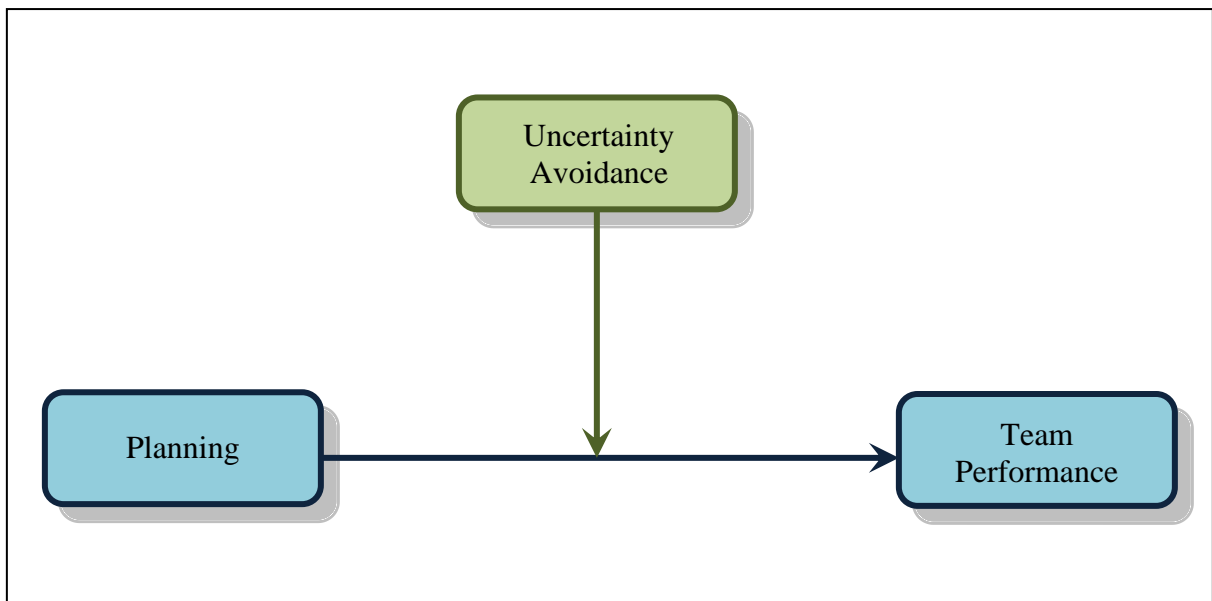


Figure 6. Hypothesis 4a: Uncertainty Avoidance moderating the relation between planning and team performance

Additionally, recent research attention has turned to themes of uncertainty reduction and on a construct named Personal Need for Structure, which refers to a cognitive preference for structure and clarity (Thompson, Naccarato, Parker, & Moskowitz, 2001; Neuberg, Judice, & West, 1997; Neuberg & Newsom, 1993). For example, individuals who have high scores on Personal Need for Structure “prefer simplicity, precision, and structure in most situations, with ambiguity and grey areas proving troubling and uncomfortable” (Thompson, 2008, p. KN2-4). They tend to have more confidence in their group evaluations, tend to avoid procrastination, and

push for creating fast solutions. Because their focus is on the task work, rather than teamwork, they are assertive about gaining group consensus early even if that requires rejecting dissenting information (i.e., groupthink becomes a concern). Thus, they snub consensus building, team empowerment to voice opinions, and buy-in from the group—all requisites for team decision-making effectiveness. This style has been noted as “detrimental to the success of multinational coalitions” (Thompson, 2008, p. KN2-5). The tendency to develop a strategy early and remain on task requires those proponents to continue to search and report data to their team that are aligned with supporting their strategy. This process allows for quietly dissenting team members to commit to the plan, increase team buy-in, and promote team unity. In doing so, it is expected that those who possess a Personal Need for Structure and are Uncertainty Avoidant will provide many situation updates to ensure that the tasks are on time and the feedback on performance was acceptable. Thus, the following hypothesis is provided:

*Hypothesis 4b: Uncertainty Avoidance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between situation update and team performance is expected for teams scoring higher on Uncertainty Avoidance than for teams scoring lower on Uncertainty Avoidance.*

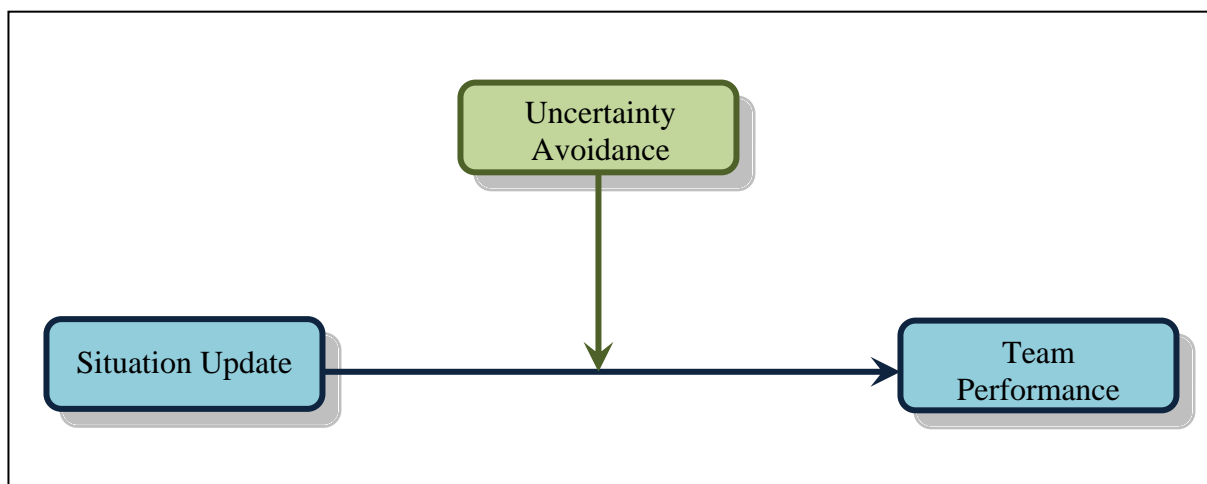


Figure 7. Hypothesis 4b: Uncertainty Avoidance moderating the relation between situation update and team performance.

### Current Study

The current study was conducted to understand the relations among culture, information sharing, and team performance. To do so, I analyzed archival data originally collected under the NATO Human Factors & Medicine Panel-138, in the investigators conducted an experiment among a participant sample of NATO Officers from five countries (Bulgaria, the Netherlands, Norway, Sweden, and United States). The experimental task involved having the participants complete individual difference and attitude questionnaires and participate in a computer-based task in teams of four. The task was developed to be a true team experiment in that all of the team members did not hold the identical information. In order to complete the mission of finding weapons caches, the team members had to virtually share information (e.g., typing and sharing information to the entire team). All of the information was automatically collected throughout the experiment. The participants' ability to find the weapons caches and interact with the virtual characters in a culturally-appropriate manner affected the team performance score. The criterion (team performance) was automatically calculated throughout the experiment, with increases and decreases of the score reported to the team. After the experiment, the participants completed other measures regarding the team dynamics and perceived team performance. The data collected from this experiment were analyzed to advance the industrial and organizational psychology research domain by examining teams from a non-Western lens. A summary of the hypotheses can be found in Table 5 and depicted in Figure 8 below. The Method section provides details about the information sharing coding system that was developed to test the aforementioned hypotheses.

Table 5. Summary of Hypotheses

Hypotheses	
Hypothesis 1	The information sharing is expected to positively predict team performance.
Hypothesis 2a	Individualism is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between supporting behavior and team performance is expected for teams scoring lower on Individualism than for teams scoring higher on Individualism.
Hypothesis 2b	Individualism is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between information exchange and team performance is expected for teams scoring higher on Individualism than for teams scoring lower on Individualism.
Hypothesis 2c	Individualism is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between team reinforcement/punishment and team performance is expected for teams scoring higher on Individualism than for teams scoring lower on Individualism.
Hypothesis 3	Power Distance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between directing tasks and team performance is expected for teams scoring higher on Power Distance than for teams scoring lower on Power Distance.
Hypothesis 4a	Uncertainty Avoidance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between planning and team performance is expected for teams scoring higher on Uncertainty Avoidance than for teams scoring lower on Uncertainty Avoidance.
Hypothesis 4b	Uncertainty Avoidance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between situation update and team performance is expected for teams scoring higher on Uncertainty Avoidance than for teams scoring lower on Uncertainty Avoidance.

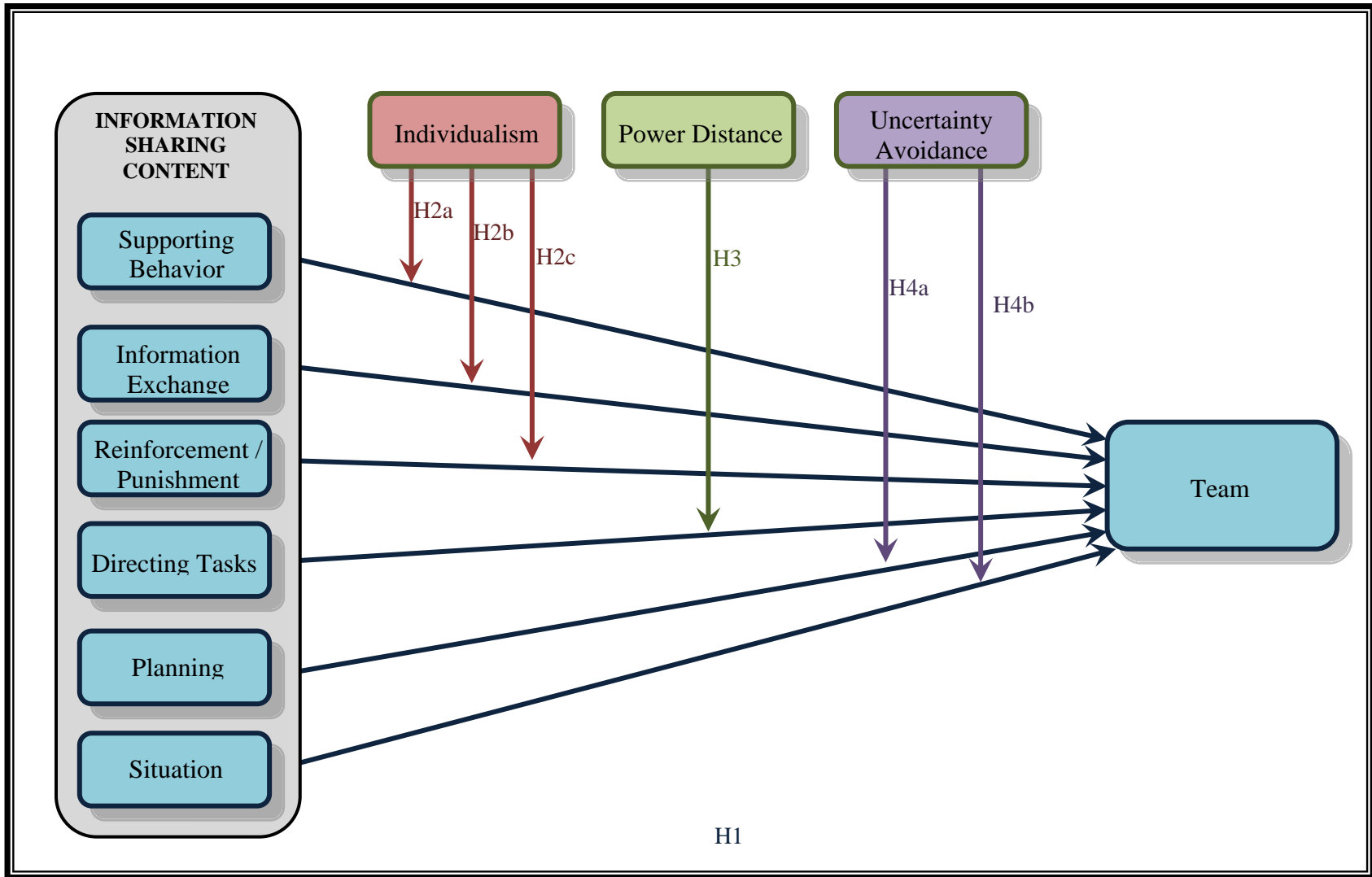


Figure 8. Model of Hypotheses



## CHAPTER THREE: METHOD

### Participants

The study participants included a sample of 48 four-person teams (yielding a total of 192 individuals), representing five countries: Bulgaria ( $n = 8$ ), the Netherlands ( $n = 8$ ), Norway ( $n = 16$ ), Sweden ( $n = 9$ ), and United States ( $n = 7$ ). The participant characteristics required for inclusion were that they were male officers with a rank of OF-1 to OF-4, between the ages of 18-35. Within teams, the members were of the same rank. Other requirements were normal, or corrected-to-normal vision, and familiarity with computer use (e.g., mouse, keyboard). They had to ethnically and culturally identify with the nation under study and reported to not have spent more than 6 months between the ages of one and 18 living outside of the nation under study. Further, they had to have completed or were currently enrolled in college. Finally, the study was limited to those who were fluent in written English.

### Measures

*Background Information.* The participants completed a Background Information questionnaire that had 19 items eliciting demographic information (e.g., age, sex, nationality, languages, education, rank, computer and game experience; see Appendix B).

*Culture Values.* The Hofstede Value Survey Module 1994 (VSM 94) Culture Survey was administered to assess the five cultural values (Individualism, Power Distance, Uncertainty Avoidance, Long-Term Orientation, and Masculinity) for each participant. The VSM 94 includes 20 items (four for each subscale). All of the items are scored on a five-point scale, but varied on response formats. The items asked for ratings of either (a) importance (“Of Utmost Importance” to “Of Very Little Importance”), (b) agreement (“Strongly Disagree” to “Strongly Agree”), or (c) frequency. An example item is “Competition between employees usually does

more harm than good.” Although the VSM 94 is widely used, there is limited information about the psychometric properties of this measure by the author. Further, no information about the reliability and construct validity of the five dimension was provided in Hofstede’s (1994) manual (Spector, Cooper, & Sparks, 2001). Relying on the psychometric properties provided by Spector, Cooper, & Spark’s (2001) critique, the following are the reported internal consistencies for the subscales: Individualism (alpha = 0.57), Power Distance (alpha = 0.64), Uncertainty Avoidance (alpha = 0.49), Long-Term Orientation (alpha = 0.74), and Masculinity (alpha = 0.29). Although the cultural values were collected from each of the participant, the values reported in the database were not used for this study for two reasons. Hofstede (2001) reiterates that the cultural values are to be collected and reported to reflect a national-level index. The sample size for these analyses was only 48, with homogeneous teams representing between 7 and 16 teams. This amount of data is limited to reflect a national-level cultural value. Second, and most important, the values reported in the database were not to scale for interpretation as they should be in accordance to Hofstede’s guidance. Moreover, many of the values exceeded 100, with Hofstede’s values ranging from 0-100. Thus, to respond to this discrepancy and to address a national level, I consulted the national cultural values reported on Hofstede’s website. The values for Power Distance, Individualism, and Uncertainty Avoidance were provided for all five countries (see Table 6). Thus, these were the values used in the analyses for this study.

Table 6. Hofstede Cultural Value Scores

Country	Power Distance	Individualism	Uncertainty Avoidance
Bulgaria	70	30	85
Netherlands	38	80	53
Norway	31	69	50
Sweden	31	71	29
USA	40	91	46

*Information Sharing Coding.* Typed messages by all team members during the team task were automatically collected by the computer program. There were three steps involved in developing the information sharing coding system: (a) reviewing coding systems in the literature and developing a preliminary coding system; (b) testing theoretical model with a card sort technique with a doctoral student team; and (c) review, revise, tryout, and finalize the coding system with the research assistant coding team. STEP 1: To develop the coding system, I reviewed existing coding systems in the literature to examine their capability to code this study's data (e.g., Rosen, 2010; Smith-Jentsch, Campbell, Milanovich, & Reynolds, 2001). Rosen (2010) presented six communication coding processes, each with at least one sub-dimension: Team Information Exchange (Information Provision, Information Request), Team Knowledge Sharing (Knowledge Provision, Knowledge Request), Team Solution Option Generation (Option Generation-Part, Option Generation-Full), Team Evaluation and Negotiation of Alternatives (Solution Evaluation), Team Process and Plan Regulation (Goal/Task Orientation, Situation Update/Request, Reflection), and Other (Simple Agree/Disagree/Acknowledgements, Fillers/Incomplete/Exclamation, Tangent/Off-Task, Uncertainty). Because of the difference in nature of the current study and that of Rosen (e.g., coders in Rosen's study were aware of what was presented on the computer screen), I consulted another study that employed a categorical system from Team Dimensional Training (TDT). Smith-Jentsch et al. (2001) presented four

dimensions and 11 subcategories as an expert mental model of teamwork: Information Exchange (Utilizing information from all available resources, Passing information before being asked, Providing situation updates), Communication (Using proper phraseology, Providing complete reports, Using clear communication, Using brief communication), Supporting Behavior (Correcting errors, Requesting and providing backup), Initiative/Leadership (Providing guidance, Stating clear priorities). STEP 2: After examining the coding system dimensions and definitions, I developed the first version. Two coding teams were recruited to finalize the information sharing coding system. The first team of Subject Matter Experts (SMEs) consisted of five I/O psychology doctoral students. The SMEs were presented with individual information sharing messages that were collected from the heterogeneous teams that participated in the original NATO HFM study. They were blind to the study participant who typed the message, to whom the message was sent, and what country he represented. The students each read the individual message and conducted a card sort, as documented in the development procedure for the TDT mental model. After the completion of the individual card sort, the students discussed the number, messages, and labels of their groups. The students then finalized their coding system by consensus using the actual information sharing data. I compared the coding system that was derived theoretically from the literature to that of what the doctoral student team developed and made some revisions.

STEP 3: A second team of four graduate I/O psychology students (one doctoral and three Master's students) and one post-baccalaureate student served as coders for this study. The team of five reviewed the experimenter's guide to familiarize themselves with the study. The team was provided with an introduction to the current study and the coding system. To train the team on the coding system, the team met in a classroom and each dimension, sub-category, and

respective definitions were reviewed. In the same session, they were provided with examples of information sharing messages collected from the heterogeneous teams and discussed the most appropriate coding system dimension. Any discrepancies were discussed and rationales were provided for the coding. After the initial training session, the team coded data (550 statements) from the mixed-culture teams for the following week for practice and to examine their coding agreement. The mixed-culture data were chosen for training as they were not to be included in the analyses for this study, but allow for a realistic preview of the data from the culturally-homogeneous teams. We met again and discussed all codes to facilitate a shared mental model. Definitions for some of the dimensions were discussed and further refined. This training process continued weekly as all eight heterogeneous teams were analyzed. After the training period, the final coding system consisted of seven categories (Appendix A): Task Direction (Task Action), Situation Update (Teammate's Current Action, Update on the Simulation/Task, Progress), Planning (Roles/Responsibilities, Goal Setting, Strategy, Task Option Generation), Supporting Behavior (Backup Behavior), Information Exchange (Agreement, Disagreement, Uncertainty/Indifference, Greetings), Team Reinforcement/Punishment (Exclamation, Positive Reinforcement/Positive Emoticon, Negative Comments/Negative Emoticon), Other (Incomplete/Filler/Miscellaneous).

After training, the coders were provided with the data in separate Excel files for each team. As in the training, they were blind to the study participant who typed the message, to whom the message was sent, and what country he represented. They were instructed to read the message and type the number of the information sharing sub-category code in the column adjacent to the message. Every week, the coders completed the coding for numerous teams (ranging from four to twelve teams), with the number of teams dependent on the amount of

messages communicated among the study participants. There were three coders for the coding content analyses. I analyzed agreement by calculating the percentage of statements of when the three coders selected the same coding content area for each statement in relation to the total statements for each team. More specifically, if two coders agreed on the content area for a statement, but one disagreed, that statement was coded as a disagreement. If all three selected different content areas, that statement was coded as a disagreement. Only when all three coders selected the same content area for the statement was when the statement was analyzed as agreement. To complete the agreement analyses, I coded all agreements as "1" and disagreements as "0", then calculated the percentage by dividing the total agreements over total statements for that team, which yielded an agreement ratio. I color coded discrepancies and reported the results to the research assistant team. This procedure continued until all of the initial coding was completed (approximately eight weeks). I examined the coding agreement percentage for all of the data for this study. The mean agreement percentage was 60%, which indicated that 40% of the statements coded had at least one coder to disagree on the content area. To resolve these coding discrepancies, the coding team met in person, engaged in discussion, and came to consensus for all of the coding disagreements.

*Team Performance.* Team Performance was automatically collected by the computer program. Performance for each team was generated by a metric regarded as a "Goodwill Score", with the result dependent on their interactions with avatars in order to complete the mission. The mission is to search for hidden weapons caches inside and outside of buildings. Each team is instructed to maximize their Goodwill Score by interacting with virtual characters within the town and find the caches. The score is only provided for the entire team (there is no individual performance score) and all members are provided with real-time feedback on each time a

member gains or loses points for the team. The Goodwill Score is calculated based on their ability to find these caches. The maximum number of weapons that each team can find in the town is 20: four outdoors, 12 indoors, and four indoors that exist for a short period of time. Considering that each indoor cache is worth 300 Goodwill points and each outdoor cache is worth 100 points, the maximum points that each team can gain based on the search are 5200. The teams can also earn up to 530 additional points by accomplishing other tasks unrelated to the mission (e.g., recover a stolen necklace, find a missing child, assist police with criminals). Thus, the team can gain a maximum of 5730; however, attaining this score is unlikely. Because there are approximately 40 houses, 10 empty crates, and two trapped crates, the team could theoretically lose up to 3500 Goodwill points. Losing the maximum points is also unlikely. Although finding the weapons caches is a primary indicator of the team performance, the members have to also avoid penalties to maximize their Goodwill score.

### Procedure

Principal investigators volunteered to supervise the data collection from the participating countries. NATO Officers were randomly assigned to team roles (e.g., “Nathaniel”, “Frank”, “Jacob”, and “William”). To familiarize themselves with their role and task assignments, the experimenter led a training session before the experiment commenced. The experiment was based on the Situation Authorable Behavior Research Environment game-based testbed that used the “Neverwinter Nights™” computer program. The main objective of the mission was to collaborate team efforts to find simulated weapons caches while maintaining positive relationships with the local populace. As previously mentioned, communication was

automatically recorded for all participant during the task. The Goodwill Score was automatically generated after the experiment was completed.



## CHAPTER FOUR: RESULTS

To analyze the hypotheses in this study, I used Multiple Regression Analysis using IBM's Statistical Package for the Social Sciences (SPSS), Version 16.0. Details are provided below for each hypothesis, beginning with descriptive data.

### Descriptive Data

Table 7 provides the means, standard deviations, and intercorrelations among the variables of interest. As shown, the coded information sharing content areas were all significantly correlated with each other, except for Supporting Behavior. The total amount of information sharing was positively correlated with team performance ( $r = .33, p < .05$ ). The information sharing dimension that was significantly related to overall team performance was Situation Update ( $r = .42, p < .01$ ). Situation Update was the information sharing content that was most strongly correlated with total information sharing ( $r = .93, p < .01$ ), with all of the other content areas having similarly high correlations with total information sharing except for Support Behavior. That is, as the Situation Updates increased during the team task, the total information sharing also increased. Moreover, the more that teams engaged in Task Direction, Planning, Supporting Behavior, Information Exchange, and Reinforcement / Punishment, the more information sharing was observed. However, Supporting Behavior was not related to total information sharing.

The cultural dimensions correlated with many information sharing content areas. Specifically, Power Distance was negatively related to Task Direction ( $r = -0.53, p < .01$ ), Situation Update ( $r = -0.53, p < .01$ ), Planning ( $r = -0.41, p < .01$ ), Information Exchange ( $r = -0.51, p < .01$ ), Team Reinforcement / Punishment ( $r = -0.39, p < .01$ ), and Total IS ( $r = -0.57, p < .01$ ). Likewise, but with positive correlations, Individualism was significantly related to Task

Direction ( $r = 0.51, p < .01$ ), Situation Update ( $r = 0.75, p < .01$ ), Planning ( $r = 0.65, p < .01$ ), Information Exchange ( $r = 0.49, p < .01$ ), Team Reinforcement /Punishment ( $r = 0.63, p < .01$ ), and Total IS ( $r = 0.71, p < .01$ ). Finally, Uncertainty Avoidance was negatively related to Task Direction ( $r = -0.51, p < .01$ ), Situation Update ( $r = -0.54, p < .01$ ), Planning ( $r = -0.41, p < .01$ ), Information Exchange ( $r = -0.50, p < .01$ ), Team Reinforcement /Punishment ( $r = -0.39, p < .01$ ), and Total IS ( $r = -0.55, p < .01$ ).

Not surprisingly, there were high correlations among the culture variables with Power Distance being negatively related to Individualism ( $r = -0.79, p < .01$ ) and positively to Uncertainty Avoidance ( $r = -0.89, p < .01$ ), and Individualism negatively related to Uncertainty Avoidance ( $r = -0.77, p < .01$ ). These very high correlations among the culture dimensions suggest substantial overlap between the three cultural dimensions and can explain why they correlate similarly with the information sharing content areas. The most common information sharing content used by all teams was Situation Update (32.77% of all IS) followed by Task Direction (25.19%), Planning (19.12%), Information Exchange (14.90%), and Supporting Behavior (0.52%). The infrequent use of Supporting Behavior explains the lack of relations with any of the variables of interest.

Table 7. Means, Standard Deviations, and Intercorrelations

Variable	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. Task Direction	92.44 (52.72)	-											
2. Situation Update	120.52 (59.93)	.76**	-										
3. Planning	69.42 (32.45)	.46**	.63**	-									
4. Supporting Behavior	1.92 (2.02)	.04	.18	-.01	-								
5. Information Exchange	54.67 (34.22)	.73**	.72**	.59**	-.02	-							
6. Team Reinforcement / Punishment	5.23 (4.31)	.58**	.72**	.65**	.17	.49**	-						
7. Other Communications	22.17 (18.23)	.63**	.65**	.53**	.05	.57**	.57**	-					
8. Total Communications	366.35 (172.40)	.88**	.93**	.74**	.09	.86**	.73**	.75**	-				
9. Team Performance	803.96 (437.13)	.16	.42**	.25	.08	.26	.26	.25	.33*	-			
10. Power Distance	39.98 (14.03)	-.53**	-.53**	-.41**	-.17	-.51**	-.39**	-.31*	-.57**	.07	-		
11. Individualism	67.92 (18.74)	.51**	.75**	.65**	.19	.49**	.63**	.47**	.71**	.26	-.79**	-	
12. Uncertainty Avoidance	51.81 (17.13)	-.51**	-.54**	-.41**	-.19	-.50**	-.39**	-.21	-.55**	-.04	.89**	-.77**	-

Note. *N* = 48.

\*  $p < 0.05$ . \*\*  $p < 0.01$

## Hypothesis Tests

Hypothesis 1 proposed that there would be a relation between information sharing and team performance. To test this hypothesis, I correlated the total information sharing statements with the team performance score. The information sharing-team performance correlation was statistically significant ( $r = .33, p = .02$ ), suggesting that greater information sharing positively related to the teams' performance on this task.

Hypothesis 2a-c proposed that Individualism would moderate the relation between information sharing content and team performance. To analyze these hypotheses, I employed steps cited in Frazier, Tix, and Barron (2004). I first centered the information sharing content variables (Supporting Behavior for Hypothesis 2a, Information Exchange for Hypothesis 2b, and Reinforcement / Punishment for Hypothesis 2c) and Individualism (moderator variable). I then created product terms to represent the interaction between the information sharing content variables and Individualism by multiplying them together. Finally, I structured three separate hierarchical multiple regression equations to test for moderating effects.

For Hypothesis 2a, which tested the moderating effect of Individualism on the Supporting Behavior-team performance relation, team performance was regressed onto Individualism, Supporting Behavior, and the interaction between Individualism and Supporting Behavior. The reduced model was not statistically significant, but the full model was significant, with a significant main effect of Individualism ( $\beta = .34$ ) and a significant interaction term ( $F(3, 44) = 3.27, p = .03; \beta = .35, p = .02$ ), suggesting that Individualism significantly moderated the relation between Supporting Behavior and Team Performance. Specifically, for those teams that scored low on Individualism, Supporting Behavior had a negative association to team

performance. Conversely, for the teams that scored high on Individualism, Supporting Behavior had a positive relation with team performance. Interestingly, although the interaction was significant, it was in the opposite direction than proposed. Additionally, the model accounted for 13% of the variance in team performance, with the interaction term accounting for an additional 10% of the variance over the main effects.

For additional information, Table 8 provides the statistical analysis results and Figure 9 provides the graphical representation of the interaction.

Table 8. Testing the Moderating Effect of Individualism on Supporting Behavior and Team Performance Using Hierarchical Multiple Regression

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Supporting Behavior	7.59	31.70	.04	-5.21	30.51	-.02
Individualism	5.97	3.42	.26	7.86	3.33	.34*
Supporting Behavior x Individualism				4.04	1.64	.35*
<i>F</i>			1.70			3.27*
<i>Adjusted R</i> <sup>2</sup>			.03			.13

Note. *N* = 48

\**p* ≤ .05. \*\**p* ≤ .01.

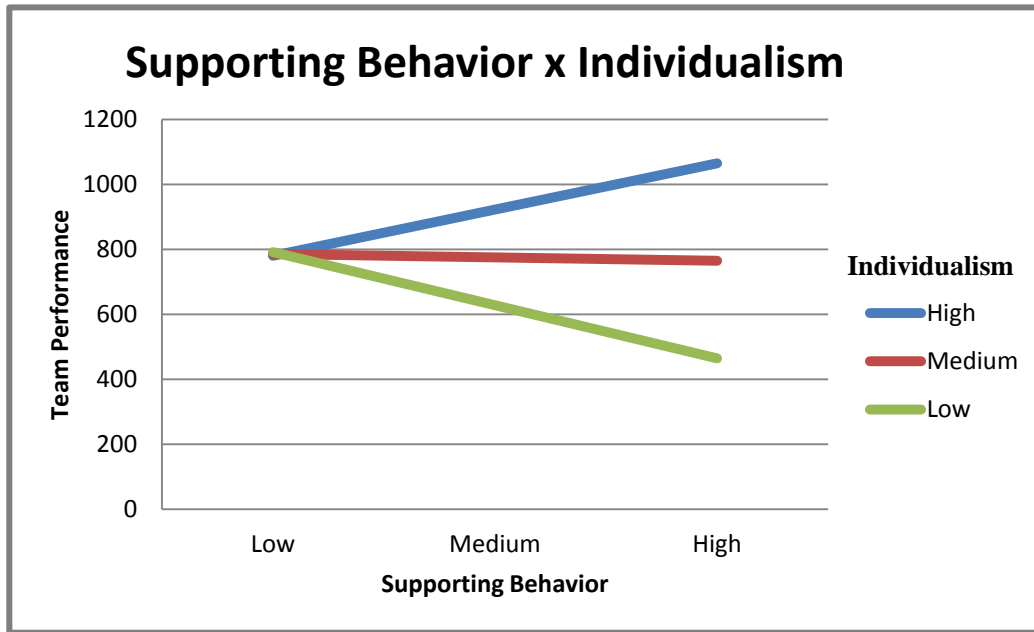


Figure 9. Supporting Behavior x Individualism Interaction

To test Hypothesis 2b, team performance was regressed onto Individualism, Information Exchange, and the interaction between Individualism and Information Exchange. The reduced model was not statistically significant, but the full model was significant, with a significant main effect of Individualism ( $\beta = .76$ ) and a significant interaction term ( $F(3, 44) = 4.68, p = .01, \beta = .65, p = .01$ ). These results suggest that Information Exchange had a positive relation with team performance for the high-scoring Individualist teams. However, the relation was negative for teams that were lower on Individualism. The model accounted for 19% of the variance in team performance. Table 9 and Figure 10 provide additional information to further illustrate said moderated relation.

Table 9. Testing the Moderating Effect of Individualism on Information Exchange and Team Performance Using Hierarchical Multiple Regression

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Information Exchange	2.21	2.09	.17	.20	2.04	.02
Individualism	4.13	3.81	.18	17.74	5.80	.76**
Information Exchange x Individualism				.44	.15	.65**
<i>F</i>			2.26			4.68**
<i>Adjusted R</i> <sup>2</sup>			.05			.19

Note. *N* = 48

\**p* ≤ .05. \*\**p* ≤ .01.

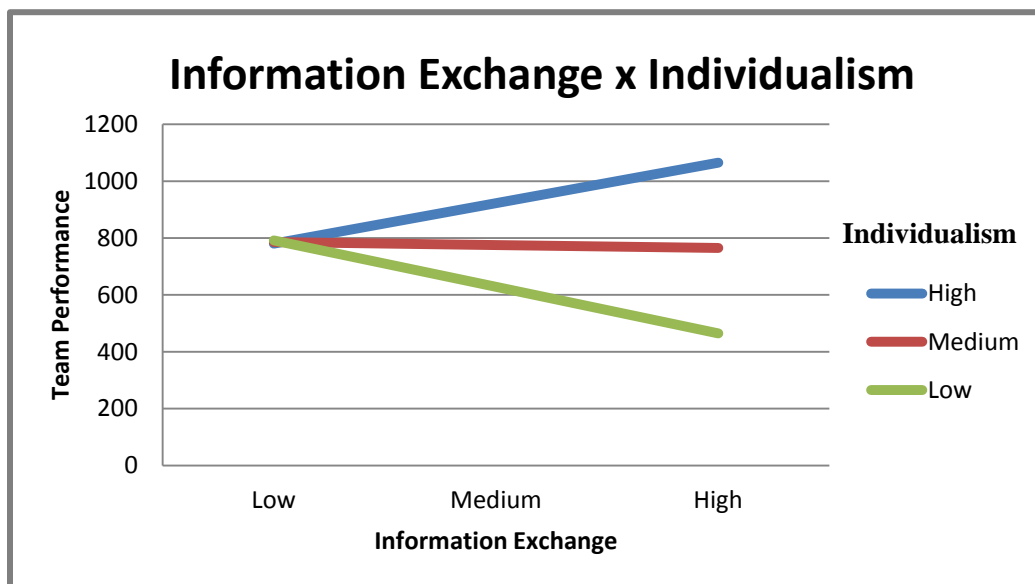


Figure 10. Information Exchange x Individualism Interaction

For Hypothesis 2c, team performance was regressed on Individualism, Reinforcement / Punishment, and the interaction between Individualism and Reinforcement / Punishment. The reduced model was not significant; however, the full model was statistically significant, with a significant main effect for Individualism ( $\beta = .56$ ), and a significant Individualism x

Reinforcement / Punishment interaction ( $F(3, 44) = 3.24, p = .03; \beta = .44, p = .03$ ). Specifically, the relation between Reinforcement / Punishment and team performance was positive for those teams high on Individualism and negative for those teams who were low on the cultural value. That is, for more Individualist teams, statements regarding Reinforcement and Punishment were stronger positive predictors of team performance. In contrast, these statements were indicative of poorer performance scores for teams that did not score high on Individualism. For further clarification, the analysis results and graphical representation of this interaction can be found on Table 10 and Figure 11, respectively. In summary, the findings from the data analyses regarding Individualism as a moderator for information sharing and team performance were statistically significant; thus, Hypotheses 2b and 2c were supported, and there were effects for 2a, but not in the direction proposed.

Table 10. Testing the Moderating Effect of Individualism on Reinforcement / Punishment and Team Performance Using Hierarchical Multiple Regression

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Reinforcement / Punishment	15.09	18.61	.15	-12.21	21.36	-.12
Individualism	3.94	4.28	.17	12.95	5.66	.56*
Reinforcement / Punishment x Individualism				2.28	.99	.44*
<i>F</i>			2.02			3.24*
<i>Adjusted R</i> <sup>2</sup>			.04			.13

Note.  $N = 48$

\* $p \leq .05$ . \*\* $p \leq .01$ .



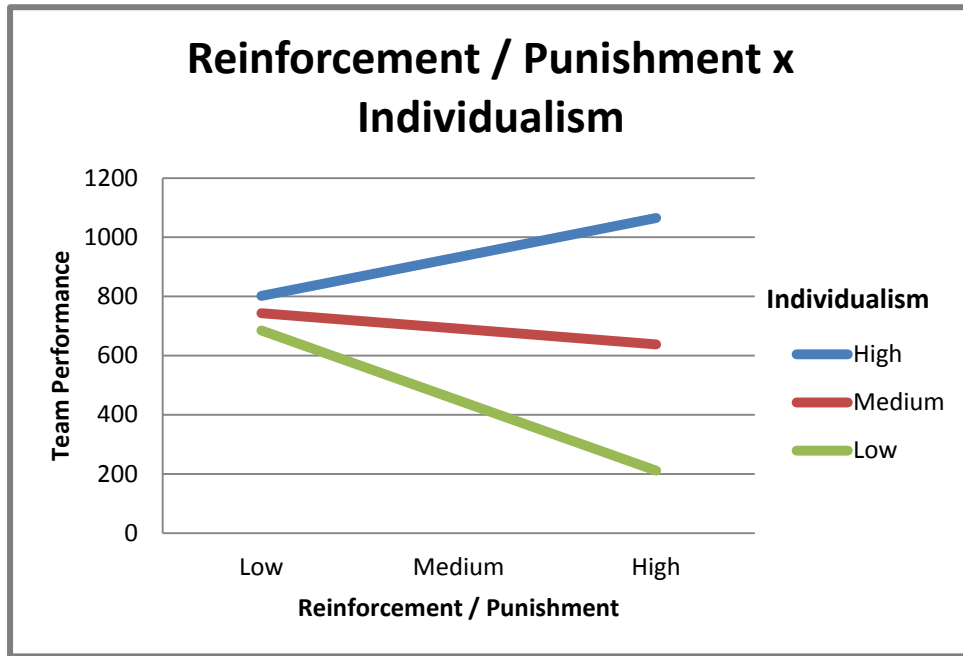


Figure 11. Reinforcement / Punishment x Individualism Interaction

To test Hypothesis 3, team performance was regressed onto Power Distance, Task Direction, and the interaction between Power Distance and Task Direction. The reduced model was not statistically significant; however, the full model was significant, with significant main effects for Task Direction ( $\beta = .43$ ), Power Distance ( $\beta = .85$ ) and a significant interaction term ( $F(3, 44) = 2.86, p = .05; \beta = .65, p = .02$ ). The model accounted for 11% of the variance in team performance. The finding suggests that those teams that scored higher on Power Distance performed better on the task than those teams that scored lower. Further, the results show that the relation between Task Direction and team performance was positive for High-Power Distance teams and negative for Low-Power Distance teams; therefore, this analysis provides support for Hypothesis 3. The results for this analysis can be found in Table 11 and the plotted graph on Figure 12.

Table 11. Testing the Moderating Effect of Power Distance on Task Direction and Team Performance Using Hierarchical Multiple Regression

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Task Direction	2.31	1.41	.28	3.55	1.45	.43*
Power Distance	6.78	5.30	.22	26.52	9.89	.85**
Task Direction x Power Distance				.36	.16	.65*
<i>F</i>			1.46			2.86*
<i>Adjusted R</i> <sup>2</sup>			.02			.11

Note. *N* = 48

\* $p \leq .05$ . \*\* $p \leq .01$ .

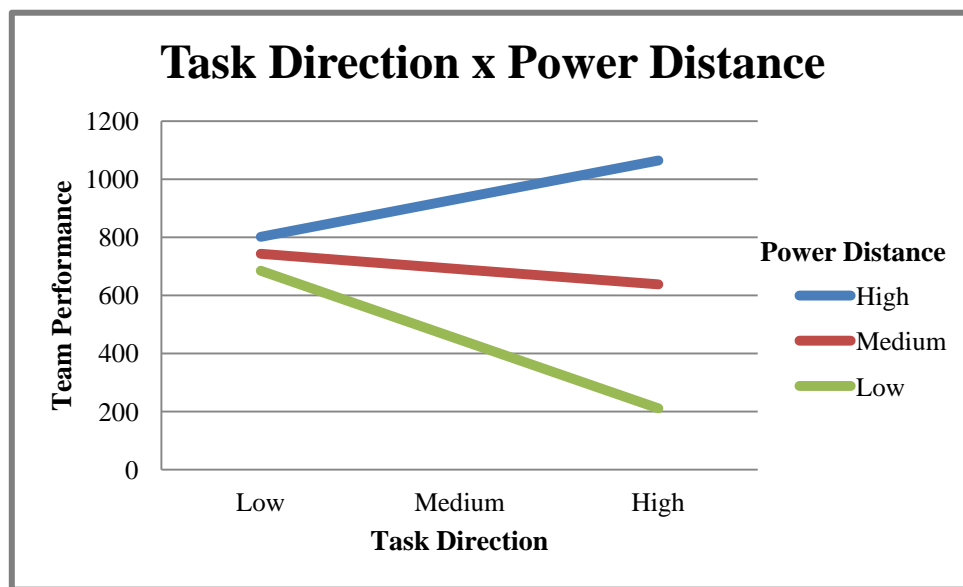


Figure 12. Task Direction x Power Distance Interaction

Hypotheses 4a and 4b proposed that Uncertainty Avoidance was expected to moderate the relation between information sharing content (Planning for 4a and Situation Update for 4b) and Team Performance. To test Hypothesis 4a, team performance was regressed onto Uncertainty Avoidance, Planning, and the interaction between Uncertainty Avoidance and Planning. Neither the reduced model ( $F(2, 45) = 1.54, p = .23$ ) nor the full model were

statistically significant ( $F(3, 44) = 1.34, p = .26$ ), providing no support for Hypothesis 4a (see Table 12 for details).

Table 12. Testing the Moderating Effect of Uncertainty Avoidance on Planning and Team Performance Using Hierarchical Multiple Regression

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Planning	3.69	2.13	0.27	3.94	2.15	.29
Uncertainty Avoidance	1.79	4.04	0.07	-2.23	5.62	-.09
Planning x Uncertainty Avoidance				-.18	.17	-.22
<i>F</i>			1.54			1.38
<i>Adjusted R</i> <sup>2</sup>			.02			.02

Note.  $N = 48$

\* $p \leq .05$ . \*\* $p \leq .01$ .

To test Hypothesis 4b, team performance was regressed onto Uncertainty Avoidance, Situation Update, and the interaction between Uncertainty Avoidance and Situation Update. Both the reduced model ( $F(2, 45) = 6.43, p = .00$ ) and the full model were statistically significant ( $F(3, 44) = 4.35, p = .01$ ). Although the main effect for Situation Update was significant in the full model ( $\beta = .57$ ), the Situation Update-Uncertainty Avoidance interaction was not statistically significant. Moreover, Uncertainty Avoidance did not present any change in strength in the relations between information sharing content and team performance. Thus, there was no statistical support for Hypothesis 4b (see Table 13).

Table 13. Testing the Moderating Effect of Uncertainty Avoidance on Situation Update and Team Performance Using Hierarchical Multiple Regression

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Situation Update	4.05	1.13	.56**	4.16	1.16	.57**
Uncertainty Avoidance	6.48	3.97	.25	4.10	5.59	.16
Situation Update x Uncertainty Avoidance				-.05	.08	-.13
<i>F</i>			6.43**			4.35**
<i>Adjusted R</i> <sup>2</sup>			.19			.18

Note. *N* = 48

\**p* ≤ .05. \*\**p* ≤ .01.

In summary, most of information sharing dimensions was strongly correlated.

Information sharing was also related to both team performance and culture. Although there was high multicollinearity among the information sharing dimensions and cultural values, only

Individualism and Power Distance were significant moderators for various Information Sharing content areas. Unfortunately, Uncertainty Avoidance was not observed to be an influential factor for the Planning- and Situation Update-Team Performance relations. A summary of the hypothesis tests can be found in Table 14.

Table 14. Hypothesis Test Results

Hypothesis	Proposed Relation	Result
Hypothesis 1	The information sharing was expected to be positively correlated with team performance.	Supported
Hypothesis 2a	Individualism was expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between supporting behavior and team performance was expected for teams that scored low on Individualism than for teams scoring high on Individualism.	Not Supported (interactive effects found in opposite direction)
Hypothesis 2b	Individualism was expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between information exchange and team performance was expected for teams that scored high on Individualism than for teams that scored low on Individualism.	Supported
Hypothesis 2c	Individualism was expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between team reinforcement/punishment and team performance is expected for teams scoring higher on Individualism than for teams scoring lower on Individualism.	Supported
Hypothesis 3	Power Distance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between directing tasks and team performance is expected for teams scoring higher on Power Distance than for teams scoring lower on Power Distance.	Supported
Hypothesis 4a	Uncertainty Avoidance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between planning and team performance is expected for teams scoring higher on Uncertainty Avoidance than for teams scoring lower on Uncertainty Avoidance.	Not Supported
Hypothesis 4b	Uncertainty Avoidance is expected to moderate the relation between information sharing content and team performance. Specifically, a higher correlation between situation update and team performance is expected for teams scoring higher on Uncertainty Avoidance than for teams scoring lower on Uncertainty Avoidance.	Not Supported

## Exploratory Analyses

To fully understand how culture related to information sharing and team performance in this study, I will provide an abridged overview of the culture scores and communication-pattern differences within each country.

### *Culture*

The cultural variables of interest in this study were Individualism, Power Distance, and Uncertainty Avoidance. As reported earlier in this paper, the three culture variables were highly correlated, suggesting that the measures do not represent separate constructs. Thus, I will report information sharing differences based on Individualism only.

### *Information Sharing*

Seven information sharing dimensions were coded in this study: Task Direction, Situation Update, Planning, Supporting Behavior, Information Exchange, Team Reinforcement/Punishment, and Other Communications. With the exception of Supporting Behavior, these information sharing dimensions were strongly correlated ( $p < .05$ ). Although the total amount of communication was significantly related to team performance ( $r = 0.33, p < 0.05$ ), the only coded dimension that was related to team performance was Situation Update ( $r = 0.42, p < 0.01$ ). In addition to correlations, I also examined the total number of information sharing statements by country and culture.

To examine total information sharing, I calculated team-level minimum, maximum, and average scores of total IS by Nationality (and rank for Norway). The results can be found in Table 18. The teams from the USA had the highest Individualism score and the highest *maximum* IS messages of all of the teams (698 statements). However, the Netherlands NATO teams, with the second highest Individualism score, had the highest *mean* IS score (511.75

statements). Bulgaria, the least individualistic country in the study, had the lowest team *minimum* frequency (29 statements), lowest *maximum* team score (168 statements) and lowest *mean* (114.38 statements). When examining mean differences in total IS, I conducted a One-Way Analysis of Variance and found that there were significant information sharing differences among countries ( $F(4, 43) = 12.73, p < .00$ ). The eta-squared ( $\eta^2$ ) was calculated by dividing the Sum of Squares Between Groups by the Sum of Squares Total to yield the effect size of this analysis. The  $\eta^2$  was .28, suggesting that 28% of the variance in team performance was accounted for by nationality.

Table 15. Cultural Values, Information Sharing, and Performance Data by Country

Country	<i>N</i>	<i>PD</i>	<i>IND</i>	<i>UA</i>	<i>IS</i> <i>Min</i>	<i>IS</i> <i>Max</i>	<i>IS</i> <i>Mean</i>	<i>Team</i> <i>Performance</i> <i>Min</i>	<i>Team</i> <i>Performance</i> <i>Max</i>	<i>Team</i> <i>Performance</i> <i>Mean</i>
Norway	8	31	69	50	153	362	258.5	150	800	406.25
Norway	8	31	69	50	322	666	454.5	0	1150	733.75
Sweden	9	31	71	29	262	658	402.67	150	1950	760
USA	7	40	91	46	286	698	464	900	1690	1235.71
Netherlands	8	38	80	53	361	653	511.75	500	1250	1001.25
Bulgaria	8	70	30	85	29	168	114.38	250	1650	746.25

With an Individualism score that was the second lowest in the study sample, Norway was the only country that had teams with different ranks. Though not a focus in this study, there were distinct information sharing differences when examining the junior- versus senior-Officer teams. Specifically, the junior teams had a higher *minimum*, *maximum*, and *mean* information sharing frequency as compared to their senior counterparts. These findings can be found in Table 16. To further understand if there were statistical Information Sharing differences between ranks, an Analysis of Variance was conducted. The result was that there was a statistical

significant difference in total IS between senior and junior Norwegian Officers ( $F(1, 14) = 13.70, p < .01$ ).

Table 16. Rank Differences in Total Statements for Norwegian Officers

Variable	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Senior Norwegian Officer Teams	8	258.50	75.36	153	362
Junior Norwegian Officer Teams	8	454.50	129.43	322	666

When separating the experimental task into three equal temporal phases—beginning, middle, and end, there are some unique communication differences exhibited by culture. To examine these information sharing differences, I visually examined a data set from each country that reflected the closest total information sharing frequency as the country’s mean index (among all teams within each country), as detailed in Table 17. These data were intended to provide an overview of information sharing differences by nationality. Interestingly, when taking a sample of information sharing data from each country, those that are more individualistic (Sweden, USA, and the Netherlands), as determined by a median split, exhibited the same pattern of communication when examining the most coded information sharing content area in the three aforementioned phases. That is, when examining the frequency of information sharing content by time phase, the highest percentage of communication was Planning for the beginning phase, and Situation Update for the middle and end phases for the more Individualistic teams. Bulgaria, the most collectivist country, most frequently engaged in Planning for all three phases. The other collectivist country, although not as collectivist as Bulgaria, is Norway. As found in total IS, the Norwegian teams differed by rank level, but not as expected. The senior-ranked Norwegian Officers relied on Planning for the beginning phase, Situation Update for the middle,



and Task Direction for the end phase. However, the information sharing patterns by the junior Norwegian Officers mirrored those from the senior officers from individualist cultures— Planning for the beginning, and Situation Update for the middle and end phases.

Table 17. Information Sharing Differences by Temporal Phase

Country	Phase	Task Direction		Situation Update		Planning		Supporting Behavior		Information Exchange		Reinforce/Punish		Other		Total		Majority IS
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Norway	Beg	21	24.14	13	14.94	29	33.33	0	0.00	21	24.14	1	1.15	2	2.30	87	100.00	Planning
	Mid	19	21.84	42	48	11	12.64	0	0.00	13	14.94	0	0.00	2	2.30	87	100.00	Situation Update
	End	34	38.6	28	31.82	13	14.77	0	0.00	12	13.64	0	0.00	1	1.14	88	100.00	Task Direction
Norway (Junior)	Beg	26	18.44	28	19.86	51	36.17	0	0.00	24	17.02	0	0.00	12	8.51	141	100.00	Planning
	Mid	39	27.46	52	36.62	25	17.61	2	1.41	20	14.08	0	0.00	4	2.82	142	100.00	Situation Update
	End	44	31.21	67	47.52	1	0.71	2	1.42	14	9.93	7	4.96	6	4.26	141	100.00	Situation Update
Sweden	Beg	19	14.96	16	12.60	45	35.43	0	0.00	40	31.50	2	1.57	5	3.94	127	100.00	Planning
	Mid	33	25.78	38	29.69	28	21.88	0	0.00	25	19.53	0	0.00	4	3.13	128	100.00	Situation Update
	End	34	26.56	66	51.56	6	4.69	0	0.00	22	17.19	0	0.00	0	0.00	128	100.00	Situation Update
USA	Beg	21	15.79	33	24.81	51	38.35	0	0.00	21	15.79	0	0.00	7	5.26	133	100.00	Planning
	Mid	37	27.82	59	44.36	15	11.28	1	0.75	15	11.28	6	4.51	0	0.00	133	100.00	Situation Update
	End	27	20.30	82	61.65	2	1.50	7	5.26	10	7.52	2	1.50	3	2.26	133	100.00	Situation Update
Netherlands	Beg	15	8.67	20	11.56	86	49.71	0	0.00	19	10.98	4	2.31	29	16.76	173	100.00	Planning
	Mid	38	21.97	82	47.40	20	11.56	5	2.89	17	9.83	2	1.16	9	5.20	173	100.00	Situation Update
	End	28	16.18	111	64.16	0	0.00	0	0.00	18	10.40	6	3.47	10	5.78	173	100.00	Situation Update
Bulgaria	Beg	6	18.18	1	3.03	15	45.45	0	0.00	9	27.27	0	0.00	2	6.06	33	100.00	Planning
	Mid	9	28.13	1	3.13	18	56.25	0	0.00	4	12.50	0	0.00	0	0.00	32	100.00	Planning
	End	8	24.24	6	18.18	14	42.42	0	0.00	3	9.09	1	3.03	1	3.03	33	100.00	Planning

### Team Performance

I examined whether there were mean differences in team performance based on Nationality of the teams. The results of the Analysis of Variance concluded that there were mean differences in team performance when analyzed with Nationality as a factor ( $F(4, 43) = 4.23, p = .01$ ). More information regarding the different Nationality's team performance data can be found in Table 18.

Table 18. Descriptives of Team Performance based on Nationality

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Norway	16	570.00	340.78	0	1150
Sweden	9	760.00	523.62	150	1950
USA	7	1235.71	346.69	900	1690
Netherlands	8	1001.25	249.14	500	1250
Bulgaria	8	746.25	439.77	250	1650
Total	48	803.96	437.13	0	1950

Bonferroni post-hoc analyses were conducted to examine the nature of the mean differences. I separated the Norwegian senior officer teams from the junior officer teams for the analyses ( $F(5, 42) = 4.14, p = .00$ ). The results of the post-hoc analyses clarified the significant differences among the senior Norwegian, American and the Dutch NATO Officer teams. Specifically, the American and Dutch teams' mean performance were significantly greater than the senior Norwegians' team performance mean.

## CHAPTER FIVE: DISCUSSION

The purpose of this dissertation was to examine how culture relates to information sharing and team performance. To reflect on team research, the Input-Process-Output (I-P-O) model is often used to examine relations among variables of interest. However, the I-P-O model was developed with a Western view and this study provided some support to its transfer to other cultures. In this study, a moderated model of the interactive effects of information sharing and culture on team performance was examined. Investigating homogeneous teams is not only a needed study objective for culture research, but it is a prerequisite in understanding how information sharing is unique within culture. Moreover, in order to understand how to effectively share information among teammates from various cultures, it is important to understand how communication is dictated by their native culture. The homogeneous-teams approach allows researchers to attribute the information sharing patterns to the culture, reducing the culture confound in heterogeneous teams. Thus, this study provides an examination of within- and between-culture analysis of team information sharing among teams composed of NATO Officers.

### Information Sharing & Team Performance

As reflected in the extant literature, information sharing was related to team performance. The results of the data analyses showed that most of the information sharing content areas was strongly correlated and related to both team performance and culture. Although the total amount of messages exchanged was significantly related to team performance, the only coded information sharing dimension that was related to team performance was Situation Update. The literature suggests that providing and requesting Situation Updates is a direct significant team process that predicts expert team performance (Smith-Jentsch et al., 2001). Research has

consistently shown that having information sharing that focuses on the current state of the mission allows for clarification for team members and for strategy development to increase effective decision making and performance. Furthermore, consistent situation updates facilitate more dynamic mission planning, and subsequently improve Warfighter performance. Smith-Jentsch et al. (2001) suggest that Situation Updates are especially crucial for teams that have to make critical decisions under extreme time pressures. The NATO Officer population that was used in this study is one such career field that possesses such team characteristics; therefore, it is understandable why this relation was significant in this study.

Although the information sharing findings are consistent with the established literature, it was expected that the other coded information sharing content variables (or at least a subset) would have demonstrated some statistically-significant relations with team performance as demonstrated in literature (Rosen, 2005). Yet, when considered in military context, the results reflect the current military information sharing protocol. As previously stated, team research conducted in the military, and in similar career fields like the medical community, has overwhelmingly reported the importance of Situation Update provisions to and requests from teammates to enhance team performance (Smith-Jentsch, et al., 2001). In fact, many team training courses, like Team Dimensional Training, in the United States emphasize the importance of situation updates, especially from junior to senior members. And even though these team information sharing techniques are trained in the United States, it is interesting that these results apparently translate to teams from other countries. In this study, the teams that were among the higher performance scores were those that engaged in situation update during the middle and end of the mission (e.g., Sweden). The teams composed of senior Norwegian and Bulgarian Officers were the only teams to not have Situation Update as their most frequent information sharing

dimension for the middle and end of the mission. Additionally, these teams had the lowest total IS (as measured by mean, minimum, and maximum) and are among the lower team performance scores; thus, these results support the positive information sharing-team performance relations previously published in the literature.

### Cultural Impact

This study underscored that culture mattered. The data analyses conducted for this study were directed at examining the interactive effects of culture on various information sharing content areas and team performance, as depicted in Figure 8. The hypothesized relations involving Power Distance and Individualism were statistically significant. Specifically, Task Direction had a positive association with team performance for high-Power Distance teams and the opposite relation for their low-scoring culture counterparts.

Individualists had a tendency to communicate more than those lower on this cultural scale. Also, positive relations between team performance and Information Exchange and Reinforcement / Punishment were observed for high-Individualist teams, but negative relations for teams scoring low on this cultural value. Although these interactions were significant, the finding regarding Supporting Behavior was in the opposite direction as proposed. It was hypothesized that information sharing statements targeting supporting behavior would be positively related to team performance, and that this relation would be exacerbated for those teams that scored low on Individualism than those that scored high. Instead, the interaction was indeed significant, but after examining the plot, the data showed that the relation between Supporting Behavior and Team performance was *positive* for high-Individualist teams, and *negative* for low-Individualist teams. Thus, the results indicate that Supporting Behavior was associated with inferior team performance for low-Individualist teams. The high Individualists

engaged in more information sharing and also more Supporting Behavior. Because the low Individualists engaged in less frequent information sharing, it can be expected that their information sharing would be focused more on mission planning than on Supporting Behavior. If the low Individualists used some of their infrequent statements to include Supporting Behavior, it can be expected that these messages would not substitute other mission-critical messages; consequently, the information sharing would have a negative relation with team performance. Additionally, low Individualists engage in more high-context communication and can be assumed that the Supporting Behavior experienced by such culture would be nonverbal and not captured in this study.

The interactions involving Uncertainty Avoidance were not statistically significant—neither Planning nor Situation Update was moderated by this cultural variable. The data suggest that Planning was not related to team performance and this relation did not change with the introduction of culture. Situation Update, however, was significantly related to team performance and Uncertainty Avoidance did not strengthen this relation. The sample size was small ( $n = 48$ ), providing low power, which possibly prevented statistical significant findings for the hypothesized relations regarding Uncertainty Avoidance. If there were more teams involved, it would lend the opportunity to provide more conclusive responses to these hypotheses.

### Mission Strategy

When exploring the information sharing differences, there were insightful trends that facilitated the understanding of differing mission strategies adopted by high- versus low-Individualists. Although not hypothesized, a distinct pattern of communication over the course of the task was observed. When the task was divided in three phases, low-Individualists engaged more in Planning in all three phases, whereas high-Individualists began the task with frequent

statements about Planning, but used Situation Updates more as time went on. These communication strategies should be recognized and can also account for why high-Individualists' performance was superior, as Situation Update was the only information sharing content that was significantly related to team performance.

### Limitations

Although many of the results were as expected, there were some hypotheses and findings that were not supported. This study only had 48 teams of participants, which could be a contributing factor to having insufficient statistical power. That is, if there were more participants and teams involved in the study, the hypotheses regarding Uncertainty Avoidance and the relations among information sharing and team performance may have resulted in different statistical findings. However, it should be reinforced that even with a small sample size, the moderated hypotheses regarding Individualism and Power Distance were observed as expected—underscoring the strength of these relations.

The cultural values measure by Hofstede has gained much attention by critics for its development and psychometric properties. The findings from the cultural values analyses would suggest that the three dimensions (i.e., Individualism, Power Distance, and Uncertainty Avoidance) that were initially conceptualized as separate constructs, were highly correlated, inferring that there may be one culture construct. Additionally, in this study, the cultural value score was assigned to the team based on their nationality. These scores are based on national levels and eliminate the variability presented by collecting cultural values for each individual and aggregating these values to represent the team score. Moreover, assigning these team-level scores that are based on actual national scores reported by Hofstede ([www.geert-hofstede.com](http://www.geert-hofstede.com)) may not reflect the individual cultural values of the participants. For example, to assign a score



for a participant who is representing the United States prevents the opportunity to measure the variability in values of those from the four corners of the country. We can assume that the values of a participant from New York can differ from those of a participant from Mississippi, Florida, and California. Thus, relying on a national score to represent the cultural values of a four-participant team may not provide an accurate appreciation of the team culture.

Another limitation related to culture was that the participants involved in this study were representing countries that scored high on Individualism. Bulgaria was the only country that could be truly considered low on Individualism. The purpose of this study was not to highlight team performance differences, but the behavior variations in the information sharing because hypotheses regarding performance were not considered. It was envisioned that the conclusion of the study would be that although different cultures communicate differently, they still perform equally—taking more of a criterion dimensionality approach. Unfortunately, there was performance differences observed. In general, the individualist countries performed better on this task than the collectivist. Taken together, in agreement with previous research, information sharing (specifically, the total frequency and the Situation Update dimension) was related to team performance. Moreover, these relations were exacerbated for those teams that represented countries from Individualist cultures. These findings would suggest that Individualists perform better on team tasks, which seems counterintuitive. However, when scrutinizing the experimental method and task requirements, this study's team task is designed to facilitate better performance from individualist teams more than would be expected from a true collectivist team. These findings are in accordance with literature on direct and low-context communication. It is expected that if the task requires participants to solely engage in computer-based text communication, then those who are more fluent in direct, low-context information sharing (i.e.,

Individualists) will engage more within said task and will score high in total IS (which was related to team performance). For more clarification, this task required team members to engage in direct communication, low-context information sharing that is more aligned with Individualists' style. Thus, these results, albeit informative, should be considered with caution and cannot generalize to any team task in a cross-cultural environment.

### Strengths

The participants in this study were NATO Officers from various countries. This study required the collaboration of many researchers to conduct the experiment in their respective countries, which underscores its contribution to cross-cultural research. The experiment allowed researchers to effectively examine how culture is related to information sharing and team performance.

Although the laboratory task may not be generalizable to real-world tasks and may have disadvantaged low Individualists by eliminating nonverbals, information sharing expectations in this task were relevant to the tasking that NATO Officers experience in their job. Moreover, the task required all teams to type in English (one of NATO's official languages), even if it was not their native language. Because the vast majority of communication is non-verbal (Ferraro & Andreatta, 2010), limiting the information sharing to text-typing provides a deficiency in the information sharing criterion and facilitates an advantage to low-context cultures. But the digital age has required teams to rely more on typed communication with email and text messages to keep abreast on the team task across time zones. Because, much can be lost in translation in verbal information sharing, it may require teams to engage in more information sharing for clarification and mission planning. Because the total IS was related in team performance in this study, this finding supports the need to engage in more text communication in a virtual

environment. Thus, this team task corresponds to the current state of team information sharing processes that face our current military demands. Further, this study allows the audience to understand how cultures differ in information sharing and team performance while considering the current nature of missions.

### Future Research

One major research effort that should be addressed is the lack of an empirically-based measure of culture. Future research should be directed at developing a more advanced culture measure that addresses the critiques of the Hofstede measure. Specifically, future research should be dedicated to understanding the multidimensional concept of culture and developing a measure that is validated by a globally-representative sample. Moreover, the data from cultural values presented by Hofstede were highly correlated, which suggests that there are not separate dimensions but just one measure of culture. Cross-cultural researchers should examine independent operationalizations of culture that strengthens the current literature on culture.

Similarly, there is a need for more sophisticated, behavior-based information sharing coding system, especially for digital communication. There should be an emphasis on what information is unique versus redundant in the team communications. Specifically, researchers should quantitatively index the ratio of unique to redundant information sharing and how these messages relate to team performance. There is an expectation that the greater proportion of unique information that is shared, the better the teams will perform. With a revised information sharing coding system that measures these messages, the hypotheses in this study can be readdressed and more clarification of whether culture trumps unique information sharing in homogeneous teams can be appraised. For example, do high Individualists share more unique

information than low Individualists? Is Individualism a significant moderator when unique information is coded?

Team scientists should also consider manipulating the task to include various levels of interdependency and mission urgency. For example, military missions involving having a planning meeting with local leaders while drinking chai tea has different information sharing and culture implications than when the mission is task focused on piloting an unmanned aerial vehicle for a tactical air strike. The former task has less task interdependency and requires more cross-cultural competence for success. The latter mission features greater urgency, risk, stress and time demands that can result in catastrophes if the mission is compromised. With these task characteristics, the military personnel are dependent less on culture, but on the mission requirements. It can be hypothesized that under some task conditions, other demographic data (e.g., rank, education) may trump culture. Thus, future researchers should consider such task characteristics to provide guidance for what tasks culture matters more and what personal characteristics are needed.

Future team researchers should also consider developing their studies to collect data at various levels (e.g., individual, team, and national) to allow for more sophisticated data analyses. Data analysis techniques like Hierarchical Linear Modeling (HLM) are appropriate for such studies and are increasingly gaining attention in team research. Using data analysis techniques that analyze nested variables encourages the understanding of the unique contributions provided by each level. Researchers should anticipate employing this and other emerging analyses for nested variables and develop their measures accordingly to advance the team research domain.

## Practical Implications

The results of this study provide practical implications for people who work in similar careers to the military environments (e.g., first responders, medical teams, etc.). Employees need to remember the importance of sharing unique information when working in teams. More information that is shared among the team is related to improved team performance. However, employees should know that collaborating with team members from other cultures may not be similar to when working with those from the same culture. These collaborative working relationships may require trust to facilitate the IS needed for mission success (Hughes, McCoy, & Johnston, 2009; Hughes, McCoy, Severe, & Johnston, 2010; McCoy-Fisher, Severe, & Hughes, 2011; McCoy-Fisher, Hughes, & Severe, 2012). Specifically, culturally-distant team members may engage in indirect, high-context communication that may not be transparent for Westerners.

Team members should engage in an introduction that allows for teammates to identify their strengths, weaknesses, and expertise in attacking the team task. In this study, the more effective teams engaged in Planning in the beginning of the mission, where tasks and roles were divided. These effective teams did not spend the rest of the mission in Planning mode, but more in providing or requesting Situation Updates. This orientation in the beginning of the task may have to occur quickly in the field because of the time pressures associated with their decision making and mission, but the benefits of this short exchange may serve as a critical force multiplier in intense missions. This introduction can be compared to having a thorough pre-brief, where mission overview, goals, and planning take place—common for military teams.

Finally, more recent technology advancements have been considered by multinational corporations to augment the high-context environments. Specifically, there has been an increase

of live virtual feeds of office spaces in various countries which allows the employees to interact as if they are sharing their daily workspace with their international-counterparts. For example, there are mobile desks with a screen to project the office in a European location and the ability to talk directly to team members in a globally-distributed team. With the internet and video conferencing capabilities, these tools can enhance both high- and low- context communication, alleviate the ineffective information sharing, and encourage effective decision making.

### Conclusion

In conclusion, this study highlighted the relations among culture, information sharing, and team performance and provided support for the transfer of the Western-developed team I-P-O model to other cultures. Although total information sharing was related to Team Performance and culture (Power Distance, Individualism, and Uncertainty Avoidance), Situation Update was the only coded information sharing variable related to team performance. The effective teams exchanged more information and teams that were similar in cultural values engaged in similar information sharing during the beginning, middle, and end of the missions. Additionally, Individualism and Power Distance were significant moderators for Information Sharing content, but not Uncertainty Avoidance. Limitations, contributions and practical implications were discussed along with the look to the future for team research.

## **APPENDIX A: INFORMATION SHARING AND CODING SYSTEM**

TYPE	CONTENT	Definition	SABRE Examples
Task Direction	1. <i>Task Action</i>	Statements that include provisions or requests about instructing team members of how to proceed in the task.	<p>“Go ahead William.”</p> <p>“Scan it.”</p> <p>“Let’s move on.”</p> <p>“Click on dude and give a final report.”</p> <p>“Frank or Jacob, pick up the high fidelity sensor.”</p> <p>“We will start at 1<sup>st</sup> and 2<sup>nd</sup> avenue.”</p> <p>“Jacob and Frank will start on 2<sup>nd</sup> avenue.”</p> <p>“He will decide.”</p>
Situation Update	2. <i>Teammate’s Current Action</i>	Statements that include provisions or requests about what the <b>teammate(s)</b> are currently doing in the mission.	<p>“William, are you still conscious?”</p> <p>“Do you have tips you can share?”</p> <p>“You can see me on map”</p> <p>“The purple dot on 2nd street”</p>
	3. <i>Update on the Simulation / Task</i>	Statements that include provisions or requests of recently-acquired information about the <b>task or mission</b> .	<p>“Did you scan the door yet?”</p> <p>“Did everyone give a final status report?”</p> <p>“There can be a bomb.”</p> <p>“Only one lock pick.”</p> <p>“Can you unpick the lock?”</p> <p>“Do you have information about weapon?”</p> <p>“Do you need weapon sensor here?”</p>
	4. <i>Progress</i>	Statements that include provisions or requests about team’s performance status in the mission.	<p>“I marked it”</p> <p>“You just scored 100 goodwill points”</p> <p>“Goodwill 1150”</p> <p>“There are 26 minutes left”</p>
Planning	5. <i>Roles / Responsibilities</i>	Statements that include provisions or requests on how teammate(s) should divide the team responsibilities.	<p>“We will make two teams”</p> <p>“William and Nathan will be on team one.”</p> <p>“You are leader.”</p> <p>“What are going to be teams?”</p> <p>“Who is team one?”</p>
	6. <i>Goal setting</i>	Statements that include provisions or requests about goals for the team or specific actions team member’s need to take to address a goal.	<p>“The goal is to search as many locations as possible”</p> <p>“The objective is to gain many gw points”</p> <p>“What is our goal?”</p>



TYPE	CONTENT	Definition	SABRE Examples
Planning (continued)	7. <i>Strategy</i>	Statements that include provisions or requests about strategy for task performance. These statements are more firm declarations as compared to Task Option Generation Statements.	“Okay, so what is our plan?” “Let one team start from first avenue.” “Now, this is our communication plan. We will communicate by radio.”
	8. <i>Task Option Generation</i>	Statements that include provisions or requests about potential solutions to a problem. These statements are more suggestions and questions rather than Strategy statements.	“Can we start on 3rd avenue and search in a clockwise direction?” “I am just suggesting as the team leader that he is.” “Should we look in here?”
Supporting Behavior	9. <i>Backup behavior</i>	Statements that include provisions of support to team member(s) or requests for help by team member(s).	“We need help” “Help me” “Help me with this.”
Information Exchange	10. <i>Agreement</i>	Statements that express agreement with no rationale provided. Statements that confirm receipt of communication.	“Ok.” “Yes.” “Got it.”
	11. <i>Disagreement</i>	Statements that express disagreement with no rationale provided.	“I think that you are wrong.” “No.”
	12. <i>Uncertainty / Indifference</i>	Uncertainty statements explicitly express either general or specific uncertainty about the roles, tasks, situations, or anything else task-related.	“Heck, I don’t know” “I don’t care who is on my team.”
	13. <i>Greetings</i>	Statements that focus on salutations.	“Hi.” “Good bye”
Team Reinforcement / Punishment	14. <i>Exclamation</i>	Statements that have no grammatical connection to surrounding statements and emphatically expresses emotion.	“!!!” “?”
	15. <i>Positive Reinforcement / Positive Emoticon</i>	Statements that are positive comments on the nature of the experiment, team experience, and / or team performance.  Statements that are pleasant facial expressions pictorially represented by punctuation and letters.	“Thank you all for participating.” “It was a pleasure for me to play with you.” “You were great.” “We are a good team.” “☺” “.p”

TYPE	CONTENT	Definition	SABRE Examples
<p><b>Team Reinforcement / Punishment (continued)</b></p>	<p>16. <i>Negative Comments / Negative Emoticon</i></p>	<p>Statements that focus on expressing negative opinion about the nature of the experiment, team experience, and / or team performance.</p> <p>Statements that are unpleasant facial expressions pictorially represented by punctuation and letters.</p>	<p>“That really sucked.”  “We are terrible!”  “☹”  “.:”(</p>
<p><b>Other</b></p>	<p>17. <i>Incomplete / Filler / Miscellaneous</i></p>	<p>Statements that have no explicit meaning because they are missing one or more critical components of grammar: subjects, verbs, or objects.</p> <p>Statements that are words spoken to fill gaps.</p> <p>Statements that cannot be coded in any other category.</p>	<p>“William buddy”  “And you”  “IK”  “Umm”</p>

## **APPENDIX B: BACKGROUND QUESTIONNAIRE**

The background questionnaire is a pre-game survey. Included below is a screenshot of the first part of the survey, and then a complete list of the questions and answer choices.

**Survey**

### Background Questionnaire for 1

1 Age

2 Sex

- Male
- Female

3 What is your nationality?

- Norwegian
- Swedish
- Canadian
- American
- Dutch
- British
- Other

4 If Other, please specify.

5 How many years have you lived in this country?

6 How many languages do you speak?

7 List the languages you speak.

8 What is the highest degree you have completed?

- High School or equivalent
- Associate Degree or 2 years after high school
- Bachelor's Degree or equivalent
- Master's Degree or equivalent
- PhD or doctorate equivalent

Age

Sex

- Male
- Female

What is your nationality?

- Norwegian
- Swedish
- Canadian
- American
- Dutch
- British
- Other

If Other, please specify.

How many years have you lived in this country?

How many languages do you speak?

List the languages you speak.

What is the highest degree you have completed?

- High School or equivalent
- Associate Degree or 2 years after high school
- Bachelor's Degree or equivalent
- Master's Degree or equivalent
- PhD or doctorate equivalent

What is your current military rank (NATO standard)?

- OR
- OF-1
- OF-2
- OF-3
- OF-4
- OF-5
- OF-6
- OF-7
- OF-8
- OF-9

Is English your native language?

Yes  
No

How would you rate your ability to read and write in English?

Very Poor  
Poor  
Functional  
Fluent  
Very Fluent

Even though you may have a very good command of the English language, how often do you:

feel that you get more easily stressed when working in an English-speaking environment rather than in your native language?

Not Applicable  
Never  
Seldom  
Sometimes  
Often  
Very Often

become more reserved about presenting your point of view in English than in your native language?

Not Applicable  
Never  
Seldom  
Sometimes  
Often  
Very Often

Computer and Game Experience

What is your overall level of computer expertise?

Low : Seldom use computers  
Medium: Use computers often and are comfortable with them  
High : Use computers a lot and feel very comfortable about my abilities

Do you own a computer?

Yes  
No

Have you ever used any of the following collaboration tools (check all that apply)

Email

Daily  
Weekly  
Monthly  
Yearly  
Don't use

Web Browsers

Daily  
Weekly  
Monthly  
Yearly  
Don't use

Video Teleconferencing

Daily  
Weekly  
Monthly  
Yearly  
Don't use

Instant Messaging/Chat

Daily  
Weekly  
Monthly  
Yearly  
Don't use

Netmeeting/WebEx

Daily  
Weekly  
Monthly  
Yearly  
Don't use

Do you own or use often any of the following game consoles (check all that apply)?

Playstation 1 or 2  
Xbox  
Gamecube  
Personal Computer

Approximately how many hours per week, if any, do you spend playing computer games?

Approximately how many hours per week, if any, do you spend playing multi-player computer games?

Have you ever played the game Neverwinter Nights?

Yes

No

What computer games, if any, do you most often play?

Have you ever developed any mods for games?

Yes

No

If yes, please list the games:

Thank you!



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