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Intercultural Interaction of Russian-American Space Crews

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INTERCULTURAL INTERACTION OF

RUSSIAN-AMERICAN SPACE CREWS

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TABLE OF CONTENTS

INTERCULTURAL INTERACTION OF RUSSIAN-AMERICAN SPACE CREWS

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NASA has recently directed the United States into the largest global partnership in U.S. history -- the development of an International Space Station. In order to collaborate successfully in this unique setting, participants must develop a strong sense of teamwork, camaraderie, and partnership. Previous research indicates a variety of factors, such as differences in cultural background and environmental factors, that may affect the ability to develop these successful relationships. This study analyzes cultural variance and disclosure dynamics between Russian cosmonauts and American astronauts.

CHAPTER ONE: PURPOSE OF THE STUDY

We are standing on the edge of a new era . . . an era filled not only with the wonders of space yet unexplored but also an era of advancement, achieved through international partnerships of a magnitude before unseen. The National Aeronautics and Space Administration (NASA) has recently directed the United States into the largest global partnership in U.S. history.[1] Sixteen countries have joined forces to design and build the first-ever International Space Station. This orbiting laboratory and research module allows scientists to analyze the effects of weightlessness on the human body and on growth and development of new medicines. Engineers can also use the low-gravity setting to test new technologies that could benefit everyone on earth. Beyond these medical and technological breakthroughs, however, lies the implicit desire of the participants to show the world that countries can successfully work together on a project of peace, particularly former adversarial giants like the United States and Russia.

In order to collaborate successfully in this unique setting, participants must develop a strong sense of teamwork, camaraderie, and partnership. Previous research indicates a variety of factors that may affect the ability to develop these successful relationships, such as cultural differences (Gudykunst, 1985a, 1985b) and contextual circumstances (e.g., Altman & Haythorn, 1965; Derlega & Grzelak, 1979). This study postulates that researching crew interaction during previous and current international space missions provides a unique opportunity to examine the interplay and impact of both factors on relationship development. Researching this unique group could not only add

to our understanding of intercultural relationships but it could also create a direct benefit for organizations involved in space ventures now and in the future by drawing their attention to cultural issues which may have been overlooked.

Beginning in earnest with their 1975 research expedition, the Apollo Soyuz Test Project, America and Russia developed a history of space partnership that helped pull them both from the icy depths of the Cold War (Smith, 1988). Since that time, the two countries have successfully cooperated in numerous space projects, the most recent of which is the International Space Station. Operating successfully in this unique bicultural partnership requires representatives from both countries to effectively communicate with each other, not just technically during mission projects (i.e., relaying work orders in another language) but also interpersonally as members of the same team. Unfortunately, America has yet to fully prepare its workforce for international collaborations, despite the fact that we have long anticipated our current global economy. Most workers simply "muddle through" (Derderian, 1993, p.9) the intercultural encounter, never understanding the needs of those they work with or serve.

Santy, Holland, Looper, and Marcondes-North (1993) surveyed 20 NASA astronauts about their previous intercultural interactions during shuttle missions. The astronauts, among other things, reported the emergence of various "critical incidents" which arose because of cultural misunderstandings. The nature of each incident was analyzed and later determined to be a result of intercultural difficulties in four primary areas: 1) "cultural or national differences" such as personal grooming habits; 2) "personality conflicts"; 3) "lack of operational experience" of non-U.S. crew members; and 4) "difficulties with the parent or national organization" (p.198) such as the former

Communist Party. Most astronauts responding to the Santy et al. study expressed a desire for more personal contact through joint training with international crew members. Many also advocated the distribution of personal background information about crew members prior to the mission.

In a related study by Kanas, Salnitskiy, Grund, Gushin, Weiss, Kozerenko, Sled, and Marmar (2000), Russian cosmonauts echoed the same desire for better cultural understanding prior to a mission. According to these cosmonauts, missions involving two representatives from one country and one representative from another country often created feelings of isolation and restrictive expression because the crew member in the cultural minority felt displaced. Arguably, many other countries worldwide are as ill-prepared for multinational encounters as the U.S. Verluyten (1997), for example, cites research carried out in several Central and Eastern European corporations which found that many European workers have received no specific intercultural training.

We cannot be surprised, then, if multinational endeavors of the magnitude of a space mission create significant obstacles to effective communication among representatives from different countries. Yet as our problems mount and our business boundaries disappear, it becomes evident that "intercultural cooperation has become a prime condition for the survival of mankind" (Hofstede, 1997, p. 241). Despite inherent difficulties, then, individuals *must* find a way to form reliable interpersonal relationships during multinational projects. Our current economy demands it. We must find a way to open our hearts and minds to others unlike us.

One communication strategy which can enrich relationship development between interactants is disclosure. Originally discussed by researches such as Altman and Taylor

(1973), Derlega and Grzelak (1979), and others, disclosure by one interactant to another in a communicative situation establishes social connections and serves as a "vehicle for developing close relationships" (Derlega & Grezelak, p.154). It is highly probable that successful relationships created during past space missions evolved due to reciprocal disclosure by crew members of each country during their interaction. Yet, at the time of the Santy et al. (1993) study, personal information was not regularly distributed prior to the mission, and crew members often met as complete strangers.

Many researchers have also determined that more disclosure will occur when it benefits both parties (Altman & Haythorn, 1965; Derlega & Grzelak, 1979). In the case of a space mission, we might assume that the importance of the mission and the potential for disasters in a space environment would elicit similar disclosure patterns among all representatives, causing earlier disclosure simply due to the uniqueness of the environment. However, contrary to this assumption is the research by Jourard (1961), Carbaugh (1993) and others which reveals distinct differences in disclosure patterns among individuals from diverse cultural backgrounds. The incongruous nature of this research makes it difficult to surmise which factor--cultural or environmental or perhaps one unknown as yet--would have the most impact on disclosure among crew members.

This research project analyzes the impact of various factors on relationship development in order to determine which might have the most influence on disclosure patterns. First, previous research concerning the effects of culture and environment on disclosure patterns was reviewed. Next, Russian cosmonauts and American astronauts were interviewed to gather data about previous partnered missions and the relationships that developed among crew members. The descriptive narrations offered by crew

members were then analyzed to uncover cultural value differences and variances in disclosure patterns, as well as to unearth the factors primarily responsible for disclosure differences.

An examination of international space crew interaction is worthwhile for a variety of reasons. Studying relationship development by reviewing the experiences of those who participated in a real-life scenario validates the findings proffered by laboratory research. Though the observation of human communication in a controlled setting offers insight into behavior, it will arguably remain inferior to analyzing a genuine interaction.

Additionally, any research that adds to our understanding of interpersonal communication substantiates the existence of communication as a constructive field of study, particularly if the findings benefit human interaction. This study of interpersonal communication development in an isolated, intercultural environment could reveal valuable information which may ease relations in future international situations. For example, in the past space exploration was strictly the domain of government employees and perhaps science fiction authors. It is possible, however, that in the future these controlling entities may relinquish near-space settlement to the corporate world so they can focus their efforts on joint deep-space exploration and improved technological research. My hope in this research is that valuable information gained through interviews with current space explorers will not only benefit current space explorers by offering them new insight into their crew relationship development patterns but that it may also enhance intercultural interactions of future civilians venturing into space.

Before discussing the experiences of the astronauts and cosmonauts, it is necessary to review previous academic research on cultural values and disclosure

patterns. Specifically, several studies that sought to determine if intercultural and environmental issues could impact disclosure patterns are summarized. As will be seen in Chapter 2, the findings were often contradictory, thus ensuring this research project was worthy of pursuit.

CHAPTER 2: REVIEW OF LITERATURE

Altman and Taylor (1973) first discussed self-disclosure in terms of its usefulness in the development of social relationships. According to their theory of social penetration, humans in communicative interaction strive to know one another more intimately. Individual personalities are composed of levels of information, ranging in content from vague, impersonal opinions to highly intimate feelings and emotions. Altman and Taylor succinctly compared this concept to the description of an onion, where the core of an individual is surrounded by layers of unknown information. Penetrating those layers and reaching the core requires many interactions and behaviors, including the disclosure of progressively more intimate information as the relationship develops. In order to facilitate closeness, communicators reveal certain aspects of their personalities or pasts to others. This action of revealing is defined as social exchange, or self-disclosure.

Self-disclosure has been defined generally by Wheeless and Grotz (1976) as merely the tendency to reveal information and by Derlega and Grzelak (1979, p. 152) as "any information exchange that refers to the self." Cooper (1994), however, describes disclosure in more specific terms, as a communication tool used for exclusive purposes such as impression formation, social attraction, and trust. Dindia (1985) groups disclosure research into categories such as the effect of self-disclosure on one's own behavior (e.g., intimacy actions) and the effect of disclosure on the behavior of others. In her study,

Dindia determines that individuals often reciprocate disclosure and adjust their physical proximity to more appropriately match the disclosure level in a conversation.

Previous studies of disclosure have sometimes focused on relationship development and maintenance in a family or between marital partners (e.g., Morton, 1978). One can argue here that crew structures aboard an international space mission are similar social systems in that they are "interdependent . . relational networks characterized by a dynamic equilibrium and positive and negative feedback loops" (Morton, 1978, p. 72). This argument is supported by Taylor and Altman (1975), who examined disclosure between sailors who believed they were embarking either on a short-term or long-term submarine assignment in isolation with a stranger. Their findings reflected a desire by sailors who believed they were entering into long-term isolation to converse more when the initial conversation was continuously positive, or even when the conversation began negatively but became positive as the interaction progressed. The findings seem to imply that the prospect of long-term confinement encourages disclosure as a way to promote relationship development and camaraderie.

Though it is not mentioned specifically in the Taylor and Altman (1975) study, it is reasonable to assume that their subjects were American sailors. Therefore, despite the value of the disclosure research mentioned above, it provides us with only an intracultural perspective. Intercultural relationship issues and their effect on disclosure patterns must also be considered.

Cultural Issues and their Impact on Disclosure

In 1997, Hofstede decided to revisit his pioneering intercultural research

published 17 years earlier (Hofstede, 1980). By examining work-related values reported by international IBM employees, he developed a set of cultural dimensions to describe the unique actions, apparent thought-processes, and visible value systems which appear to vary across cultures. These dimensions included individualistic vs. collectivistic approaches to goals; small and large power distance preferences; masculine and feminine societal action; and weak and strong uncertainty avoidance. Hofstede offers this information not as another dividing line but as a way to prepare others to anticipate differences among individuals from varied cultures. Presumably, advance knowledge of cultural differences could improve an individual's rate of success in future intercultural encounters. As Hofstede (1997, p. 235) states, "[e]verybody looks at the world from behind the windows of a cultural home." Therefore, ignoring these differences will certainly lead to miscommunication.

Chen (1989) later developed an interpersonal communication framework which he also hoped would allow individuals to interact more successfully in an intercultural environment. The framework, or grid, he created outlined a set of skills deemed necessary for a communicator to possess in order to effectively interact with a person from another culture. Chen's (1989, p. 121) grid included "personal attributes" like self-disclosure habits; "communication skills," such as interactional behavior; "psychological adaptation" to, for example, stressful situations; and "cultural awareness" of another's values and customs. His research on these dimensions revealed the importance, as well as the interplay, of the many factors involved in intercultural encounters.

One example of the importance of obtaining effective intercultural communication skills is evident in a study by Carbaugh (1993) which examined public

conversations between an American TV talk show host and a Russian audience. The typical problem-debate format of the show, which is highly successful in the U.S., did not work well in Russia, particularly when discussing sensitive subjects such as sexual activities. In his study, Carbaugh (1993) found three national characteristics evident within the public dialogue, namely three differences in topical disclosure created by the context (public vs. private forum) of the situation: 1) those topics deemed acceptable for discussion; 2) the intensity at which topics can be discussed; and 3) the depth at which a topic can be discussed. Carbaugh found that many Russians desired to discuss important topics only with confidants while maintaining a cool, respectable distance when communicating with those outside the Russian culture. This variance in what is deemed appropriate for each communication forum creates "a dual quality in the Russian person" (p.194).

Interestingly, the findings of a Fernandez, Carlson, Stepina, and Nicholson (1997) study on cultural variance might explain the duality detected by Carbaugh (1993). Fernandez and her colleagues revisited Hofstede's research to determine if any shifts had occurred in cultural behavior over the years. They also chose to study representatives from different organizational backgrounds instead of focusing on employees from the same company. Additionally, they hoped to include valuable new information on individuals from China and Russia. Through their research, Fernandez et al. found Russia to be quite collective in nature, explained by Hofstede (1997, p.260) as a tendency to relate to outsiders through united fronts or "cohesive ingroups . . . [designed] to protect them."

This classification might well explain the dual nature discovered in Carbaugh's (1993) study of Russian public speech. Unless a relationship with someone outside the communicator's ingroup has advanced to a more intimate level, Russians may prefer to maintain interpersonal distance in communicative interactions, discussing only the most trivial topics. An examination of disclosure by Goodwin, Nizharadze, Luu, Kosa, and Emelyanova (1999) supports this explanation. These researchers focused on the disclosure patterns and values communicated by members of three formerly communist nations (Russia, Hungary, and Georgia). Though differences were slight, Hungary was classified as more collectivist in nature and was found to disclose overall more frequently only to other Hungarians (Goodwin et al.). Similarly, Wheeless, Erickson, and Behrens (1986, p. 38) uncovered disclosure differences between American students and international students based on "locus of control," or those governed by internal forces, attributed to Western cultures, versus external forces, attributed to non-Western cultures. The Wheeless et al. study focused not on whether persons with a particular locus of control were more or less likely to disclose but instead confirmed a distinct difference in disclosure patterns based on cultural origins.

Another study of international students living in the United States (Chen, 1993) revealed a relationship between willingness to self-disclose to those in the host culture and ability to successfully handle social situations. In Chen's study, Asian students at American universities were asked about their abilities to cope socially and to describe their tendencies to disclose. Findings indicated that these students did not equate "amount and depth of self-disclosure . . .[with] forming an intimate relationship" (Chen, p.608), indicating variation in perception of self-disclosure as an essential component of

relationship development between cultures. The results echoed previous findings by Wolfson and Pearce (1983, p. 255) whose research of Asian students' "distaste . . .for high disclosure situations" also provided evidence of variance in self-disclosure patterns across cultural lines.

Several researchers, however, discovered no differences in amount of disclosure based on cultural variance, but instead they often found other dissimilarities. Won-Doornink (1985), while unearthing little variance in amount of disclosure between Korean opposite-sex dyads and American opposite-sex dyads, uncovered notable differences in topical reciprocity. Korean dyads apparently disclosed to each other as frequently as Americans dyads; however, Koreans responded to disclosure by a partner with different, but equally intimate, topics. Again, though this research was beneficial it focused on interaction within a particular cultural group. It is not unreasonable to expect divergence in disclosure patterns when the interaction involves partners from different cultural backgrounds.

It is important to note here that, though some researchers found differences in disclosure patterns during initial relationship development, other researchers have discovered that very little variance exists in relationships which are in a later stage of development, even when the individuals within the relationship are from different cultural backgrounds. For example, Gudykunst (1985b, p. 213) found that after a relationship develops, "there are few significant differences . attributable to culturally dissimilar backgrounds." Actual differences eventually give way to perceived similarities in evolving intercultural friendships, rapidly bringing the burgeoning relationship out of a cultural context and into "a personalistic focus" (Gudykunst, 1985a, p. 281).

Since cultural differences tend to fall away in time, the benefits of creating a diverse work team, such as that involved in the space station projects, outweigh any initial struggles. As Bantz (1993) so eloquently states:

> The advantage of having a group of stimulating minds is played against the difficulty of unifying a diverse group; the advantage of many hands making work light is limited by the extra effort in integrating and coordinating all those hands. (Bantz, 1993, p. 1)

We certainly have good reason for continued development of intercultural work teams. We simply need to learn more about them.

Undoubtedly, executing effective intercultural research also has its difficulties. Wolfson and Pearce (1983) point out specific methodical shortcomings in intercultural studies due to the necessity to choose particular tools, descriptions, or units of analysis which inevitably are affected by the culture in which the researcher resides. However, an awareness of these disadvantages should not discourage us from pursuing the intercultural research; it should instead encourage us to approach data interpretation from a more malleable perspective.

Other factors present during an international space mission, however, might account for disclosure differences. Beyond intercultural issues, there are unique environmental impacts with which space crew members must contend. Even Altman and Taylor (1973) discussed the importance of examining the context surrounding the disclosure, instead of merely focusing on one issue such as reciprocity, the nature of the relationship between the communicators, or the topic of discussion. Unlike sojourners of other organizational ventures, international space crew members have often been isolated collectively in an area roughly the size of a large passenger plane for weeks or months at a time (Space Station Assembly, 2000). Obviously, the unique extraterrestrial

environment of the International Space Station has the potential to influence relationship development. Therefore, an analysis of environmental impact on disclosure patterns is worthwhile.

Environmental Issues and their Impact on Disclosure

In 1965, Altman and Haythorn examined the effects of environment on relationship development tools, such as disclosure. They compared disclosure patterns in dyadic interactions between sailors recruited for an isolation exercise. The first group of strangers paired together was offered no outside contact or ability to leave the room for 10 days; the second group was confined for approximately 12 hours each day with no outside contact but was given freedom to leave the room each night. Results from both groups revealed a tendency toward greater disclosure to the stranger they spent time with in isolation than to a typical stranger they might encounter in military service.

One noteworthy limitation of this study is that the paired strangers were "matched as closely as possible on age, education, religion, family size, birth order and size of hometown" (Altman & Haythorn, 1965, p.414) prior to beginning the exercise. This preselection process might significantly limit the personality variance between two individuals working together. It is reasonable to assume that individuals aboard an international space mission might not be this homogenous. Therefore, at first glance, these results would appear to have limited applicability to the current study.

However, a Kanas (1987) study on those with varied backgrounds verified the impact that isolation has on interpersonal communication. Kanas studied American crew member diaries and government documents from past arctic, oceanic, and space

simulations and missions. His research indicates that isolation impacts relationship development because of decreased privacy as equally as crew heterogeneity. Morton (1978) found isolation to play a different role when he studied spouses interacting with each other and spouses interacting with strangers. Morton's study found less reciprocal disclosure between spouses than between strangers. This is not to say that spouses cease to communicate or are completely isolated, however. As Archer (1979) describes Morton's study, it merely implies that spouses have the option of reciprocating the disclosure at a later date, whereas strangers only have a limited opportunity to disclose since the interaction is usually brief with no future interaction anticipated. We must consider the possibility that members of a long-duration mission, depending on the length of the mission or the number of future missions planned together, may also have time at a later date to reciprocate a disclosure.

A study by Leon (1991) also describes the impact of environment on interpersonal communication. However, her findings reveal limited disclosure between interactants, apparently due to stress resulting from the extreme nature of the environment. Leon (p.732) examined diaries kept by eight members during a 56-day polar mission and discovered that self-disclosure and sharing of emotions were kept to a minimum, that instead members focused on "the task-oriented nature" of the mission.

Of particular importance to the present study was Leon's examination of a Bering Bridge expedition comprised of six Soviets and six Americans who traversed the Bering Straits region in an effort to improve Soviet-American relations and to offer support to both American and Soviet Eskimo villages in that area. Her findings revealed the important connection between interpersonal relations and the environment:

> Three of the group designated interpersonal problems as the major stressor . . .and four others who indicated environmental factors as their primary stressor indicated interpersonal or communication problems as the second most stressful expedition situation with which they had to deal. . . .[T]he interpersonal issues involved disputes about strategy decisions and how to carry out particular tasks. (Leon, 1991, p. 738)

Participants in these expeditions also provided evidence of problems which arose due to cultural differences. Specifically, Soviet and American team members reported disagreements within the group due to differences such as an individualistic or collectivistic approach to tasks; gender relation differences; the perception of time, also known as temporal view; and language obstacles. These differences did not keep the team from meeting its goals, but they did create periodic feelings of distrust. Findings such as these remind us again of the importance of examining the interplay of culture and environment and their subsequent impact on disclosure differences.

The previously reviewed data provides an excellent framework of disclosure and intercultural research. These studies were performed from a variety of perspectives and findings were often contradictory. However, the voluminous interest in general disclosure patterns, as well as the desire to study specific effects of both cultural and environmental issues on interpersonal relationship development, authenticates the merit of pursuing new knowledge in this area of research. This study of international space mission crew members is devoted to these goals.

CHAPTER THREE: RATIONALE

Much of the literature reviewed above has examined intercultural interaction and disclosure through a quantitative lens, where researchers performed statistical analyses to examine self-response questionnaires and observational data. It is evident by the volume and applicability of the above studies that important information, both within the field and interdisciplinarily, was gained from these approaches. Often, however, the findings were contradictory. Perhaps an alternative approach to data retrieval and analysis will shed new light on intercultural encounters and the effects of various phenomena on disclosure.

My research utilized qualitative methods, as opposed to using surveys or other quantitative toools, to analyze personal descriptions of interactants in international space projects. In this project, I was primarily interested in the words used by astronauts and cosmonauts when describing their relationships with one another. As Liska and Cronkhite (1994, p.61) state, words used by a group being studied "constitute THE data of interest to communication scholars" (*original emphasis*). Tompkins (1994, pp.44-45) concurs with this approach to data collecting and states that researchers must rely on words "spoken by a communicator under scrutiny, or . .elicited by a researcher's questions" as evidence when performing qualitative research. He proceeds to recommend a set of guidelines one can apply to determine the merit of the research, such as ensuring the results are indicative of the general course of action taken by the

interactants being studied; verifiable by outside evaluators; and reviewed with the interactants under study to assure reasonable interpretation of the data has occurred.

My goal was to adhere as closely as possible to these guidelines. In-depth interviews with astronauts and cosmonauts involved in previous and current space missions were transcribed and a textual analysis of their experiences was performed. The subjects were asked to describe their intercultural relationships with other crew members in the hopes that interpretive analysis of their descriptions would reveal patterns in disclosure.

The following textual analysis attempts to answer four primary research questions. First, as noted earlier, previous research of intercultural interaction has noted significant differences in cultural value systems (e.g., Hofstede, 1997; Fernandez et al., 1997). Understanding these differences may offer enhanced insight into human interaction and an ability for communication scholars to more successfully counsel American organizations who wish to improve their international relationships. As Hofstede states:

> Questions of economic, technological, medical or biological cooperation have too often been considered as merely technical. One of the reasons why so many solutions do not work or cannot be implemented is because differences in thinking among the partners have been ignored (1997, p.4).

Some critics might suggest that focusing on the differences creates further division between individuals of diverse cultures. I argue, along with Hofstede and others, that searching for differences in communication patterns may, in fact, encourage understanding and openness. It is for this reason that I pose the first research question of this study:

> Q1: To what extent do Russian and American representatives who are involved in cooperative space missions exhibit cultural value behaviors as anticipated by the findings of Hofstede and Fernandez et al.?

Though Hofstede's research identified several life circles in which cultural values appeared (e.g., within the family, at school), this researcher describes cultural differences witnessed in the workplace setting. Improving our understanding of how Russians and Americans view life at work is important for the participants involved in these international space collaborations, particularly since millions of dollars are at stake.

More than economic success is in the balance, however. Another primary goal of the International Space Station is to solidify the peaceful bonds recently created with former adversaries. The ability of America to maintain its currently amiable relationship with Russia may depend in part on successful collaboration in endeavors such as the Shuttle-Mir project and the International Space Station. No doubt partnerships of this magnititude require the development of strong interpersonal relationships among those representatives intimately involved in each mission, specifically the astronauts and cosmonauts who perform the hands-on work. One method of strengthening those relationships, as noted by Altman and Taylor (1973) and Derlega and Grzelak (1979), is through reciprocal disclosure of personal information, specifically disclosure which is reciprocated. Since we know that the astronauts and cosmonauts have cooperated successfully thus far, an analysis of the way they disclose information to each other might uncover keys to relationship development which are effective in critical and even dangerous situations. My second research question, therefore, is as follows:

> Q2: How do astronauts and cosmonauts engaged in joint space projects describe the disclosure patterns of their counterparts?

Subsequently, if differences between representatives of the two cultures are reported, then

> Q3: What do the findings of this research reveal about intercultural disclosure in comparison to previous findings?

The narrative descriptions astronauts and cosmonauts offer to explain their relationship development will reveal whether their disclosure behaviors are typical of those found in other intercultural studies of disclosure or if their behaviors are somehow unique to this group.

It is possible that factors beyond cultural differences significantly impact this Russian-American interaction. For example, the environment surrounding an interaction has been shown to influence disclosure behavior. Certainly the environment in which the astronauts and cosmonauts work -- before, during, and after a mission -- is distinctive. A final aspect of this study, therefore, will be to determine the following:

> Q4: What effect do environmental and other factors have on reported disclosure behaviors?

Identifying factors that strongly affect disclosure in this situation would ideally lead to improved methods of interpersonal interaction between individuals involved in this and similar projects.

CHAPTER 4: METHODS

This study emerged as a result of several unique occurrences. As a graduate student at Western Kentucky University, I was interested in the development of the space station and NASA's burgeoning relationship with the former Soviet Union. I had written several essays on the subject and planned to pursue a closer analysis of this intercultural interaction for my thesis work. During the early phase of my research, a distinguished alumnus of Western Kentucky University came to campus to speak about his experiences as a commander in NASA's astronaut office. Knowing my interest in NASA, members of my thesis committee and public relations delegates at the university arranged a meeting for me while the commander was on campus.

During that meeting, two statements were made that excited me as a communication scholar. First, the commander described how his Russian counterparts wanted to spend some social time together and get to know him first before performing a significant amount of work. Second, he told a story about one Russian cosmonaut who had struggled to exist on very meager paychecks because of the dismal economic condition in his country. As I listened to the commander's stories, I realized that his experiences were the explicit result of interpersonal disclosure between members of two cultures. Further study certainly seemed warranted. However, a thorough analysis of disclosure patterns required personal interviews with several individuals involved in these international

projects. Therefore, I politely invited myself to NASA for a visit, and--fortunately for me--the commander and his office graciously accepted.

Participants and Interviews

In all, I was able to interview five American astronauts from NASA's Johnson Space Center astronaut office. I was also given the opportunity to interview one Russian cosmonaut and one non-Russian cosmonaut, both of whom were now members of NASA's astronaut corps. Each interview was approximately one hour in length and was performed individually instead of as a group. The interviews primarily focused on the following issues: relationship development between the interviewee and other crew members; experiences recalled from interactions with crew members from other cultures; and the impact of the environment on crew communication and behavior. Only one of the interviewees had never been assigned as a shuttle or station crew member. All interviewees, however, had significant experience interacting with their counterparts from other countries.

As mentioned before, many insightful studies have examined intercultural communication in a workplace setting, usually through the use of quantitative survey instruments such as questionnaires (e.g., Fernandez et al., 1997). It is important here to note that any intercultural research, though significant, is still somewhat weakened by the ethnocentrism inherent in the question design. The cultural values of every researcher inevitably influence the creation and wording of every research question proposed to a respondent. However, limiting a respondent's answer to numbers on a scale further restricts his or her ability to discuss the subject naturally. It is undeniable that my

research and interview questions are influenced by my own cultural values. Relying on the unrestricted descriptions of the participants as the primary data for this study, though, allowed respondents the most freedom in answering. The primary interview questions used in this study (Table 1) were designed to allow participants as much room as possible to describe their intercultural interactions in the cooperative space projects.[2]

One-on-one interviews with the astronauts and cosmonauts were audio-taped and transcribed, and responses were analyzed as text in an effort to find patterns in cultural behavior and disclosure processes. In this study, I was primarily interested in the words participants chose to describe their interactions, not in the way the participants vocalized those words. This research, therefore, did not require a complete transcriptual analysis. Occurrences such as pause duration, variation in pitch, length of syllable sounds, and other conversational phenomena were omitted from examination. Some grammatical emphases were retained for use in direct quotations merely to maintain the natural feel of the language. These emphases were not, however, used specifically to answer any research question.

CHAPTER FIVE: RESULTS AND DISCUSSION

Words and descriptive narrations used by astronauts and cosmonauts to describe their interactions during previous cooperative space missions were transcribed. Examination of these texts revealed differences in communicative action among participants. These variances appear to result from differences in cultural values, preferred disclosure patterns, and the impact of environment.

Differences in Cultural Values

Our personal values influence the way we interact with the world. As Hofstede (1997, p.237) states, "no human being can escape from using value standards all the time." Despite the risk we take when stereoptyping others, it is arguably beneficial to anticipate that members from another culture may view the world differently than we do. Approaching intercultural encounters from this perspective encourages open acceptance of divergences in thinking and action. When Hofstede (1997) revisited his IBM study of 17 years earlier, he described four primary dimensions of cultural value: preference for power distance; focus on individual versus group; masculine or feminine traits; and level of uncertainty avoidance. Hofstede (and later Fernandez et al., 1997) ranked national cultures in terms of these value dimensions. The first research question in this study sought to find support for the cultural rankings of America and Russia based on how the astronauts and cosmonauts described their interactions. Results shown below are categorized by dimension.

Power Distance

Power distance in organizational terms denotes how tall or flat an organization's management structure is. According to Hofstede's (1997) definition, countries that prefer to reduce or eliminate power distance expect equality in the workplace; countries that exhibit a higher power distance anticipate hierarchy and a certain level of dependency at work. American representatives participating in Hofstede's research, as well as those in the Fernandez et al. (1997) research, scored low on the power distance scale. This scoring pattern primarily indicates that Americans prefer consultative management over bureaucracy. Russia was not included in Hofstede's research, but Fernandez et al.did include Russians in their study and found their tolerance for power distance to be quite high. One explanation offered for this tolerance is the lasting effect of communism, which actually maintained a "large separation between those in power and those not in power" (Fernandez et al., p.50). Cultures exhibiting greater power distances tend to form nearly impenetrable barriers between superiors and subordinates in the workplace.

Descriptions by interview participants in my research supported the rankings given to America and Russia. American management, including mission commanders, were primarily described in terms of their preference for fostering "good communication between crew members" and encouraging a team approach to every task undertaken during a mission. As one commander stated:

> You may have to pick up a little more of the load yourself, to cover all the bases. The object is for you to function as a team with no holes, and . .if you can't cover everything that the last guy did then one of you will fill in there.

The command structure both before and during a mission is obviously ready to make decisions, yet they primarily consider themselves part of a team, ready to offer hands-on

assistance when needed. Employee input is sought continuously. For example, when astronauts return from a mission, they are asked to describe in detail any discrepancies between simulator training and what was actually experienced in space. If any discrepancies are noted, organizational changes are made immediately based simply on crew member feedback.

Russians in the international space projects are perhaps more accustomed to hierarchy during a mission, according to several interviewees. One astronaut told of early struggles with Russian aerospace trainers who wanted to teach detailed information about things the American astronauts already knew. This astronaut also described how Russian trainers routinely tested crew members on material covered during the training, something that did not happen at NASA. The approach as recounted by the astronaut offers support for Hofstede's (1997, p.37) description of instructors in countries with large power distances as "gurus who transfer personal wisdom." Russian commanders were described by astronauts as "the absolute boss." One interviewee identified specific management differences during previous encounters:

> There is much less empowerment from management [in Russia]. It's more of a micromanaged environment . . .pecking order. You would never say anything outside of what . . . your boss feels or, there'd be serious repercussions, whereas here you know, it's a little different.

It is very important to note that several astronauts suggested this approach may be military in nature and may not be the case in privately-owned Russian corporations. However, one astronaut addressed this issue specifically by stating that, at one privately-owned space technology corporation in Russia with which he interacted, the "pecking order . . .was very loose [but] it was there."

The fatalistic mentality of Russians noticed by one astronaut is also indicative of both a large power distance and an external locus of control, as found by Wheeless et al. (1986). As one astronaut described, this viewpoint was encountered frequently during time spent in Moscow:

> They didn't think they could change anything in their government. . . [T]hey would just shrug their shoulders and say, eh, you know..it'll never change . . .what's the point of talking about it cause it'll never change. It'll always be this way. I don't have any control really over who's gonna be in positions of power, so . . .just go on with my life.

Specific differences in power distance and management style were also alluded to through the praise of the Russian cosmonaut, as he recounted time spent with NASA commanders:

> My opinion is that . . .American astronaut corps [has a] very good . . way to resolve some differences uh between crew members . . . main role in this process is commander . . . he is responsible for . . . good communication . . . good spirit . . . between crew members.

It is arguable, therefore, that specific differences indeed exist in power distance expectations between the Russians and Americans in this group.

Interestingly, one astronaut suggested that the bureaucratic approach in Russia, though still noticeable, is somewhat outdated and the younger Russian generation may demand change:

> Cause it's hard to put that genie back in the bottle, once people . . . have the freedom to speak. . . . These young people that are coming up now, I think they'll be a lot more comfortable speaking their mind. And you need that, I mean if you surround yourself with yes people, and just nod your head then . . . you've outlined an organization that's doomed to fail.

The astronaut's point is an important one, particularly since Hofstede (1997, p.27) had suggested a connection between "the reality one perceives and the reality one desires." The implication is that we anticipate, perhaps even demand, the power distance

arrangement currently in place in our culture. If the younger Russians desire to reduce power distance in the workplace, Hofstede's assumption would be contradicted.

Individualism/Collectivism

The importance placed on ingroup involvement exemplifies another dimension on Hofstede's indices, expressed specifically as individualism or collectivism. In an individualistic workplace, the primary emphasis is on personal action, task, and achievement. An employee will continue to work for an employer as long as it is mutually beneficial to both parties. In a collectivist workplace, the employer-employee connection operates like a family. Significant emphasis here is placed on relationship, respect, and group consequence. According to Hofstede (1997), America is the most individualistic nation in the world. Fernandez et al. (1997) confirmed this ranking in their follow-up study of value systems; they also ranked Russia as the most collective society in their study. Though Hofstede's research did not include representatives from Russia, he seems to anticipate this finding based on other analyses of Russian interaction with American culture.

Not surprisingly, many aspects of these two opposing rankings were supported by my research. Astronauts and cosmonauts interviewed all seemed to agree that Americans place less emphasis on relationships at work. All participants identified teamwork as important to the success of the mission; yet, the Americans I interviewed described teamwork in somewhat more individualistic terms. For example, one astronaut explained that in order for a mission to be successful you must work as hard as possible then "help

out other people . . . [after] getting your own stuff done," indicating a strong desire for peak efficiency and accomplishment of tasks as a primary purpose of the team approach.

Alternatively, interviewees described Russians as more interested in developing strong personal relationships at work. One American commander described how he had learned a lot from the Russians in this regard, particularly during one docking mission in which the crew was to unload equipment into the space station:

> Like typical Americans we opened the hatch, said where do you want all this stuff? You know, let's go to work, and [the Russian commander], he wouldn't even talk to us about work. He just said no, no, no, no . . . follow me. We went in to their kitchen table, sat around and had a meal, and talked and then after we had spent some time socializing, then he was willing to talk about work.

Another participant explained how problems in communication with Russian crew members were often overcome quickly because a strong personal relationship existed between the crew members.

The Russian cosmonaut interviewed described his pleasure serving on missions because it was a "friendly atmosphere" and crew members became "like family." The preference for family-like ties is exhibited not just during a mission, but at Moscow training center as well. Spending a substantial amount of time in Russia, one astronaut explained his efforts to become accepted by the ingroup when assigned as a new member of NASA's Moscow-based support staff. He attributed much of his success in forming ties with the Russians to an American astronaut who introduced him to the Russians, an astronaut who had been in the country long enough to develop some significant relationships.

> You know he introduced me to a lot of people. . . . [T]hat helped a lot I think in breaking down barriers for me.

The newly assigned astronaut may have needed much longer to gain entrance into the culture had it not been for his connection with a respected member of the ingroup.

One final area of interest here is Hofstede's (1997) suggestion that collective cultures are high-context cultures. According to Hofstede, high-context communicators often enhance their words with many nonverbal signals and evident emotion. This additional indicator of collectivity was evident through one astronaut's description:

> Russian men speaking together. . . . [They] can be pretty animated in the way they speak or raise the level of their voice.

It appears, then, that both Russians and Americans exhibit many of the traits identified as collectivistic and individualistic by Hofstede.

Masculinity/Feminity

Masculine and feminine workplaces, according to Hofstede, are differentiated primarily by being competitive and compassionate, respectively. Masculine managers are described as successful, tough, and assertive, even aggressive. Feminine managers, on the other hand, are seen as nurturing, intuitive, and concerned about equality. Hofstede (1980) ranked America as exhibiting primarily masculine values. In the study performed by Fernandez et al. (1997), however, America had experienced a values shift in this area and was found to be more feminine in nature. The shift was attributed to the increased number of power positions women have attained since Hofstede acquired his original data.

Support for this shift from masculinity to femininity in American workplaces is obtained through this research. According to NASA employees, communication openness at work is on the rise, particularly since the Challenger disaster. There is also a

greater emphasis on relationship development between crew members. For example, NASA recently implemented a new training procedure which places astronauts together with cosmonauts in winter survival training. As one astronaut explains it, "we're trying to, uh, get em into groups and start talkin' early"; obviously, fostering good crew interaction is on its way to becoming as important as task mastery during crew training. This approach seems fairly recent, since the astronauts in the Santy et al. (1993) study voiced frustration at the lack of contact with and information about international crew members prior to a mission. NASA is also considering the addition of personality profile analysis as part of its crew assignment procedures. It appears the human element of the missions is receiving more attention than ever before.

Russia, though not included in Hofstede's 1980 research, was ranked as a masculine value culture by Fernandez et al. (1997). Support for this ranking is unclear in my research. According to Hofstede's definitions, feministic workplaces perpetuate a more nurturing approach focused on relationships. The astronauts and cosmonauts interviewed continued to stress the importance the Russians placed on fostering personal relationships at work. Support for personal working relationships can also be heard in the Russian cosmonaut's praise for his American commander for not living life "order by order" and for urging crew members to "relax sometimes and talk each other." Importantly, however, this statement also implies that many Russian commanders may not be supportive of this concept. Arguments can be made for both the masculine and feminine approaches in this organizational setting. A project as colossal as a partnered space mission would never transpire if Russia was more intent on competition over cooperation. However, it is possible that space missions prompt workplace behaviors in

employees which are different (perhaps more demanding and militaristic) than those exhibited by Russian and American employees in other industrial settings. It appears, therefore, that no solid evidence is offered in this research to support or contradict the rankings of these two countries on the masculinity/femininity dimension.

Strong/Weak Uncertainty Avoidance

The final dimension identified by Hofstede (1997) relates to how well uncertainty is handled. Workplace cultures exhibiting strong uncertainty avoidance are stressful, rules are concrete, everyone is busy, and the world is seen in terms of black and white, right and wrong. Those with a low uncertainty avoidance are more tolerant and lenient, ambiguity is acceptable, and the world is seen as gray, open to many interpretations. According to Hofstede, the United States displays very weak uncertainty avoidance, tolerating most any condition or situation. Fernandez et al. (1997), however, score the United States as strong on uncertainty avoidance and attribute the score shift to the fiscal turbulence of late. Undoubtedly, many economic changes have occurred during the 17 years between Hofstede's data gathering and the Fernandez et al. (1997) study.

Narrative descriptions provided by the interviewees offer additional support for the Fernandez et al. (1997) rankings. For example, excessive concern for punctuality was identified by Hofstede (1997) as a component of strong uncertainty avoidance. As one astronaut describes meetings at NASA:

> We'll have a meeting at, 9:15 you're expected to be there at 9:15 and you get your business done and you move on . . . we kind of live by the clock here I think.

The non-Russian cosmonaut illustrated another strong uncertainty avoidance trait in the American workplace related to schedule:

> The people are so busy here usually and maybe more than Europe or in Russia . . . usually people are doing [a] lot of different things at the same time. . . . I think that's part of the culture.

The cosmonaut, however, did not notice any difference between the Russian and American approach to meeting times and agendas in the workplace. He attributed the similarity specifically to the "space business" and the time-sensitiveness of crew member training schedules. The nature of this business would certainly explain why traits of this dimension were only partially supported by interviewee description. If it is a cultural issue, perhaps the result offers support for Fernandez et al. (1997), who found Russians and Americans to both be strong on uncertainty avoidance. In essence, however, no real data was uncovered during my analysis of astronauts and cosmonauts to either support or contradict the findings.

Cultural Differences Perceived in Disclosure Patterns

The second research question in this study sought to uncover any disparity in the way astronauts and cosmonauts disclose personal information to each other during relationship development. According to data gathered through my interviews, there are some differences, primarily during the initial phases of the relationship. Though profoundly interested in developing relationships with coworkers, the Russians were often somewhat hesitant initially to reveal personal information. One astronaut believed these differences resulted from historical oppression within the country. Here, he describes his involvement with others at Moscow headquarters:

> You'd have a meeting . . . but then invariably after that, they would break out a bottle of something and want to get to know you a little bit. . . . They've had an expression that if you don't drink, they'll ask you, are you a spy amongst us?. . . . [Y]ou were not allowed to discuss your thoughts freely, if they were negative, you could wind up trouble, so the only person you could ever tell that everything wasn't perfect in their country was a very close friend of yours . close groups of friends . . . would gather and have a drink . . . share their thoughts . . . about what wasn't working. . . . [I]f you mentioned that before then you were being unfaithful to the party and that could get you in a lot of trouble, so . . you sat down had a drink or 2 . . and then you'd be free to talk.

Another astronaut had a similar perception about differences in the way Russians and Americans initially develop relationships, but didn't attribute it to any specific cause:

> The Russians in general, don't invest a lot on the front end. They let you prove yourself, over a course of months or years or whatever to see if you're really what your initial exterior says you are . . . and get to know you over time, and then that's when the walls are broken down.

When asked if he noticed any variance as to when the Russians were ready to discuss personal information, he added:

> Oh, yeah . . on the front end. . . . [Y]ou didn't start talking about anything until you were accepted as, this person's okay . . . not just this person's okay but this person's gonna be around . . . why am I gonna invest all this time if someone's gonna pop in and pop out, you know?

The answer echoes the findings of Carbaugh (1993) mentioned previously, who noted a hesitation to speak freely with those outside the ingroup.

Contrary to research findings reviewed earlier, however, few differences were noted in topic matter deemed acceptable or unacceptable for conversation among crew members. Current projects, family and home life, as well as career experiences were often discussed during training and during missions by members from both cultures. Reaction was mixed among the American interviewees as to whether politics and national economics were acceptable topics of conversation. For example, those who spent more

time in Russia seemed to voice fewer concerns about discussing topics such as politics and economics with their Russian counterparts. I postulate that this difference is a result of their increased ability to vocalize abstract thoughts due to their greater fluency in Russian.

Increased fluency is important since the language obstacle was often pinpointed as the primary difficulty in these intercultural interactions. Many participants interviewed bemoaned their inability to communicate nontechnical thoughts and ideas sufficiently to their foreign counterparts. One astronaut explained it this way:

> There was a limit to uh, the communication . . . what they could understand so . . . you didn't talk to them and you try to be social and you'd ask questions about them but sometimes they wouldn't understand the questions, so you kinda had to keep things . . . at a simpler level.

Several crew members described their frustrations at their inability to effectively verbalize requests during a mission:

> There was just a frustration level. . . I think that was really the biggest obstacle of communication not that we'd had different styles , it's just that we found we were very limited in our vocabulary . . so there was only a certain . . . level or depth of conversation that we could get to, and then beyond that . . . point, smile, nod your head, be polite but you just . . . couldn't do anymore.

Again, these concerns were primarily voiced by those who admitted to a weaker grasp of the Russian language.

Relative to relationship development, the non-Russian cosmonaut (who spoke both Russian and English well) described his Russian counterparts as more likely to disclose quickly and concentrate more on building relationships. Interestingly, he attributed this tendency primarily to the environment surrounding Moscow's space headquarters, Star City:

> I think that's . . . because of the environment. . . . It's due to the fact that in, in Star City . . . you are all in the same village let's say. . [At NASA] it's a little bit different of course, because people are spread around . . . there are much much more people here . . . so it's harder to, to get in closer contacts with everybody.

He went on to explain how it was more difficult to get to know Americans because they distanced themselves with conversational pleasantries, such as always responding to "How are you?" with "I'm fine," whether or not the response is an accurate representation of their true feelings. Russians, he explained, take the relationship to a deeper level sooner than do Americans.

Despite some contradictory opinions about disclosure, however, interviewees described more commonalities than differences in the way crew members disclosed to each other. Astronauts and cosmonauts saw themselves as "cut from the same cloth"; all "Type A" personalities driven by success; "flying people" with a penchant for sharing airplane "war stories." This group, though somewhat diverse in their preparatory backgrounds, all have a strong interest in space exploration and an obvious predilection for adventure which automatically serves to bond them together. As if these similarities in personality were not enough to facilitate relationship development, astronauts and cosmonauts on a crew also spend an excessive amount of time together as soon as they get assigned to a mission. Most interviewees point to this training time as a key force which propels them toward deeper relationships. Several astronauts mentioned that the rigor of the training program would have revealed many things about crew members prior to the mission, and no one interviewed witnessed any communicative surprises (something they were unaware of before) during a mission.

Obviously, there are some differences perceived among the astronauts and cosmonauts in terms of disclosure to other crew members. The majority, however, believe that any differences which exist primarily emerge during the initial encounters of the relationship, thereby supporting the research of Gudykunst (1985a & b) mentioned earlier which found that cultural differences dissolve as the relationship progresses.

Other Factors Affecting Disclosure Patterns

The final research question sought to determine if other, non-cultural factors have an impact on disclosure during relationship development. Narrative descriptions offered by crew members indicate that one factor--environment--has some impact. Environment in this sense did not refer exclusively to the surroundings while aboard a shuttle or space station but related to the semi-isolation of the crew during their lengthy training period. As mentioned above, some interviewees believe the village-like "closed community" atmosphere in Star City increases the speed at which individuals become acquainted. The findings of Taylor and Altman (1975) described this same phenomena; however the current study offers support for their research in an intercultural setting.

Crew members also spend over 60 hours per week with each other in training, certainly most of their waking hours and significantly more time than most spend with family members. The astronauts and cosmonauts explained how they often missed landmark events at home, and those feelings of loss were inevitably shared with crew mates:

> Their kids have their birthday or graduation or get a skinned knee. . . . Well their partner . . is the one that's going to hear about. I missed my kids graduation. . . . I missed this performance, this football game . .

> they probably know each other really really well by the time we get to space.

Importantly, all interviewees agreed that because they spent so much time together training before the mission, they neither expected nor experienced any surprises in behavior, morale, or conversational patterns during the actual mission. Most believed the mission itself simply served to bind them more closely together because they shared such a unique and arduous experience. It appears, therefore, that relationship development evolves and solidifies during this extensive training period, and it is quite possible that the lack of advanced training time together limited the success of the Russian-American crews in Leon's (1991) study.

Many argued, however, that relationships may evolve quite differently for crew members assigned to a long-duration mission (i.e., living aboard the station) instead of a short shuttle flight:

> You don't have any exit . . . you cannot go out . . . and jog or breath . . . some air or . be alone during a certain time so you have no choice, you have to be there. . I don't think that there are many issues during the short flight . for a longer flight of course it could be very different.

Even during the flights which docked for just a few days with the space station, the thought of living in the station environment had quite an impact on some crew members. Compassionate concern for those assigned there was quite evident in one astronaut's description of a shuttle mission he participated in which docked with Mir:

> It's the same thing as being on a desert island . a remote outpost you can't get off of. . . . [W]e gave em food we gave em water, things . . . they needed to <u>live</u>, and then we undocked. [I]t was uh, a very emotional moment to . . . leave them up there on their desert island while we were coming back to earth.

Some interviewees were convinced that serving as a crew member on a long-duration mission would necessitate greater depth in conversation, because "you can't talk airplanes for six months."

Despite any of the above-mentioned influences on disclosure--cultural or environmental--astronauts and cosmonauts all agreed that individual personality traits had the most impact on disclosure patterns. As one cosmonaut explained:

> When you are getting closer to people of course, um, one by one . the relations are different. . . [I]f you have an open personality . . . tolerating uh the differences . . . makes it easier.

A NASA astronaut endorsed the belief that personal characteristics were more important in relationship development:

> There's so much variation . . . from person to person that it's not clear to me that, you know, you can say well all Russians are like this or all Americans are like this and that it means anything. . . [S]ome people are certainly easier to get along with than others and I think it's more up to the person. [I]t's more important who you fly with than what the mission is.

Most, convinced the same type of person becomes an astronaut or cosmonaut, believed crew members share similar personalities and immediately have a common ground. The astronaut and cosmonaut corps were seen as "special population[s]" which share many commonalities in educational background, work history, and even hobbies. Crew members are still individuals, however, and may inevitably react quite differently. The assertion that, regardless of personality similarities, individual behavior still has significant impact on relationship development is supported by the fact that NASA is now creating personality profiles of crew members to assist them in making successful mission assigments.

CHAPTER SIX: CONCLUSION

Analysis of astronaut and cosmonaut descriptions of workplace interaction revealed some noticeable differences in Russian and American exhibited cultural values, primarily in terms of Hofstede's (1997) power distance and individualist/collectivist dimensions. According to participants in this study, the Russians may be more accustomed to larger power distances and were described as more focused on relationship development in the workplace. American astronauts displayed several individualistic traits, such as a success-driven approach to work and a preference for speaking their own minds. They also showed a fondness for consultation and collaboration in the workplace. Indicators of masculinity/femininity and uncertainty avoidance in this study were basically too weak to analyze thoroughly. Those which appeared more explicitly, however, tended not to support Hofstede's original rankings and instead supported the research of Fernandez et al. (1997).

In terms of disclosure patterns, differences between the Russians and Americans in this study surfaced during descriptions of initial encounters. Interviewees believed Russians were more reserved around strangers until the newcomer was accepted by the ingroup. After being accepted, however, the Russians were seen as more open and eager to establish strong relationships with their new-found friends. Beyond initial encounters, however, few differences in disclosure patterns between representatives from the two cultures were reported. The similar approach to disclosure was attributed by the group to

two key factors: the significant amount of time members spend in joint training together and the personalities of individuals who choose to work in space. The first factor supports Gudykunst's (1985a & b) studies of relationship development, which determined that friends notice the most cultural discrepancy during the initial encounter stage of the relationship. Gudykunst identified that, after time is spent together, most cultural variances are ignored. The second factor, that of likeness in personality, is intriguing and also tends to support Gudykunst, but it has yet to be researched as thoroughly in other studies. The effect of individual personality traits on disclosure tendencies is a subject worthy of future attention.

Most interviewees presumed environmental factors had a significant impact on relationship development among crew members, perhaps more impact than does cultural variation. Both astronauts and cosmonauts in this study believed the semi-isolation surrounding the crew during their extensive training period constituted the environment with the most influence. It is important to note again that none of the participants involved had experienced long-duration assignments in space. The majority of interviewees assumed, however, that a longer-duration mission--one which isolated them with crew mates for months at a time--would have a significant and unique impact on relationship development. Crew members with experience on long-duration missions should be interviewed in the future to obtain further insight.

The current research offered interesting insight into intercultural encounters and disclosure pattern variation. It also shed light on these areas while overcoming many limitations of previous studies. Though representatives interviewed in this study were in the same line of work, they were not operating within the same organization, which adds

a new dimension that Hofstede's 1980 study did not include. Additionally, valuable information about an underrepresented group--members of Russian culture--was gained. Finally, an examination of disclosure behaviors between intercultural dyadic partners with quite diverse backgrounds also presents new insight which the homogenous research of Altman and Haythorn (1965) and Won-Doornink (1985) could not. Perhaps most importantly, the current research provides us with a new way of analyzing intercultural encounters and disclosure patterns, since the majority of previous research interprets the situation quantitatively. Arguably, allowing these subjects the freedom to describe their experiences unreservedly lessens the ethnocentric shortcomings mentioned previously by Wolfson and Pearce (1983).

Limitations

Only seven astronauts and cosmonauts were available to speak with me during my visit; therefore, it is difficult to make broad generalizations based on the feedback of these few. However, members of the astronaut and cosmonaut corps comprise a small but important population. It is my hope that the group I interviewed, which was quite diverse in its makeup, conceivably represents the prevailing viewpoints of the astronaut-cosmonaut population.

In future studies, extended observation of Russian-American interaction during training would be a nice supplement to the interview data. Ideally, the total number of interviewees would also be increased, and interviewing the crew as a whole might reveal even more valuable information. Finally, performing interviews in Russian (perhaps even in Russia), using knowledge about Russian cultural values and conversational

ettiquette to design better cross-cultural questions, could yield supplementary data. Doing so could also lower the level of cultural bias inherent in the question design.

Suggestions

The astronauts and cosmonauts participating in the interviews seem open-minded and accepting of the differences between them and their foreign counterparts. Obstacles to relationship development noted most frequently by crew members were attributed to personality conflicts and language obstacles. According to one astronaut, NASA is beginning to pay more attention to personality profiles when making crew assignments. This procedure seems to be a step in the right direction.

As for language obstacles, current astronauts are required to take extensive Russian language training only when assigned to a long-duration mission or if they are responsible for vital components of Russian hardware. Additionally, the official language of the International Space Station is English. Therefore, it is possible that future crew members could have even looser demands placed on their foreign language acquisition. Despite the near inattention to enhancing language skill of all crew members, I suggest that NASA and the other national space agencies spend more time training astronauts and cosmonauts on the conversational aspect of each other's languages.

Overcoming language barriers will create better communication between co-workers and stronger relationships at work. A higher level of fluency in a language is required by both speakers before the communication can progress to a deeper level. Take, for example, the use of humor among employees as a tool to strengthen bonds and

ease nerves during stressful tasks. As Meyer (1997, p.189) states, humor exchanged between employees ensures "the maintenance of unity in the face of inevitable diversity." It is quite difficult, however, to tell a joke if you have a shaky grasp of your co-worker's everyday language. Most astronauts interviewed had a sufficient understanding of technical Russian but found their skills in conversational Russian lacking and expressed frustration with that deficiency. As one astronaut succinctly illustrated:

> If we sat here and just had a conversation about . . . the space shuttle main engines, and I told you well there's . . . liquid oxygen . . . booster pressures and high pots and low pots and things like that . . . that's not any words that you'd ever use in a normal conversation, but those are words you need to know. You'd know all these technical terms and understand how the equipment's furnished, but you wouldn't know, what makes your partner laugh.

Supplementing technical language training with instruction about everyday language usage may greatly enhance working relationships among crew members.

Between the previously published research on the effect of environment on space crews (Kanas, 1987; Kanas et al., 2000) and the current trend toward joint training, it is apparent that government-run space agencies are well aware of the significance of environment on crew behavior (see Kanas, 1987; Kanas et al., 2000). More attention should be paid, however, to the interplay of cultural variance and long-term isolation on crew communication, particularly since new international space crews will include representatives from other cultures as well. A better understanding of these factors may greatly affect the ability for future international space crews to develop strong, cohesive work teams in this unique environment. It will also be essential information for the next generation of space explorers--regular citizens from all around the world--who could be thrown together in the near future and forced to cohabitate in this unchartered territory.

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NOTES

[1] This statement has been broadcast through various means, most notably the International Space Station Fact Book and the International Space Station television documentary broadcast in late 2000 on the Discovery channel.

[2] These questions were supplemented with individual questions about work history, upcoming missions, and any questions prompted by participant responses to previous questions.

TABLE ONE:

BASIC INTERVIEW QUESTIONS

1. How many years have you been in the space business?

2. What is your military/educational background?

3. How many missions have you served on so far?

4. Describe your training for the mission(s).

5. Describe your quarantine environment prior to a launch.

6. Describe the makeup of your crew.

7. Describe your communication with other crew members particularly during social time.

8. Describe your initial interactions with foreign crew members.

9. Do you believe Russians and Americans communicate differently? Why or why not?

10. During your mission(s), who did you spend the most time with?

11. What did you learn about other crew members during the mission(s) that you didn't know before launch?

12. Describe the physical environment to me during a mission. Do you believe the environment had any effect on you and/or your colleagues mentally or emotionally?

13. Once you return from a mission, describe your interaction with the other crew members.

14. Is there anything that, looking back on your mission, you see as the biggest communication obstacle?

5. What upcoming missions are you participating in?