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A FRAMEWORK FOR UNDERSTANDING CULTURAL DIVERSITY IN COGNITION AND TEAMWORK

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Abstract

Cultural competence is a critical enabler of effective performance on planned and *ad-hoc* multinational teams. The Army's Objective Force leaders and soldiers must understand cultural differences affecting team performance before they can learn adaptive behaviors that would ensure mission success when working with multinational partners. We studied processes of multinational teams running military peacekeeping operations at Stabilization Force (SFOR) headquarters in Bosnia-Herzegovina (B-H) to assess the degree to which cultural cognitive dimensions impact working level teamwork in a multinational headquarters. Several cognitive dimensions were identified as indicators of potential barriers of team performance in the areas of situation assessment, coordination, assigning roles and responsibilities, and support behavior. Findings were used to build a framework for considering the relationship among culture, social cognitive processes, and multinational teamwork. A methodology for building the framework is reviewed.

INTRODUCTION

Future military operations will be characterized by joint, interagency, and multinational (JIM) collaboration, and these operations will be business as usual by 2015 (Objective Force 2015, 2002). Whether fighting wars, countering terrorism, keeping the peace, or providing humanitarian assistance, the U.S. Army will not work alone. JIM operations will increase both the complexity and uncertainty of the mission and the probability of success. It is essential that the U. S. Army learn how to exploit the diversity inherent in JIM operations. The multinational alliances in Bosnia-Herzegovina and Kosovo are representative of this movement. A multinational alliance involves a complicated assembly of leaders, teams, cultures, networks, and systems. To operate within this environment the U.S. Army must be adaptable. Research has shown a lack of skill in multinational teamwork to be a significant barrier to adaptability (Klein & Pierce, 2001; Pierce & Pomranky, 2001).

Thesis

Researchers seek to improve the ability of the U.S. Army to perform in JIM operations by better understanding the cognitive differences among cultures and how to use that knowledge to improve team performance. Cultural competence will not only be a key enabler of decision making in these complex command and control (C²) configurations (Objective Force 2015, 2002) but it will also form the basis of team adaptability and performance. This effort is part of a new research program to link culture to teamwork and teamwork to performance in multinational teams. The efforts of the U.S. Army Research Laboratory (ARL) Human Research and Engineering Directorate (HRED) in establishing and testing a framework for guiding the study of multinational team performance as well as in developing methods and tools for rapid team development and adaptive performance are presented.

Theoretical Background: Cultural and Team Factors

Culture is derived from collective experiences arising from a group's social, political, and physical surroundings. Whereas the term "culture" could refer to any collective group experience (e.g., military culture or organizational culture), our focus was on national culture, or the values, beliefs, and cognitions that guide interpretation of unfolding events and social interactions on multinational military C² teams. Klein, Pongonis, and Klein (2000) provided the impetus for our work in this area. Their "Cultural Lens" model for looking at performance improvement on culturally diverse teams posits that interactions among members of multinational teams will improve if team members could see the world through each other's eyes.

Klein, Klein, and Mumaw (2001) found six dimensions of national culture to potentially impact military teamwork. For our research, we refined a subset of those dimensions: Power Distance (the extent to which the less powerful expect and accept that power is distributed unequally), Uncertainty Avoidance (the extent to which people feel threatened by uncertainty), Activity Orientation (the extent to which people emphasize independent accomplishments in terms of task over relationship), and Thinking Orientation (the extent to which one is capable of mentally playing out alternate strategies and imagining how they might have resulted in different outcomes).

The constructs of Power Distance and Uncertainty Avoidance were originally identified in Hofstede's (1980) seminal research in which he characterized national differences in values along a continuum. He proposed that culturally based behavior would vary, depending on where the individual's values fell along the continuum. While individuals of the same nationality have similar behavior patterns associated with Power Distance and Uncertainty Avoidance, their behaviors vary by degree. Behaviors associated with Activity Orientation also fall along a continuum. Kluckhohn and Strodtbeck (1971) asked, "What is the human orientation to activity?" and found that people define activity along a continuum from a "doing" orientation to a "being" orientation. Theoretical underpinnings of Thinking Orientation originate with cognitive development theory (Piaget, 1970) where differences in ability to think in abstract terms were viewed as a consequence of education. More recent work has

identified national group differences in cognitions associated with thinking (Markus & Kitayama, 1991; Norenzayan & Nisbett, 2000). One end of the Thinking Orientation continuum may be the ability to apply logical thinking to real objects or objects that are easily imagined (i.e., concrete thinking). The other end of the continuum may be hypothetical thinking or the ability to apply logical thinking to suppositional cases.

Cultural differences may be seen within a team context. Pierce (2002) proposed that situation assessment, coordination, roles and responsibilities, and support behavior are four fundamental aspects of team performance that are consistent across teams, multinational or not. Conceptualizing teamwork in these terms emphasizes cognitive functions that manifest in measurable behaviors (for a detailed review, see McGlynn, Sutton, Sprague, Demski, & Pierce, 1999). Behaviors associated with team functions are, for example, information exchange regarding team tasks, goals, and mission (situation assessment); response sequencing, time and position coordination of responses (coordination); load balancing, matching member resources to task requirements (assigning roles and responsibilities); and general activity monitoring, adjustments of team and member activities in response to errors and omissions (support behavior) (Fleishman & Zaccaro, 1992).

Individuals can have significantly different culturally based cognitive biases that influence their behavior. In concert with cognitive biases of others, these behaviors will either enhance or damage team performance. Leaders and team members who recognize those biases and understand the implication of culture's impact on situation assessment, coordination, assigning of roles and responsibilities, and support behavior are better prepared to adapt, as needed, to ensure mission success. We propose that the relationship between culturally based cognitive dimensions (Power Distance, Uncertainty Avoidance, Activity Orientation, and Thinking Orientation) and team performance functions (Situation Assessment, Coordination, Assigning of Roles and Responsibilities, and Support Behavior) can be behaviorally defined. Once defined, a framework for understanding cultural diversity in cognition and teamwork will provide insight into culturally based cognitive biases on teams that will further enhance our understanding of the relationship between cognitive behaviors and adaptive performance. This knowledge should lead to improved adaptive team performance in JIM operations.

Overview of Research

The goal of this work was to develop and validate a model representing the relationship between cultural dimensions and team performance functions. Data collection occurred over a period of 12 months wherein four trips were made to SFOR headquarters in Sarajevo, Bosnia-Herzegovina. ARL led a team of researchers that included representatives of the Army Research Institute (ARI), Klein Associates Inc., and retired military officers who served as subject matter experts (Brown, 2002). The first trip focused on introducing the project to the commander and key staff and included interviews of key leaders. Each subsequent trip targeted staff members in

successively lower echelons for participation. In this way, researchers were able to achieve a good cross section of SFOR military personnel both in terms of rank and staff element represented. On Trips 2 and 3, we ran focus groups and conducted semi-structured interviews with selected staff members to elicit

(1) perceptions of cultural similarities and differences, and (2) behavioral examples of cognitive processes. Field research conducted on Trips 1 through 3 is presented as Study 1.

Insights from analyses of data collected on Trips 1-3 led to the construction of a theoretically driven behaviorally based framework for studying the impact of culture on multinational teamwork and is presented as Study 2. The intent of this work was to develop an effective, workable tool that researchers could use as both a theoretical and behavioral reference when considering the relationship between cultural, social cognitive processes and multinational teamwork. The process of validation of the framework began on Trip 4 and is presented as Study 3.

STUDY 1: Field Research

Investigative research methods were used on Trips 1 through 3 to increase our understanding of operations in a multinational headquarters with particular emphasis on defining requirements for multicultural teamwork. Participants represented critical staff elements of a multinational headquarters operation.

Interviews

Scenario-based, semi-structured interviews were used to elicit information from the participants. Two platforms were used to present the scenarios. In the first, participants read one of several short scenarios realistic of assignments they may be given at SFOR headquarters. They then responded to questions asked by researchers. In most cases, one researcher led the interview while a second researcher took notes. The interviews were audio recorded but the recordings were difficult to hear. Because of the poor quality, the tapes were not transcribed.

We did not ask direct questions about the impact of cultural differences on teamwork. Instead, we used probes that were open ended and designed to indirectly reveal cognitive processes in teamwork. An example of a typical question would be, "How does the staff interact?" We also used statements followed by probes to draw out responses. For example, "Some team members may feel more comfortable with more structure . . . whereas others may have a looser way of operating. Have you experienced this? What has happened? How have members accommodated conflicting demands for information? What are the implications for teamwork?"

The second platform was computer based and used a scenario that required participants to have a more thorough understanding of military operations than the scenario used in the first platform. Michel, Ward, Hethcoat, and Fontenot (in press) developed the second, "Think Like a Commander," scenario. An operationally

relevant situation was presented and participants were then asked to “think like a commander.” The scenario posed a situation that a commander at SFOR headquarters might encounter. Participants responded to questions such as, “As commander, how would you handle urgent issues? How would you establish command? How would you analyze the problem? How would you deal with the media?” Results were similar for both platforms, but the set up for the second platform was more difficult and time consuming than the first. Subsequent administrations did not include the “Think Like a Commander” platform.

Participants were able to share thoughts and feelings about multinational teamwork that we may not have been able to tap into if we had used a structured interview format. Researchers were free to pursue participants’ streams of consciousness with probing questions of their own. Such questions included, “What are the advantages to multinational teamwork? Do you see any disadvantages? How does work really get done here at the headquarters?”

Focus Groups

Our research partners from ARI conducted focus groups on Trips 2 and 3. Holding focus group discussions served several purposes. They provided researchers with a rich background information about the mechanics of running a military peacekeeping headquarters as well as illuminated issues and concerns stemming from expected, and sometimes unexpected, cultural diversity. One researcher facilitated the discussions while a second researcher took notes. Sessions were not recorded. Guiding questions included the following: What preparation did you receive for this SFOR assignment? What is good about multinational teams? What problems are typical with multinational teams? What are the challenges of multinational teams? How does military culture affect multinational SFOR teams? What recommendations do you have for improving multinational teamwork at SFOR headquarters?

Key Findings

Examples of Power Distance, Uncertainty Avoidance, and Activity Orientation were evident in participant comments in the structured interviews and focus groups. Examples of Thinking Orientation were also evident, though to a lesser degree than those mentioned before. Distinct patterns were revealed in the degree to which individuals were judged to be high or low Power Distance. Uncertainty Avoidance responses showed that individuals were judged to have either a high need for certainty or a low need for certainty. Activity Orientation responses tended to reflect an independent versus interdependent orientation. Thinking Orientation responses were judged to indicate a tendency toward either hypothetical or concrete thinking. Figure 1 shows examples of statements made by SFOR officers during interview sessions or focus group discussions.

Statement judged to be reflective of:	Participant Statement	Participant Nationality
High Power Distance	[As team leader], "I would prefer people with a rank below mine."	Germany
Low Power Distance	"I expect the person to come back to me if someone needs more guidance."	Denmark
High need for Certainty	"It needs to be as detailed as possible to avoid training something that is not in the plan. We need strict guidance for everybody to follow."	France
Low need for Certainty	"My style is to give general guidance and let them work, especially if you work with your senior officers. Once I got an order with specific tasks. I was very upset."	France
Independent Orientation	"There is not enough work. I made up work, figured out what could be done to make the work better, easier."	UK
Interdependent Orientation	"My country is not so much devoted to work. We know how to enjoy life and family."	Spain
Hypothetical Thinking	"I'd lay out all the options, then decide. You have to have different solutions."	USA
Concrete Thinking	"When five solutions are presented, I have to review each again. This is a waste of time."	Italy

Figure 1. Representative Participant Statements

STUDY 2: Framework Construction

While theory provided the building blocks for construction of a 4 x 4 (Cultural Dimension x Team Function) matrix, findings from interviews and focus groups supported the effort. There are 16 cells in the 4 x 4 matrix representing the behavior of individuals performing a specific team function in a manner predicted by culturally based cognitions. Each of these 16 cells is subdivided into two categories to reflect the proposed endpoints of a specific cultural dimension continuum (see Figure 2 for framework shell). For example, cell 1 represents the relationship between Power Distance and Situation Assessment. It is subdivided into sub-cells A and B with cell 1A representing Situation Assessment behaviors judged to be high Power Distance and cell 1B representing Situation Assessment behaviors judged to be low Power Distance.

National Cultural Dimension	Team Performance Functions				
	Range	Situation Assessment	Coordination	Assigning Roles & Responsibilities	Support Behavior
Power Distance	High	Cell 1 A	Cell 2 A		
	Low	Cell 1 B	Cell 2 B		
Uncertainty Avoidance	High need for Certainty				
	Low need for Certainty				
Activity Orientation	Independent				
	Interdependent				
Thinking Orientation	Hypothetical			Cell 15 A	Cell 16 A
	Concrete			Cell 15 B	Cell 16 B

Figure 2. Framework Shell

Initially, we entered defining behaviors obtained from SFOR participants into the appropriate cell category, A or B. For example, a participant statement judged as reflective of high Power Distance was, “As team leader, I think it is important for information to flow through me, or my second, to the team. A single point of contact leads to efficiency and accuracy of information distributed.” That behavioral statement would appear in the “High Power Distance x Situation Assessment” cell 1 category A. A statement perceived to be reflective of low Power Distance for a participant performing the same function might be, “I don’t have a problem with team members sharing information before I see it, as long as they keep me informed.” That behavioral statement would appear in the “Low Power Distance x Situation Assessment” cell 1 category B.

This procedure proved to be cumbersome as we had a large number of behavioral examples to plot. Instead of entering all the behavioral examples found, we looked for descriptive phrases that captured the essence of our behavioral examples and placed the representative phrases in the cells. To continue with our example of cell 1A and 1B, one of the phrases associated with the behavioral example provided above for cell 1A was “vertical information flow” and one of the phrases associated with the behavioral example provided above for cell 1B was “horizontal information flow.”

In our final attempt to streamline the tool, we reviewed the phrases we had selected and the supporting behavioral examples. Our intent was to determine whether a single word could be found that identified behaviors in the cells. We selected words representing behaviors that were thought to be most relevant to the Army’s participation in JIM operations (i.e., adaptive and non-adaptive behavioral

descriptors). The result was a streamlined 4 x 4 (Cultural Dimension x Team Function) revised matrix that represented behavioral components of cognitive processes as they pertain to fundamental team performance functions (see Figure 3 for preliminary framework).

National Cultural Dimension	Team Performance Functions				
	Range	Situation Assessment	Coordination	Assigning Roles & Responsibilities	Support Behavior
Power Distance	High	Vertical	Centralized	Rank	Leader
	Low	Horizontal	Decentralized	Expertise	Team
Uncertainty Avoidance	High need for Certainty	Detailed Info	Well defined	Highly Specialized	Formal
	Low need for Certainty	General Info	Ad hoc	Multi-functional	Informal
Activity Orientation	Independent	Direct Comms	Doing	Skills & Abilities	Task
	Interdependent	Indirect Comms	Being	Connections	Relationship
Thinking Orientation	Hypothetical	Augmented Search	Situation Dependent	Overlapping	Relational Review
	Concrete	Limited Search	Routine	Set	Specific Review

Figure 3. Preliminary Framework

STUDY 3: Framework Validation

To test the validity of our streamlined 4 x 4 (Cultural Dimension x Team Function) frame, we needed to tap directly the cognitive processes at work when individuals performed fundamental team tasks. We posited that if the framework accurately represented the relationship between cultural dimensions and team performance functions, we should find behavioral examples in the responses to target questions. Our success in eliciting behavioral responses through interviews when collecting background data at SFOR headquarters solidified our decision to use interviews to validate the tool.

We chose a structured interview format with questions designed to draw out responses specific to a given cell in the Cultural Dimension x Team Function matrix. Sixteen questions were required (i.e., one question per cell). In other words, one question was developed for the Power Distance x Situation Assessment cell, one for the Power Distance x Coordination cell, one for the Power Distance x Assigning Roles and Responsibilities cell, and so on through 16 probing questions. The validation process itself involved participants, on an individual basis, reading a

scenario and responding to questions pertaining to the scenario during a 1-hour structured interview session. Verbal responses were required for 14 questions and written responses were required for two questions.

There were 17 participants (16 male and 1 female) representing seven nations who participated on an individual basis. The number of participants representing each nation was Canada (2), Netherlands (1), Portugal (1), Romania (1), Spain (2), United Kingdom (2), and the United States (8). There were 11 native English speakers and 6 participants who claimed English as a second language. Fourteen of 17 (82%) spoke two or more languages. All were officers or non-commissioned officers. All but one participant was on their first tour at SFOR headquarters, though 9 of 17 (53%) had previous NATO experience.

Scenario

The scenario involved participants imagining themselves as the leader of a five-member team, with team members representing at least five nations. Their hypothetical team was assigned the task of developing recommendations for improving the current newcomer orientation processes. Participants were instructed to keep the scenario and their role in mind when responding to interviewer questions.

Question Development

Question development was a four-step process. First, we reviewed behavioral examples as well as the questions that elicited those responses. We found one question that seemed to directly tap into both the cultural dimensions and team functions represented by each cell in the matrix. Next, we asked and answered each question ourselves. The purpose of this thought exercise was twofold, to see if our response to a given question (1) provided a behavioral example of the specific cultural dimension and team function represented by the cell, and (2) could be summarized by one of the two end point words in each cell's measurement range. For example, to the Power Distance x Situation Assessment question (Is it important that information flow to you first?), one researcher answered, "Any new critical information must come to me first." This answer clearly indicated the individual was "high" Power Distance. A response to the same question that would indicate that an individual was "low" Power Distance when dealing with situation assessment would be, "Get any new critical information to the person it affects most first and have him contact me as soon as possible."

The third step in question development was to sequence the questions. Sequencing was determined by logic (e.g., what order would make the most sense to participants). It was necessary to do this, rather than counterbalance questions based on the location in the matrix, to avoid participant confusion. For example, counterbalancing may have required the question from the cell Activity Orientation x Coordination (Would you have the team working together or independently?) to occur before the question from cell Uncertainty Avoidance x Assigning Roles and

Responsibilities (Will you have specialized roles and responsibilities on your team or will team members have multifunctional roles?).

The fourth and final step in the question development process, piloting the question set with volunteers in a multinational setting, also served the purpose of piloting the overall protocol for validation of the framework. We had four volunteers for the pilot, two Americans, one Canadian, and one German. Of the two U.S. representatives, one was a retired Lieutenant Colonel and another a Captain, both associated with the Fort Sill, Oklahoma, Depth and Simultaneous Attack Battle Lab. Canadian and German Liaison officers at Fort Sill formed the multinational faction. It was determined that the questions developed were appropriate for the task.

Protocol

Participants read and signed the volunteer affidavit and completed a demographic survey. At this time, they also completed a Tolerance of Ambiguity scale (Budner, 1962). Data collected from this scale were not used for validation purposes. Over a 4-day period, one interviewer conducted 17 interviews, each interview lasting 1 hour. The interviews were recorded for later transcription. During the interview, the interviewer asked probing questions, if necessary, to further draw out thoughts, insights, and behavioral examples of cognitive processes at work.

The same 16-item question set was used for each participant. A verbal response was required for questions 1 and 2 and 5 through 16. Responses to questions 3 and 4, representing the cells Activity Orientation x Coordination and Activity Orientation x Assigning Roles and Responsibilities, respectively, were provided in written format. After responding to interviewer questions 1 and 2, participants were given 10 minutes to compose an e-mail (memo) to their hypothetical team in the newcomer orientation scenario. The interviewer provided a laptop computer and participants used Microsoft Word to create the requested document. The documents were saved on a zip disk. In the next 20 to 25 minutes, participants responded, in sequence, to the remaining 12 questions posed by the interviewer.

When all questions had been answered, participants again used the interviewer's laptop computer to create another Microsoft Word document. This time, participants had 10 minutes to compose an e-mail (memo) to their hypothetical Chief of Staff, summarizing their teamwork efforts as discussed during the interview session. Following the second writing task, the interviewer opened the discussion to participants to share their overall perceptions of working on a multinational team. Finally, participants completed an experimental questionnaire designed to measure one's tendency to adapt. Data collected from this scale were not used for validation purposes.

Analyses and Results

Recorded interviews for each participant were transcribed into individual word documents. Written responses to questions 3 and 4 were then merged with those word documents to create 17 individual records, one per participant, of responses to 16 interview questions. Three independent raters assessed participants' responses in terms of the degree to which a given response indicated whether a behavior reflected high or low Power Distance, high or low need for certainty (Uncertainty Avoidance), an independent or interdependent orientation (Activity Orientation), or hypothetical or concrete thinking (Thinking Orientation) as they pertained to situation assessment, coordination, assigning roles and responsibilities, and support behavior.

Raters carefully studied participant responses to the 16 targeted questions, looking for behavioral indicators that were similar to the behaviors described for each cell. A rating of 1 was given if the expressed words indicated a strong behavioral preference for low Power Distance, low need for certainty, an interdependent Activity Orientation, or a concrete Thinking Orientation. A rating of 2 was given if the expressed words indicated a strong behavioral preference for high Power Distance, high need for certainty, an independent Activity Orientation, or a hypothetical Thinking Orientation. For those participant responses where the expressed words contained behavioral examples that were not easily categorized, raters separated the response into behavioral phrases for closer examination. If, at that point, it was determined that the overall response indicated a behavioral tendency, a rating of 1 or 2 was given, as appropriate. If it was determined that the overall response did not indicate a behavioral tendency, a rating of 0 was given. The 0 rating indicated "not rated." Rating discrepancies among the three raters were discussed and consensus was reached on the appropriate rating for each cell in the matrix for each participant.

Data were collapsed across team functions because of the small sample size. Additionally, we collapsed the data across nationality to reflect American versus non-American results. Categorical analyses of cultural, social cognitions revealed several behavioral trends. American participants tended to be higher Power Distance ($M = 1.45$, $SD = .11$) than non-American participants ($M = 1.36$, $SD = .09$). Whereas behavioral examples of Uncertainty Avoidance occurred relatively frequently for American and non-American participants, there was little difference between the groups in terms of the degree to which either group had a high or low need for certainty (American $M = 1.4$, $SD = .10$; Non-Americans $M = 1.44$, $SD = .09$). American participants demonstrated a slightly greater tendency toward an independent Activity Orientation ($M = 1.58$, $SD = .09$) than non-American participants ($M = 1.51$, $SD = .09$). However, both groups exhibited a wide range of individual differences. There was a paucity of responses to evaluate regarding Thinking Orientation. Even so, American participants tended to be hypothetical thinkers ($M = 1.61$, $SD = .10$) compared to non-American participants ($M = 1.45$, $SD = .09$) who demonstrated a tendency toward concrete Thinking Orientation.

Conclusion

Even with a small sample size, we were able to determine that the data supported the proposed relationship between cultural dimensions and team performance functions. Specifically, we found behavioral examples judged to be reflective of the measurement endpoints for each cell in the matrix. Results were strongest for the constructs of Power Distance, Uncertainty Avoidance, and Activity Orientation. Behavioral examples clearly fell into one of those three construct categories.

Results were weaker for the construct of Thinking Orientation. One hypothesis is presented as a possible explanation for this finding. It could be that behavioral components of one's Thinking Orientation are, in fact, profiles comprised of specific sets of Power Distance, Uncertainty Avoidance, and Activity Orientation behaviors. For example, behaviors associated with low Power Distance, low need for certainty, and an interdependent Activity Orientation, may reflect a hypothetical Thinking Orientation. Behaviors associated with high Power Distance, high need for certainty, and an independent Activity Orientation, may reflect a concrete Thinking Orientation. Until such time that this hypothesis is empirically studied, the Thinking Orientation dimension will not be included in our framework for understanding the relationship between cultural dimensions and team performance functions.

The framework was modified to reflect a 3 (Power Distance, Uncertainty Avoidance, Activity Orientation) x 4 (Situation Assessment, Coordination, Assigning Roles and Responsibilities, and Support Behavior) configuration (see Figure 4 for framework for understanding cultural diversity in cognition and teamwork).

Framework for Understanding Cultural Diversity in Cognition and Teamwork					
National Cultural Dimension	Team Performance Functions				
	Range	Situation Assessment	Coordination	Assigning Roles & Responsibilities	Support Behavior
Power Distance	High	Vertical	Centralized	Rank	Leader
	Low	Horizontal	Decentralized	Expertise	Team
Uncertainty Avoidance	High need for Certainty	Detailed Info	Well defined	Highly Specialized	Formal
	Low need for Certainty	General Info	Ad hoc	Multi-functional	Informal
Activity Orientation	Independent	Direct Comms	Doing	Skills & Abilities	Task
	Interdependent	Indirect Comms	Being	Connections	Relationship

Figure 4. Framework for understanding cultural diversity in cognition and teamwork

DISCUSSION

Collaboration on multinational teams, whether to combat terrorism or keep the peace, places a premium on cultural competence and adaptable teamwork. As we begin to define what constitutes adaptable behavior on multinational military teams, we must look closely at the value of understanding the effect of culture on teamwork. Many barriers to adaptability are directly attributable to cultural cognitive diversity. Following are just a few examples noted by ARL social science researcher, Elizabeth Bowman (2002):

Power Distance

- If team members are high Power Distance, they may not share information that could alter a decision, believing that it is the leader's responsibility to make decisions.
- If a leader is high Power Distance, team members may not be used to exploit their best skills, possibly resulting in miscommunication, lack of coordination, and loss in shared situational awareness.

Uncertainty Avoidance

- If team members have a high need for certainty, they may ask for so much guidance and information that they no longer provide unique contributions to the task.
- If a leader has a high need for certainty, the task may become so detailed and structured that it obviates any creative action on the part of the team members, thereby defeating the purpose of team action. The corollary to this condition is...
- If the leader has too low a need for certainty, he may not cover sufficient details in an operation and not provide team members with enough information for them to do their jobs.

Activity Orientation

- If team members have an independent rather than an interdependent orientation, they may be moving from task to task without developing a team culture or team situational awareness.
- If a leader is independent rather than interdependent oriented, he may disregard some team members' contributions if they don't obviously contribute to the task at hand. Information and opportunities for shared situational awareness may be lost.

Thinking Orientation

- If leaders and team members are too hypothetical in their thinking, it may be difficult to reach closure on an issue as members continue to generate hypotheses.
- If leaders and team members are concrete thinkers, they may miss information that may be relevant to a task but outside the mainstream.

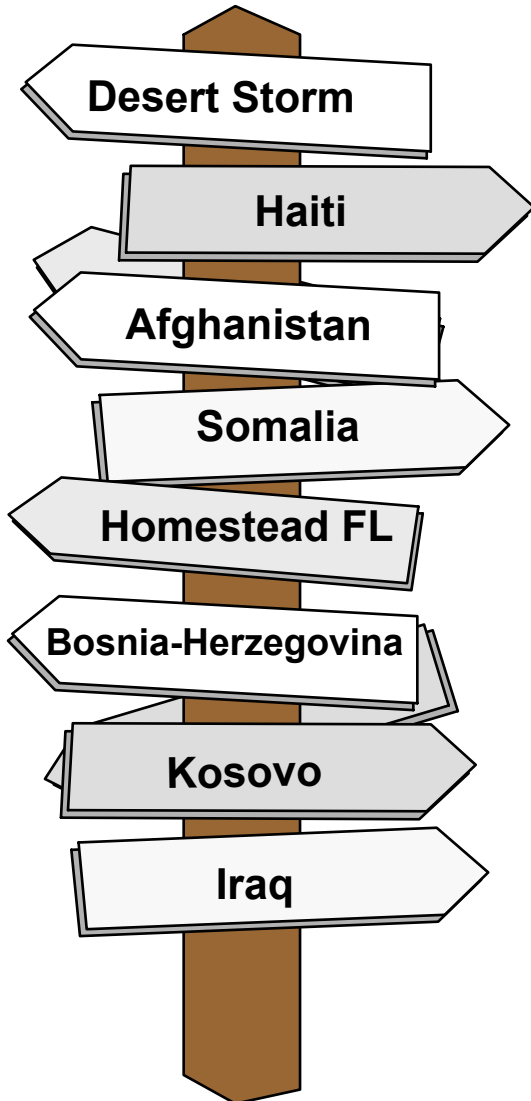
The central purpose of this program of research is to facilitate adaptable teamwork, specifically on multinational military teams, through development of Objective Force leader and soldier learning opportunities. We will continue to expand our understanding of the relationship between cultural, social cognitions and team performance functions through theoretical and practical research in collaboration with members of the multinational team commanding forces in B-H and other multinational venues, as they open. Framework design is an evolving process. Specifically, selection of representative dimensions of cultural variability may be revised to include one of the most researched in relation to cognitive processes, the Individualism and Collectivism dimension.

Using the framework as a basis, we will develop products to increase cultural awareness and multinational team adaptability. Next steps include evaluation of performance measures that predict adaptable team performance and development of a Likert-type scale to measure the degree to which team members' cognitions of Power Distance, Uncertainty Avoidance, and Activity Orientation can affect team situation awareness, coordination, assigning roles and responsibilities, and support behavior.

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A Framework for Understanding Cultural Diversity in Cognition and Teamwork

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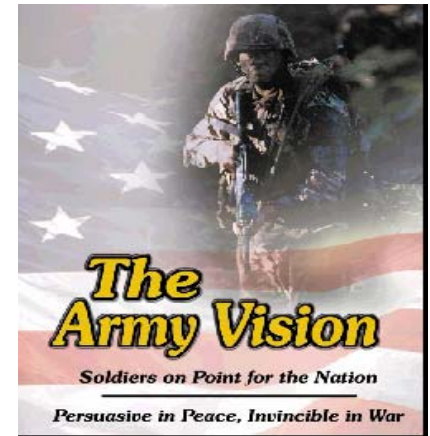
Army Research Laboratory

Human Factors Integration Division

Human Research and Engineering Directorate

Uncertainty and Adaptability

- Objective Force operational environment will be characterized by greater access to information and increased operational **uncertainty**.
- A focus of the ARL HRED Command and Control Research program is to improve leader and team **adaptability** to meet Objective Force requirements.



- Uncertainty is a sense of doubt that blocks or delays action.

- Uncertainty results from:

- Incomplete Information
- Inadequate Understanding
- Undifferentiated Alternatives

- Strategies for coping with uncertainty include:

- Over-Planning
- Delay of Action
- Adaptability

- Adaptability is a way to cope with uncertainty.

- Adaptability is achieved by:

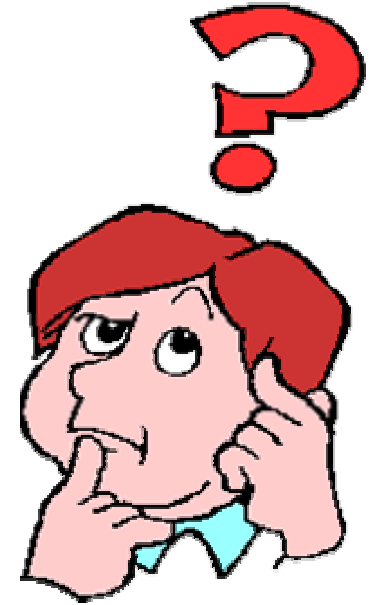
- Recognizing the need to adapt
- Understanding how to adapt
- Having the resources to adapt
- Choosing to adapt

- Adaptability is influenced by:

- Practice
- Expectations
- Preparation
- Technology

Research Question

How is teamwork affected by culture?



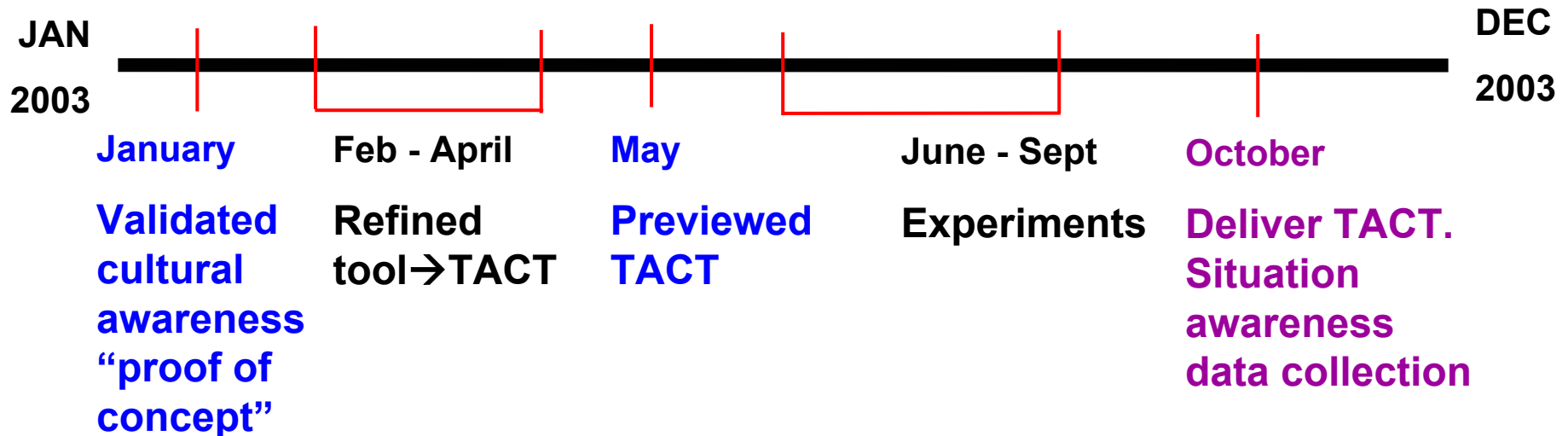
Research Objective

Improve performance on multinational teams.

- **Develop models**
- **Develop and test training tools**

**Groundwork for developing recommendations for
information systems design and collaborative tools
for multinational teamwork**

Time Line



Barriers to Adaptability

- **Lack of Trust**

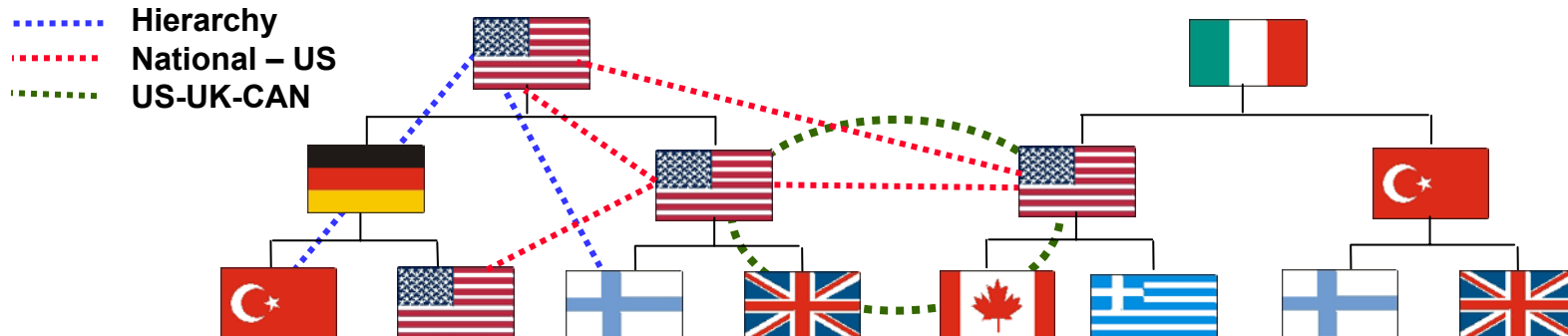
- Unsure of team member capabilities
- Closely monitor task performance to insure understanding and compliance
 - Time consuming
 - Perception of distrust and micromanagement
- Tendency to work vertically, rather than horizontally within or across teams (by the book)
- Tendency to work within national teams both horizontally and vertically

- **Lack of Cohesion**

- Lack of commitment to the HQ SFOR team
- Lack of acceptance of team goals
- Slow team building

- **Focus on Efficiency**

- Limits information exchange
- Discourages risk taking or creativity





Theoretical Basis

Teamwork

- Similarities in functions exist across team taxonomies (Dickinson & McIntyre, 1997; Fleishman & Zaccarro, 1992)
- Team performance depends on many factors including team members' knowledge, skills, and abilities relative to a task or the team (Cannon-Bowers & Salas, 1997)
- Conceptualizing teamwork in terms of situation assessment, assigning roles and responsibilities, coordination, and support emphasizes cognitive functions that manifest in measurable behaviors (McGlynn, Sutton, Sprague, Demski, & Pierce, 1999)

Culture

- Individuals have similar culturally based behavior patterns associated with cognitive values or dimensions, that vary by degree (Hofstede, 1980; Kluckhohn and Strodtbeck, 1971)
- Interactions among members of multinational teams will improve if team members could see the world through each others' eyes (Klein, Pongonis, and Klein, 2000)
- Dimensions of national culture potentially impact multinational military command and control teamwork (Klein, Klein, & Mumaw, 2001)

Linking Culture to Teamwork and Teamwork to Team Performance

Teamwork Functions

Situation Assessment: Sharing of information among team members on resources and constraints, task and goals, and priorities.

Coordination: Activity pacing, response sequencing, time and position coordination.

Assigning Roles and Responsibilities: Matching members to tasks.

Support Behavior: Assisting team members in monitoring and correcting errors, and providing back-up to other members.

Cultural Dimensions

Power Distance: The extent to which unequal distribution of power is accepted and expected.

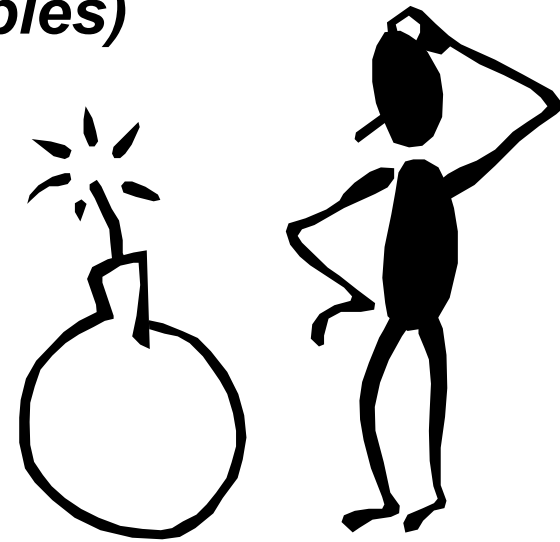
Uncertainty Avoidance: The extent to which uncertainty is experienced as stressful and actions are taken to avoid it.

Activity Orientation: The extent to which independence or interdependence is emphasized.

Potential Impact (Examples)

•Power Distance

➤If a leader is high Power Distance, team members may not be used to exploit their best skills, possibly resulting in miscommunication, lack of coordination, and loss in situational awareness.



•Uncertainty Avoidance

➤If a leader has a high need for certainty, the task may become so detailed and structured that it obviates any creative action on the part of team members, thereby defeating the purpose of team action.

•Activity Orientation

➤If a leader is highly independent-oriented, the leader may disregard some team members' contributions if they don't obviously contribute to the task at hand. Information and opportunities for shared information may be lost.

Framework for understanding the relationship between cognitions and team functions

End Point		Situation Assessment	Coordination	Roles & Responsibilities	Support Behavior
Power Distance	High				
	Low				
Uncertainty Avoidance	High Need for Certainty				
	Low Need for Certainty				
Activity Orientation	Independent				
	Interdependent				

Framework for understanding the relationship between cognitions and team functions

	End Point	Situation Assessment	Coordination	Roles & Responsibilities	Support Behavior
Power Distance	High	Vertical	Centralized	Rank	Leader
	Low	Horizontal	Decentralized	Expertise	Team
Uncertainty Avoidance	High Need for Certainty	Clear Info	Well-defined	Highly Specialized	Formal
	Low Need for Certainty	Ambiguous Info	<i>Ad-hoc</i>	Multi-functional	Informal
Activity Orientation	Independent	Direct Comms	Doing	Skills & Abilities	Task
	Interdependent	Indirect Comms	Being	Connections	Relationship

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Hypotheses:

- Barriers to Adaptability are created by High Power Distance**
- Barriers to Adaptability are created by High Need for Certainty**

Framework Validation

•Participants

- 17 participants (16 male, 1 female)
- 7 nations represented
- Native English speakers or ESL speakers
- 94% first tour at HQ SFOR
- 53% previous NATO experience

•Scenario-based, Structured Interview Format

- 12 questions (1 per cell)
- Sessions tape recorded

•Data transcribed and coded

- 3 transcribers also rated content
- Consensus reached on rating discrepancies



Scenario



Task: Assemble a team and re-design Newcomers' Orientation

Suspense: 30 days

Restriction: Must include representatives of at least 5 nations

Example of Targeted Questions

	End Point	Situation Assessment	Coordination	Roles & Responsibilities	Support Behavior
Power Distance	High	PD x SA			
	Low				
Uncertainty Avoidance	High Need for Certainty				
	Low Need for Certainty				
Activity Orientation	Independent				AO x SB
	Interdependent				

PD x SA Question Asked: *Is it important that information flow to you first? Why or why not?*

AO x SB Question Asked: *If you received confusing information from one team member, who would you request help from to clarify this information? Why?*

Framework Validation *continued*

•Categorical Analysis

- Data collapsed across team functions due to small sample size
- Data collapsed across nationality to reflect American versus non-American results.
- Data collapsed across language to reflect native English speaker versus non-native English speaker results

•Results*

	Americans		Native English Speakers		Non-Native English Speakers	
	Mean	SD	Mean	SD	Mean	SD
Power Distance	1.45	.11	1.39	.09	1.43	.14
Uncertainty Avoidance	1.40	.10	1.41	.08	1.50	.14
Activity Orientation	1.58	.09	1.51	.08	1.63	.13

**Non-significant*

Cultural Awareness Training



- **Klein Associates, Inc. “Proof of Concept”**
- **Army Research Laboratory: Training Adaptable Coalition Teamwork (TACT)**

“Proof of Concept” Usability Survey

•Participants

- **60 participants (57 male, 3 female)**
- **18 nations represented**
- **Native English speakers or ESL speakers**

•Measurement materials

- **Paper and pencil usability survey**
- **Pre- and Post-test***
- *Discontinued due to time constraints.**



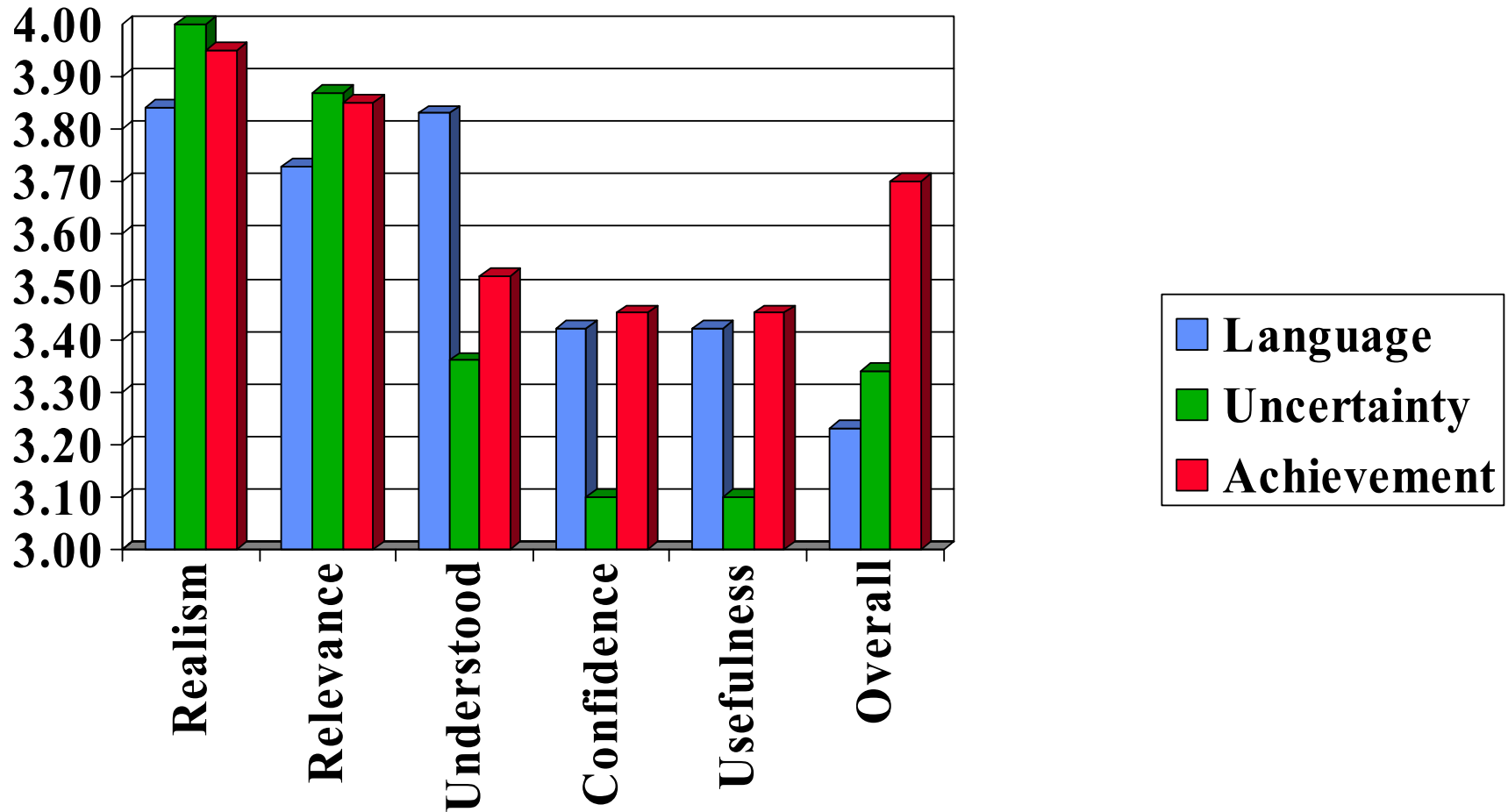
Computer based training

•Three modules

- **Language (19 participants)**
- **Tolerance for Uncertainty (20 participants)**
- **Achievement Orientation (21 participants)**

Survey Items

Five-point scale (1 – 5); Rating of 5 is a better rating than 1



Opportunities for Improvement

- **Written Comments**

- **Increase content**
- **Increase student interaction with the computer**
- **Embed knowledge assessments**
- **Decrease difficulty for non-native English speakers.**



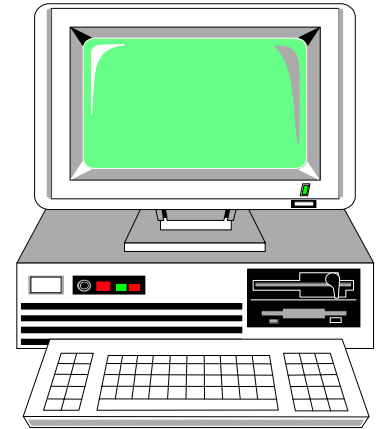
**Data supported initiation of
an iterative process of
refine, test, and refine for
the training tool.**

Training Adaptable Coalition Teamwork (TACT)

Leaders and teams that recognize culturally based biases and understand the implication of culture's impact on fundamental team performance functions are better prepared to adapt, as needed, to ensure mission success.

Self-paced computer-based training (CBT) tool

The training focus is on national culture, or the values, beliefs, and thoughts that guide interpretation of unfolding events and social interactions on multinational military command and control teams.



Military Peacekeeping Officers learn:

- Ways to help reduce or avoid teamwork problems due to culturally based cognitive differences**
- Ways for turning cultural diversity into mission strengths**

Dissemination of Results

Framework Concept

- **ARL-HRED, Human Factors Integration Division, Technical Advisory Board, June, 2003**
- **8th International Command and Control Research and Technology Symposium, June 2003, National Defense University, Washington, D.C.**

“Proof of Concept”

- **HFES 47th Annual Meeting, Oct 2003, Denver, Colorado**



Related Work

NATO Concept Development and Experimentation (CDE)

- **Proposal titled “Leader and team adaptability in multinational coalitions: Cultural diversity in cognition and teamwork”**
- **Valuable opportunity for the international community to synchronize efforts to develop adaptive leaders and teams**

Small Business Innovative Research (SBIR) 03.2 Topic

- **Solicitation titled “Advancing the Objective Force through multinational coalitions and interagency task forces”**
- **Offers agile, free thinking, small, high tech companies the opportunity to generate innovative and significant solutions to meet soldier needs**

Back up slides

Question Set



•Situation Assessment

- **Power Distance:** Is it important that information flow to you first? Why or why not?
- **Uncertainty Avoidance:** As the team is operating, how much detail do you want?
- **Activity Orientation:** When providing a status update, would you update the team as a whole or each member individually?

•Roles & Responsibilities

- **Power Distance:** What issues would you take under consideration in assigning roles & responsibilities for coming up with suggestions for improving the orientation program?
- **Uncertainty Avoidance:** Will you have specialized roles and responsibilities on your team or will team members have multifunctional roles?
- **Activity Orientation:** What decision criteria did you use to assign responsibilities?

Question Set *continued*



•Coordination

- **Power Distance:** How are decisions made?
- **Uncertainty Avoidance:** Would you plan for the meetings or have them as things come up?
- **Activity Orientation:** Would you have the team working together or have them working independently?

•Support Behavior

- **Power Distance:** How will progress toward the goal be monitored and who will be responsible to correct errors that come up?
- **Uncertainty Avoidance:** How do you like progress updates, more on the formal or the informal side?
- **Activity Orientation:** If you received information from one team member that was confusing, who would you request help from to clarify this information? Why would you choose this person to turn to?