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COLORADO TECHNICAL UNIVERSITY

BUILDING TEAM COHESION IN SMALL STAFF GROUPS
WITH TRANSIENT WORK FORCES

A DISSERTATION SUBMITTED TO
THE GRADUATE COUNCIL
IN PARTIAL FULFILLMENT OF
THE REQUIREMENT FOR THE DEGREE OF
DOCTOR OF MANAGEMENT

DEPARTMENT OF MANAGEMENT

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COLORADO SPRINGS, COLORADO
DECEMBER, 1996

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ABSTRACT

The purpose of this study is to determine if administration of simple self-assessment and training aids on basic personality, learning and communication, and behavior styles to individuals in a small group with a transient work force will improve group cohesion and group performance. The research consists of an intervention in real life context with a group of 31 individuals in the Operations Directorate of United States Space Command.

Analysis for both group cohesion and group performance was conducted at two levels: an initial "pattern matching" followed by a more rigorous statistical examination. The research also looked at the group's attitudes on understanding of personality, learning and communication, and behavior styles.

After administration of the self-assessment and training, cohesion and performance improved. Moreover, the research results were congruent. Group members believed they better understood their own learning and communication styles, personality and behavior styles, as well as the learning and communication, and personality and behavior styles of their coworkers after the intervention.

Further research using groups with different demographics should be done to determine how effective this process would be in more diverse groups. Additionally, further research should be also done to determine how effective each of the self-assessments are either alone or in different combinations.

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CHAPTER I

INTRODUCTION

The importance of teamwork in organizations has been acknowledged since the first early humans decided to band together in order to survive. In business, emphasis on teams and teamwork has always been present; although, the relative importance of teamwork and group cohesion has ebbed and flowed with the changing popular management fashions. Teamwork and group cohesion has always figured prominently in military organizations where morale, esprit de corps, and combat efficiency have always been recognized as being closely entwined. Similarly, leadership, self-knowledge, and communication skills have also been recognized as key factors in an organization's success. As early as 1919, the Alexander Hamilton Institute provided training on personality characteristics and team building (Alexander Hamilton Institute 1919). Today, after a post-World War II fascination with management by numbers, there is a renewed emphasis on the importance of the human part of the organizational equation. Since the early 1970s organizations have experimented with management techniques such as Management by Objective, Quality Circles, Total Quality Management, and finally Learning Organizations, in an attempt to get the most out of any organizations most valuable resource–its people. The philosophy behind learning organizations credits

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personal self-knowledge and team learning as key requirements for efficiency and competitive advantage (Senge 1990).

Teams are the building blocks of organizations, and there are many different types of teams just as there are many different types of organizations. The key ingredients to effective teams are the people in them, and the ability of these people to effectively relate to one another. Logically, providing or improving a basic understanding of the individual— how he or she interacts, learns. and communicates should play a key role in improving cohesion and team performance. Personality, learning, and behavioral profiles are not new, but are becoming increasingly popular. Behavioral profiles are being used in situations such as hiring a sales force (Goff 1994), screening for potentially violent workers (Schut 1994), and job matching (Borofsky 1993). Personality profiles are not a panacea. Invasion of privacy can be problem and many people are concerned that there may be legal issues regarding the Americans With Disabilities Act for some types of uses of personality profiles (Spragins 1993). Nevertheless, valid personal profiles, and there are many of them, can be a powerful step toward either self-knowledge or personal mastery. This dissertation examines not only the importance of individual personality, communication and behavioral traits, and a sense of belonging and team cohesion, but also investigates the effect these factors have on team performance. Specifically, this dissertation focuses on small staff teams consisting of 10 to 15 people whose work force is constantly in transition.

In the early 1950s, Paul Maclean, chief of the of the Laboratory of Brain Evolution at the Institute of Mental Health, discovered that the human brain is physically composed of three layers, successively superimposed, each of which carries within its structure a history and a function that developed in the various evolutionary stages of man's ascent (Froiland 1981). Based on research conducted in this area, basic personality traits can be identified according to which part of the cerebral hemisphere is dominant (either Cerebral or Hemispheric Dominance). The Left Brain is analytical, rational, and practical. The Left Brain is almost entirely responsible for verbal skills. Technocrats, scientists, computer experts, mathematicians, and lawyers tend to have Left-Brain dominance. People in this category can be perceived as driven and single minded. The Right Brain is more intuitive and emotional. There is evidence that creativity is centered in this hemisphere as well as spatial perception. Right-brained people generally have a deep seated musical sense and tend to be "laid-back and mellow." They can remember your face (an object in space), but not your name (a linguistic construct). Between the two extremes of the Left Brain and the Right Brain is the Balanced Brain. Balanced Brain people have neither the extreme single mindedness of the left-brainers nor the terminal mellowness of the right-brainers. None of us are totally dominated by one hemisphere or the other hemisphere; we need both the right hemisphere and the left hemisphere to function.

Communication and learning styles are key factors in an individual's make-up, and will have a great affect on an individual's interaction in a group. John Grinder, a linguist, and Richard Bandler, a mathematician turned Gestalt therapist, developed Neurolinguistic

Programming (NLP) based on complex models of human communications (Goleman 1979). Although NLP proponents claim there are many uses for NLP, one of the most basic uses is its ability to determine an individual's communication "modality." According to NLP doctrine, individuals perceive the world chiefly through one dominant sense—seeing (visual), hearing (auditory), or feeling (kinesthetic). Understanding which modality one is in can help one learn and "receive" communication. Watching an individual's eyes and listening for certain patterns of speech can provide clues to the individual's communication modality (Lee 1983). From personal experience, this ability can be invaluable in a team environment. To show a visual person a "cartoon" once to give him or her information is easier than giving the information to the individual in text form three or four times.

Over sixty years ago, Swiss-born Psychiatrist, C. G. Jung suggested that human behavior was not random, but predictable; therefore, human behavior was classifiable. Jung believed differences in behavior were based on preferences related to the basic functions personalities perform throughout life. Jung also believed these preferences emerge early in life and form the foundation of our personalities (Kroeger and Thuesen 1988, 10). Spurred by the onslaught of World War II, Katherine Briggs and her daughter Isabel Myers Briggs began measuring these behavioral differences and developed a system for classifying them using four pairs of preference alternatives (Kroeger and Thuesen 1988, 11). Known today as the Myers-Briggs Type Indicator (MBTI), this system uses 16 combinations of behavioral pairs to describe an individual's preferences at a given time.

The Personal Profile System (PPS), developed in the late 1970s by John Geier, is a further evolution of this idea, and is based on the previous work of Jean Piaget and William Marston. Marston theorized that human behavior could be studied on a two-axis model according to an individual's actions in a favorable or unfavorable environment (Geier 1979). Building on this construct Geier (1979) developed a self-scoring instrument that claims to measure behavioral responses in four dimensions. Dominance (D) is characterized by behavior that takes an aggressive, and sometimes demanding approach to problems. Influence (i) is characterized by friendly, persuasive, and verbally aggressive behavior. Steadiness (S) is identified by patience and loyalty. Lastly, Compliance (C) is exhibited by the desire to do things right the first time. An individual's unique personality is made-up of a blend of these four traits (Derry 1992).

Statement of the Problem

Much has been written on cohesion and team building for small temporary groups, such as Total Quality Management (TQM) and Process Action Teams (PATs). Advice on guiding PATs through the development cycle of form, storm, norm, and perform is detailed and effective (Gordon 1993). Similarly, there is guidance for groups that have a stable work force over long periods of time. Team building seminars and facilitated group discussions, when properly conducted, have proven track records. For learning organizations, Senge (1990) refers to building "alignment" and discusses "dialogue." Building these traits does not come either easily or quickly, even to stable, fairly high performing teams (Senge 1990); therefore, teams at each end of the spectrum, short term

and long term, have a wealth of available guidance. Short term guidance focuses on group dynamics, but does little to educate the individual on either personality or communication styles for himself or herself or his or her co-workers. Guidance for the long term, more stable groups uses techniques like guided facilitator groups and off-site sessions. Neither of these techniques address the problem of small groups that face a high turnover in personnel. These types of small groups might perform critical functions for their parent organizations, yet due to the constant change in personnel may be unable to build the cohesion necessary to efficiently perform their function. Effective techniques for building cohesion in this small group with high personnel turnover environment are needed; moreover, these tools must be affordable in terms of cost and time.

Overview of the Study

This study examines the attitude and performance of small groups in the headquarters staff of the United States Space Command. Specifically, this study provides individuals in these groups with self-assessments and training on basic personality, communication and learning, and behavioral styles, and measures the impact this training has on group cohesion and performance.

Purpose of the Study

The purpose of the study is to determine if the administration of simple self-assessment and training aids on basic personality, learning and communication, and behavior styles to individuals in a small group with a transient work force will improve group cohesiveness and group performance. The groups studied consist mostly of active

duty military members from all of the uniformed services and some Department of the Air Force civilian employees. Tours of duty for these individuals are between two and three years. A Congressional mandate, a Department of Defense policy, and the highly technical nature of the work require most new group members to attend formal training that can last anywhere from three to six months. An additional two to three months is normally required in order for new group members to become acclimated before they are fully productive. The aforementioned causes three problems. In a 10 to 15 person group five or six individuals will be new-comers with less than six months actual group experience (13 of 31 for the group studied during this research). Out of a 24-36 month tour of duty, individuals will be not be present for duty for five to nine months. The undermanning and lack of experience caused by the first two problems means that the veteran, or "experienced" group members must "pick up the load," and have little time for extracurricular training that does not directly relate to the work at hand. A further complication is the arcane and esoteric nature of the work. The majority of the group's members come from backgrounds that have little to do with the work they are assigned, which will be described in detail later. Suffice to say, the normal problems caused by a highly transient, heavily tasked group are exacerbated when infantrymen, helicopter pilots, and antisubmarine warfare specialists must work together to craft policy dealing with orbital mechanics, kilowatts per steradian, and the like.

Simple, easy-to-use tools that enhance an individual's understanding of himself or herself, and that provide keys to understanding the behavior, personality, and

communication styles of his or her coworkers would be invaluable to groups like this in both business and industry as well as in the military. This study develops a simple tool combining basic information and self-assessments on Cerebral Dominance, Neurolinguistic Programming, and the Personal Profile System, and evaluates its effectiveness by measuring changes in group cohesiveness and performance.

Significance

As discussed earlier, teams are the building blocks of organizations, and individuals are the building blocks of teams. Communication is a necessity of any social interaction and consists of a transmitter, path, and receiver. The more people understand the characteristics of the transmitter, path, and receiver, the more effective their communication will be. In this sense, personal mastery is an essential prerequisite for group cohesion (Gallagher 1992). This study seeks to provide an inexpensive, multifaceted tool that will provide individuals in any group the ability to better understand themselves and their coworkers. If the predicted improvement in group cohesion and performance occurs, the tool can become a valuable aid for both individuals and organizations, particularly in situations where time is short, funds are lacking, and there is constant change in the group. In addition to its simplicity, its strength is that the tool does not rely on one measurement to be effective. Individuals do not need to get the same benefit from all three parts of the tool--buying into just one part or two parts will be enough if the individual's interaction with the group is improved.

Research Questions

1. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group cohesion and group performance?

Included in the basic research question are the following four propositions:

A. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group members' understanding of how they learn and communicate?

B. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group members' understanding of how their coworkers learn and communicate?

C. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personal Profile System Self-Assessment, and training information affect group members' understanding of their personality and behavioral idiosyncrasies?

D. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personal Profile System Self-Assessment, and training information affect group members' understanding of their coworkers' personality and behavioral idiosyncrasies?

Definition of Terms

Behavioral Style: Behavioral style (or idiosyncrasies) in this study refers to the assessment of individual group members based on the behavioral self-assessment contained in the training tool. This section of the training tool utilizes the 1994 version of the Personal Profile System (PPS). Mentioned earlier, the PPS will be discussed at length in chapter 3. The study postulates that improved understanding of these characteristics in oneself and one's coworkers will improve group cohesiveness and performance.

Communication Style: In this study Communication style (or idiosyncrasies) refers to the assessment of individual group members from the learning and communication self-assessment contained in the training tool. This section of the training tool is based on Neurolinguistic Programming (NLP), mentioned earlier, and will be discussed at length in chapter 3. The study postulates that improved understanding of these characteristics in oneself and one's coworkers will improve group cohesiveness and performance. In this study, communication and learning are closely linked and use the same training tool. Communication, exchanging facts, concepts, and opinions, is "outwardly" focused on sending and receiving information.

Group Cohesion: Group Cohesion (or cohesiveness) in this study refers to the assessment of a group's unity as indicated by the results of the surveys. This includes, but is not limited to, an individual's identification with the group and the ability of group members to communicate with each other and to work together. For the purposes of this study the words "cohesion" and "cohesiveness" are used interchangeably.

Group Performance: For the purposes of this study group performance is defined as the group's ability to produce accurate documents in a timely manner. The groups being studied are responsible for policy and guidance in areas that are so technically complex and interrelated that for one individual to be able to understand the entire issue is highly unusual. This factor drives team efforts that imply the need for cooperation and communication. The measurement for this area will be the established "suspense" system that is defined in this section, and that will be described in detail in chapter 3.

Joint Staff: The staff of a commander of a unified command that includes members from the several military services, all of which comprise his or her forces, is known as a Joint Staff. These members are assigned in such a manner as to ensure that the commander understands the tactics, techniques, capabilities, needs, and limitations of the component parts of the force. Positions on the staff are divided so that Service representation and influence generally reflect the Service composition of the force (US Department of Defense Dictionary of Military Terms 1987).

Learning Style: In this study Learning style (or idiosyncrasies) refers to the assessment of individual group members from the learning and communication self-assessment contained in the training tool. This section of the training tool is based on Neurolinguistic Programming (NLP) mentioned earlier, and will be discussed at length in chapter 3. The study postulates that improved understanding of these characteristics in oneself and one's coworkers will improve group cohesiveness and performance. In this

study, communication and learning are closely linked and use the same training tool. Learning is "inwardly" focused on gaining knowledge or skill.

Military Service: A branch of the Armed Forces of the United States, established by an act of Congress, in which persons are appointed, enlisted, or inducted for military service, and which operates and is administered within a military or executive department. The military services are the United States Army, the United States Navy, the United States Air Force, the United States Marines, and the United States Coast Guard (US Department of Defense Dictionary of Military Terms 1987).

Personality Style: Personality style (or idiosyncrasies) in this study refers to the assessment of individual group members based on the personality self-assessment contained in the training tool. This section of the training tool utilizes the Human Information Processing Survey (HIPS), which is based on theories of cerebral dominance. Cerebral Dominance will be discussed at length in chapter 2, and HIPS will be discussed in depth in chapter 3. The study postulates that improved understanding of these characteristics in oneself and one's coworkers will improve group cohesiveness and performance.

Suspenses: Suspenses refer to a tasking and task tracking system used by military staffs in general, and Headquarters United States Space Command in particular, to generate requests for documents from subordinate organizations, and to keep tabs on the document's status. A key part of the task request in this system is the date the document is due to the requesting organization. The task is called a "suspense date" or "suspense."

The ability of a staff to efficiently respond to these requests (or suspenses) reflects, to a large degree, the staff's competence. Many military organizations use the timeliness of a staff group's response to suspenses, and the number of times suspensed documents are returned for reaccomplishment, because they are either incorrect or incomplete, as measures of merit. This process will be discussed at length in chapter 3.

Unified Command: A Unified Command is a command with a broad continuing mission under a single commander, and is composed of significant assigned components of two or more Services. A Unified Command is established and so designated by the President, through the Secretary of Defense with the advice and assistance of the Joint Chiefs of Staff, or when so authorized by the Joint Chiefs of Staff or by a commander of an existing unified command established by the President (US Department of Defense Dictionary of Military Terms 1987).

<div align="center">Assumptions of the Study</div>

This study does not attempt to revalidate the previous research on Cerebral Dominance, Neurolinguistic Programming, or the Personal Profile System. The groups that participated in the study are assumed to be representative of similar groups from the parent organization. Individuals in the groups are assumed to be representative of individuals from the various Services. The study also assumes that individuals honestly responded to the surveys, the self-assessment tools, and the training tool.

Based on the literature review, there are four assumptions that are central to this study. The first assumption is that groups are critical to all parts of society in general and

specifically to the work place. The second assumption is that groups with higher cohesion will outperform groups with lower cohesion in most situations. A third assumption is that individual personality, behavioral, learning, and communication styles are important elements in group interactions that affect cohesion. Finally, the fourth assumption is that a change in part of a social system (an individual) will affect the system, which will in turn affect the part in a continuing cycle.

Two hypotheses are derived from these assumptions. First, improving individual group member's understanding of how they and their coworkers learn, communicate, and behave will improve group cohesion. Second, improving individual group member's understanding of how they and their coworkers learn, communicate, and behave will result in improved group performance.

Limitations of the Study

Time, sample size, and government restrictions placed limitations on this study. One of the study's goals was to determine the affect of the self-assessment and training tool on groups with a changing (transient) population. Although the parent organization being studied has a generally high turnover rate, both historical records and projections for personnel turnover indicated the maximum number of gains and losses would occur in a narrow three-month period. This factor, combined with the twelve-month deadline for the study, limited the amount of data that could be collected. The population that was studied was also restricted and created another limitation. There was a large enough sample size for the results to be statistically valid; although, limited research funds made using a truly

large sample for the study impossible. Finally, there were several government restrictions that limited the study. The researcher was prohibited from using group members defined as "vulnerable" in the study, and rules for using human subjects in research affected how the self-assessment and training tool was administered and utilized (Institutional Review Board, Colorado Technical University 1996).

Summary

Team performance continues to be a critical factor in today's organizations—military, civil, industrial, or commercial. Teams consist of individuals, and their ability to cooperate and communicate is critical. Some short-term teams do not need much training past a basic understanding of group dynamics and an intense focus on the immediate goal. Other more stable teams have access to in-depth training utilizing facilitated off-sites and long term team building techniques. However, there are many groups that do not have the resources, in terms of time or money, for the latter, and yet have need for more help than what is provided by the former. If groups like this have a high turnover in personnel then the problem is exacerbated.

This dissertation examines the impact a simple self-assessment and training tool on personality, communication, and behavior has on group cohesion and performance. Chapter 2 reviews literature on group cohesion and its impact on group performance, as well as the theory behind and practical application of Neurolinguistic Programming, Cerebral Dominance, and the Personal Profile System.

Chapter 3 presents the methodology used for the study. Several sections in the Operations Directorate of United States Space Command (10 to 15 individuals in each section) will be administered a demographic questionnaire, a pre-training questionnaire, and a self-assessment and training survey. The pre-training questionnaire will provide a "cohesion index" that will be used as a baseline to compare to the post-training results. For a minimum of two months prior to administering the surveys, group performance measures will be collected via the aforementioned suspense system. New group members who arrive during the period of the study will be administered the surveys when they join the group. At the end of the study, individuals in the groups will be administered a post-training survey that will provide a cohesion index, plus elicit some responses on the usefulness of the self-assessments and training. Post-training group performance will be measured using the suspense tracking system.

Chapter 4 provides an analysis of the data collected. A comparison of cohesion indexes and performance measurements will provide both a subjective and objective view on the value of the total training package. Subjective views on each of the package's three components will also be provided. The final chapter (chapter 5) draws conclusions, provides recommendations for application of the tool, and suggests further research.

CHAPTER II

LITERATURE REVIEW: IMPACT OF LEARNING AND COMMUNICATION STYLES, PERSONALITY AND BEHAVIORAL STYLES ON TEAM COHESIVENESS

This chapter reviews theoretical propositions on personality, behavior,

communication and learning, and social systems. This chapter develops a framework that

links the theoretical propositions to group cohesion and performance. The chapter first

examines the components and impact of cohesion on society and groups, and then

discusses Neurolinguistic Programming, Cerebral Dominance, and the Personal Profile

System, which explain and predict learning and communication, and personality and

behavior.

Group Cohesion

This section introduces the concept of groups and their importance to society in

general and to the workplace in particular. The sociological and psychological research

done in the area of group dynamics is reviewed, and a focus on the notion of small or

"primary" groups is also presented. Finally, this section discusses how these ideas are

integrated into social systems thinking and the concept of learning organizations.

Society and Groups

In today's fast-paced world of high-speed transportation and national economy

many mid-level managers have the luxury of experiencing long-term supportive

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relationships; however, few mid-level managers have the opportunity to build this type of

group relationship at work. Barna (1990) suggests that the lack of the opportunity to

build group relationships at work is a growing cultural phenomenon in the United States.

> Friendships are earnestly desired by more and more Americans, as
> the pressures within the home drive us to seek consolation, appreciation,
> and encouragement elsewhere. Unfortunately, America is a nation in which
> the yearning for strong friendships far exceeds their existence. The
> majority of Americans feel that they do not have enough close friends.
> Among the reasons why we struggle with building and maintaining
> significant relationships are the high level of transience which tears us away
> from those whom we have become friendly with; our inability as a nation to
> effectively communicate with each other; fragmentation of our schedules,
> which makes sharing time together difficult; and the shifts in attitudes that
> make us less willing to make commitments to long-term relationships.
> (Barna 1990, 23)

This work place phenomena is as prevalent, if not more so, in the community at

large. The fact that the impact of transience may be much larger in the work place where

the demands of time, schedules, competition, and ambition combine to create a pressure

cooker environment is aptly described by the following passage:

> This book, being about work, is by its very nature, about violence--
> to the spirit as well as to the body. It is about ulcers as well as accidents.
> About shouting matches as well as kicking the dog around. It is, above all
> (or beneath all), about daily humiliation. To survive the day is triumph
> enough. (Terkel 1985, 18)

American military leaders are often quoted as saying that the US armed forces are

a microcosm of American society; yet, the phenomenon described above is one with which

the military has been familiar for many years. Modern career military families are

uprooted every three to six years, severing friendships and working relationships. By the

time a family has become a career military family, the competitive nature of the lifestyle

has normally made military members hard charging, intense, and highly motivated. Those who do not push ahead are "left behind," and the ramifications of mistakes mean giving testimony before Inspectors General, Congressional Staffers, or the ultimate nightmare of being interviewed on Sixty Minutes. As will be described in chapter 3, significant numbers of spouses going to the airport and boarding planes that take them away for days or weeks at a time is not unusual. This occurrence presents a critical problem for group leadership. As mentioned earlier, group performance is the key to organizational success. Yet the very nature of the work operates against the cohesion that produces focused, successful group behavior; therefore, understanding how and why individuals become group members is important.

Human beings are social animals. The sociological process starts when a child is born into a family. The family and other groups to which a child is exposed help to socialize the child, and provide the keys that develop each person's sense of individuality and emotional health. Some theorists suggest that a person's emotional health can be measured by the number and the level of satisfying group relationships he or she experiences.

> Our psychological health depends upon our group memberships . . . .
> It is through socialization into our family and peer groups that the social
> competencies necessary for psychological health are developed. It is through
> memberships in productive and cohesive groups that psychological health is
> maintained throughout our lives. (Johnson and Johnson 1975, 32)

Given the fact that most people's time is spent in some sort of group activity, the statement above seems reasonable. People work, play, are educated, and worship in

groups; therefore, they should have a clear understand of group development and group

processes. Group processes have a critical effect on the history of larger social systems,

and specific group dynamics will affect the way individuals choose to lead their lives

(Shugart 1992). Much research has been done in this area, which stresses the importance

group understanding plays in affecting positive changes.

> Whether one wishes to understand or to improve human behavior,
> it is necessary to know a great deal about the nature of groups. Neither a
> coherent view of man nor an advanced social technology is possible
> without dependable answers to a host of questions concerning the
> operation of groups, how individuals relate to a larger society. When and
> under what conditions do groups form? What conditions are necessary for
> their growth and effective functioning? What determines the nature of
> relationships between groups? How do groups affect the behavior,
> thinking, motivation, and adjustment of individuals? . . . . Questions like
> these must be answered before we will have a real understanding of human
> nature and human behavior. (Cartwright and Zander 1968, 45)

Understanding groups at all levels is helpful in a generic way. However, a generic

definition of a group, "a collection or set of individuals who interact with and depend on

each other" is inadequate for this study (Zander 1982, 12). This study focuses on small

"primary" groups. Participation in nonprimary (or secondary) groups is in sharp contrast

to primary groups; moreover, there is also much weaker identification and sentiment

among the members of nonprimary groups. This study focuses on primary groups, the

ability to improve their formation, and the interaction of individuals within these groups.

The term primary group was first coined in 1915 by C. H. Cooley.

> By primary groups I mean those characterized by intimate face-to-
> face association and cooperation. They are primary in several senses, but
> chiefly in that they are fundamental in forming the social nature and ideals
> of the individual. The result of intimate association, psychologically, is a

certain fusion of individualities in a common whole, so that one's very self,
for many purposes at least, is the common life and purpose of the group.
Perhaps the simplest way of describing this wholeness is by saying that it is
a "we"; it involves the sort of sympathy and mutual identification for which
"we" is the natural expression. (Cooley 1915, 29)

Group Dynamics

Group dynamics has emerged from its parent disciplines of psychology and

sociology fairly recently. As a field of study, group dynamics has been with us since the

early 1900s. An early pioneer in the field, noted sociologist Marvin Shaw (1976) put his

work in this context by comparing his work to the work of his predecessors, who studied

human interaction, when in the mid 1970s he wrote, "Group dynamics is still a relatively

new area of research" (Shaw 1976, 7). At the turn of the century the idea of a "group

mind" was both revolutionary and controversial. Detractors questioned whether a "group

mind" existed, and challenged the most basic sociological theories; however, as is often

the case, these arguments became a force that drove further research, and led to a deeper

level of understanding. One of the first in-depth studies in this field was L .J. Carr's

(1929) seminal study on the way committees function. J. F. Dashiell (1935) explored and

expanded upon Carr's (1929) work. Dashiell (1935) pointed out that according to Carr

(1929) work in committees served to show a corresponding level between the ways that

individuals and groups performed problem solving (Dashiell 1935). Prior to the

publication of Carr's (1929) and Dashiell's (1935) studies, work in this area was

considered questionable. What made these studies a watershed event was that they

demonstrated that to conduct valid studies of group behavior under highly simplified

circumstances was possible. Carr's (1929) and Dashiell's (1935) studies demonstrated the

measurable effects of a phenomenon we call group behavior. Another noted researcher in

this field, James Davis (1969), pointed out that the scientific study of group behavior

gradually emerged as an increasingly important route to understanding society. Today

group dynamics has emerged as one of the largest bodies of sociological and social

psychological studies, and has become a parent discipline itself, which spawned the study

of many facets of group behavior, including that of small groups.

Small Groups

Many outstanding theorists have contributed to the study of small groups. Robert

Bales's Interaction Process Analysis was a major development in the 1950s. This process

involved classifying particular forms of group behavior as they influenced the group in

problem solving activities (Bales 1950). Another equally noted pioneer was George

Homans (1950), whose work defined different group types based on the ways group

members interacted with each other. In contrast to other work being done during this

period, Homans (1950) used the element of interaction as the key distinguishing trait

between groups. Most of Homan's (1950) contemporaries concurred that group members

interacted, and Homans (1950) insisted that the interaction had to have significance.

Homan's (1950) definition required a group small enough to produce face-to-face

communication amongst all individuals over a span of time.

Building on this previous work Sherif and Sherif (1953) conducted a key study on

group cohesiveness. Based on the research of group principles studied in a boys' camp,

Sherif and Sherif (1953) concluded that group cohesiveness could be determined and/or affected by the amount of success a group experiences in completing tasks. They demonstrated that when groups reach or succeed goals the level of cohesion significantly rises, and that conversely, failure and frustration over not meeting group goals causes a corresponding drop in cohesion (Sherif and Sherif 1953). The information and research on small groups and group cohesion became so prolific by 1962 that a compilation of theories on small group dynamics and cohesiveness was published in an effort to track and categorize the work.

Sidney Girard (1964) and Carl Rogers (1961) both provided theories and research on group behavior, which further opened the door to our understanding of these critical processes. Girard (1964) contended that individuals must have personal relationships within the group's structure that vitally impact the individual's life. Girard (1964) pointed out that when small groups begin to flourish that these key relationships are more than superficial acquaintances. Girard (1964) further stated that "truly personal relationships between two people involve disclosure of self, one to the other in full spontaneous honesty" (52).

Carl Rogers (1961) also saw interaction as the key to group formation and group cohesiveness. Rogers (1961) believed that self-actualization, as well as group power, and esteem was lost as the interaction process was destroyed. Rogers (1961) believed that communication and interaction skills were essential, and pointed to the role of group members who could facilitate these primary processes.

> The loss of communication can be reconciled or avoided by the
> influence of a person [in the group] who is willing to understand each point
> of view empathetically, [and then] defensive distortions drop away with
> astonishing speed as people find that only the intent is to understand, not
> judge. (Rogers 1961, 81)

Although the amount of knowledge in this field has expanded enormously, there is

still relatively little information on the process individuals go through as they take the first

steps of entering a group. Group formation and leadership does not always follow formal,

published lines of authority, and the informal group can often be more binding and more

powerful than the one posted in an organization chart on the office wall.

> Human groups seem to form and organize themselves as naturally
> and spontaneously as crystals in a solution of chemicals or mold formations
> on a piece of bread. Almost automatically, someone in the group rises to
> top status and becomes the acknowledged leader. (Kagan 1972, 56)

Thibaut and Kelly (1959) have done much seminal research in this area; however,

they do not lay out a specific pattern or sequence of events, but do refer to the process of

moving from an isolated individual into group membership. Thibaut and Kelly (1959)

suggest that an exploratory exchange of testing between two or more individuals takes

place, which determines the positive and negative advantages of creating and maintaining a

relationship.

Social Systems Thinking and Learning Organizations

General system theory is based on two principles: the state of organization and

energy available to a system, and mutual causation—the idea (in contrast to linear

causation) that a given behavior is not the result of a causal relationship, but is the result

of a continuous stream of interaction and activity. A system can be defined as "a set of

elements which form an orderly, interrelated, and functional whole" (Zastrow and Kirst-Ashman 1987, 26). This definition implies that systems are constantly in a state of flux and a change in any component of the system will have some effect on related components (Hall and Fagen 1975). Within a social system or group, the elements would be the individuals and the relationships between them. The energy in the system, and the mutual causation can be understood in terms of the interactional dynamics between the individuals (Grau, Moller, and Gunnarsson 1988). Groups, like systems, have limits on membership. There is differentiation between members and nonmembers as a binding force between the individuals and transactions that occurs between parts of the system and external parts. Living systems are differentiated based on their use of information.

> A living system or its parts can take in information, assign some meaning to this information and, at some level and in a way which reflects its existing structure, modify itself in order to live in the changed situation as it has defined it. Social system theorists view human behavior in terms of the exchange and handling of information, the context in which the behavior occurred and the mutual involvement of the actors. (Montgomery and Fewer 1988, 42)

Groups, like systems, have other characteristics that help define them. Boundaries differentiate groups from other groups and the environment by differentiating membership, and the ability and the amount of communication the membership performs outside the group. Boundaries are often arbitrary and depend on the view of the group member. Many individuals are part of several groups, and groups can be part of larger groups. Strict boundaries, where the flow of information into or out of the system (or group) is limited or nonexistent, refer to a "closed system." A system with more permeable

boundaries. where information may flow freely, is termed an "open system." Groups like systems, must simultaneously balance several forces, such as the need for stability against the need to change and/or dissolve. Throughout the process runs the common thread of communication (Hall and Fagen 1975).

The importance of this research to Western management has been heightened by the rediscovery of quality in the work place, and the knowledge that any Western organization's most valuable and expensive asset is its people. The effectiveness of Japanese team-based management has led to a reassessment of many Western management principles, and an appreciation of just how powerful a highly cohesive team effort can be. Adding to the concept of "empowerment" by such quality pioneers as Deming, Juran and Crosby, new theorists like Peter Senge (1990) stress the importance of organizational learning for efficiency and competitive advantage. Senge (1990) lays out five "disciplines" required for a learning organization. Three of the disciplines, systems thinking, personal mastery, and mental models, focus more on individuals and the skills they need to be group members. The last two disciplines, shared vision and team learning, focus more on primacy and effectiveness of the group (Senge 1990). Senge (1990) defines personal mastery as an approach to life that commits individuals to improving their self-knowledge and continual learning, comparing the attitude toward one's life to the attitude of an artist toward a work of art.

> Personal mastery is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively. As such, it is an essential cornerstone of the learning organization—the learning organization's

       spiritual foundation. An organization's commitment to and capacity for
learning can be no greater than that of its members. (Senge 1990, 7)

Unfortunately, few organizations encourage the growth of their people in this

manner, which results in vast untapped resources. There can be disillusionment, loss of

commitment, and loss of a sense of mission. This bears directly on loss of group cohesion,

which, as described earlier, starts a cycle of frustration and failure that can further add to a

downward spiral.

Senge (1990) defines learning organizations as ones where people continually

"expand their capacity to create the results they truly desire; where new and expansive

patterns of thinking are nurtured; where collective aspiration is set free and where people

are continually learning to learn together" (Senge 1990, 3). Senge (1990) states learning

organizations can only be created by people following the set of disciplines described

earlier. At the heart of a learning organization is what Senge (1990) calls "metanoia"–

literally a "turning." Metanoia represents a turning away from old, no-longer-helpful,

behavior patterns toward better, more congruent behavior patterns that reflect deep-seated

goals. This shift of mind emphasizes today's popular notions of empowerment, self-

improvement, and self-leadership, and is also at the heart of collaboration, co-creativity,

and co-generativity. Also, this shift of mind provides an internal locus of control so

necessary to our own experience of efficacy in the world, which is an experience that is

said to be the most sought after state among people in any organization (Costa and

Garmston 1986).

Douglas Robertson (1988) refers to this as taking a proactive perspective, which acknowledges the tie between past, present, and future, and embraces the constancy of change. Robertson (1988) sees choice as an essential part of human existence and believes people must realize that their present is made of the choices they make, and that they participate (with others), moment by moment, in creating their own options. In short, people take responsibility for their own power even though they know their power is not absolute, and they take responsibility as change agents (Robertson 1988). How do people individually and collectively make this kind of change? The material presented so far indicates that individual change must precede and accompany group change, and that the ability to understand oneself and others, or to "communicate," is a key factor.

Communication is a more complex process than many of us believe. Communication not only involves our inefficient use of language, but tone, inflection, and body signals. Both the sender and receiver "filter" the data through personality and communication modalities, as well as gender and cultural paradigms. Our ability to sift through this process and understand each other plays a key role in our ability to build and maintain cohesive groups. One of the goals of this study is to provide a simple, inexpensive, time efficient tool that can help individuals to better understand themselves and their coworkers, and start them down the path toward better personal mastery and group interaction.

Table 2.1. Principles of a Learning Organization

1. Prime the mind of individuals at every level to be self-directed;

2. View mistakes as stepping stones to continuous learning and essential further business growth;

3. Be willing to rework organizational systems and structures of all types;

4. Acknowledge that learning is an emotional process and create a corporate culture that is a supportive place to be;

5. Celebrate the learning process for its own sake, not just its end product;

6. Celebrate all learners equally;

7. Accomplish as much transfer of knowledge and power from person to person as possible;

8. Encourage and teach learners to structure their own learning rather than structuring it for them;

9. Teach the process of self-evaluation;

10. Recognize and accept as a goal the complete liberation of all human intelligence everywhere;

11. Recognize that different learning preferences are alternate tools for approaching and accomplishing learning;

12. Encourage people to discover their own learning and thinking styles and make these accessible to others;

13. Cultivate each employee's abilities in all fields of knowledge and spread the idea that nothing is forever inaccessible to people;

14. Recognize that in order to learn something so it is easy to use, it must be logical. moral and fun;

15. Model the belief that ideas can be developed best through dialogue and discussion;

16. Treat everything as subject to re-examination and investigation.

Source: Young, J. A. 1994. Developing leadership from within: A descriptive study of the use of Neurolinguistic Programming practices in a course on leadership. Ph.D. diss., Ohio State University: 41.

Neurolinguistic Programming (NLP)

This section reviews the background and history of Neurolinguistic Programming (NLP), which is a framework for understanding and modifying the way people learn and communicate. This section discusses NLP's philosophy and techniques, and explains how these relate to language, and how people learn. Finally, this section reviews NLP-based research on how the human mental system is organized, and how this affects individual and group behavior.

Background and History

Neurolinguistic Programming (NLP) was initiated by Bandler and Grinder in 1975 with the publication of The Structure of Magic, Volume I. The growth of Neurolinguistic Programming as an area of research and practice has been supported by the work of Dilts (1990), Bateson (1991), Gordon (1993), Andreas and Andreas (1989), O'Connor and Seymour (1990), and others. Some of these individuals contributed to the seminal work and findings of NLP, and later expanded its use into the fields of business, education, and health care. As the intent of the originators was never to limit the application of Neurolinguistic Programming to either psychology or psychotherapy, much of the work has helped to broaden the scope of NLP's application and to make training in its techniques available to people of all ages and to people in virtually all walks of life.

Philosophy and Techniques

O'Connor and Seymour (1990) stated that "NLP represents an attitude of mind and a way of being in the world . . . . It is a set of models, skills and techniques for

thinking and acting effectively" (12). In supporting Bandler and Grinder's (1975) seminal

notions, O'Connor and Seymour (1990) write:

> NLP deals with the structure of human subjective experience; how
> we organize what we see, hear and feel, and how we edit and filter the
> outside world through our senses. It also explores how we describe it in
> language and how we act, both intentionally and unintentionally, to
> produce results . . . . Everyone lives in their unique reality built from their
> sense impressions and individual experiences of life, and we act on the basis
> of what we perceive: our model of the world . . . . The filters we put on
> our perceptions determine what sort of world we live in . . . . We have
> many natural, useful and necessary filters. Language is a filter. It is a map
> of our thoughts and experiences, removed a further level from the real
> world. Our beliefs also act as filters, causing us to act in certain ways and
> to notice some things at the expense of others. NLP offers one way of
> thinking about ourselves and the world; it is itself a filter . . . . By changing
> (our) filters, (we) can change (our) world. (O'Connor and Seymour 1990,
> 23)

Dilts (1990) expanded on how beliefs act as filters, and further addressed people's

ability to gain choice over their beliefs by restructuring, unlearning, or changing old beliefs

that limit them and imprinting new beliefs that expand their potential. The idea, of giving

people more choice about what they do, is a primary notion in NLP. Bateson (1991)

theorized that most of what we do and do best is done unconsciously. People initially

learn by consciously mastering small behaviors. They then add and expand upon those

behaviors until they have created unconscious habits. Learning behaviors and relegating

them to the unconscious is extremely important because the process frees the conscious

mind so other things can be attended to and noticed.

Many behavioral patterns rest on unconscious beliefs. People act, learn, and

experience based on perceptions that are filtered by these patterns. In order to make new

choices, create new behaviors, or view the environment differently people must deal with these behavioral patterns on both a conscious level and an unconscious level. This is a critical step because to build more efficient behaviors people must first go back and unlearn the old behaviors so they can relearn or learn anew. O'Connor and Seymour (1990) use NLP procedures and processes to create a potential three-minute seminar consisting of an outcome statement, acuity statement, and flexibility statement—reminding us that " being effective in the world means producing the results you choose [and] the first step is to choose" (O'Connor and Seymour 1990, 31).

> The presenter would walk on and say, "Ladies and gentlemen, to be successful in life you need only remember three things. Firstly, know what you want; have a clear idea of your outcome in any situation. Secondly, be alert and keep your senses open so that you notice what you are getting. Thirdly, have the flexibility to keep changing what you do until you get what you want." He would then write the words Outcome, Acuity, and Flexibility on the board and leave. (O'Connor and Seymour 1990, 35)

Clearly an essential skill for the use of NLP is the ability to specify a well-formed outcome. In addition the NLP practitioner must develop sensory awareness (acuity) both in communicating with himself or herself (as in thinking or reflecting) and in communicating with others. This provides vital feedback on whether or not the desired ends are being achieved. If what is being done is not working then something new must be done. This demands flexibility, which, in turn, requires a reasonably broad repertoire of choices. The optimum number of options in order for true choice to exist is three. With only one alternative an individual has no choice; with two alternatives one can experience a dilemma; and more than three alternatives can become overwhelming.

Elicitation, calibration, and anchoring are three more primary skills necessary for the use of NLP. These skills deal with a person's state of mind, defined by O'Connor and Seymour (1990) as "all the thoughts, emotions and physiology that we express at the moment; the mental pictures, sounds, feelings and all the patterns of physical posture and breathing;" indicating that "mind and body are completely interconnected, so our thoughts immediately influence our physiology, and vice versa" (O'Connor and Seymour 1990, 39). Elicitation refers to guiding someone (or oneself) into a specific state; calibration refers to recognizing a change in one's internal state, often visible externally as calibration is displayed through breathing, skin tone, pupil dilation, and the like. Anchoring refers to providing a stimulus (usually external) that is linked to and triggers a particular state.

Bandler and Grinder refined and modeled their skills, and developed the concepts of preferred representational system (PRS), pacing and leading, based on the work of earlier psychotherapists who suggested that once a person's PRS is determined and calibrated in a specific context, one can, by mirroring the person's physiology and matching his or her predicates, enhance rapport with the person and lead the person to another state (Yapko 1981, 169-175). The term "matching predicates" refers to speaking to the person in his or her preferred mode of receiving information (the preferred "modality"), which is usually visual, auditory, or kinesthetic (or VAK in NLP-speak). Similarly, Bandler and Grinder believed that determining the unique sequence of modalities employed when an individual takes in and processes information in various situations, could be useful by pacing that process (or in some instances helping the

individual find other processes) to successfully help the person facilitate change and move toward desired outcomes (Falzett 1981).

Clinical research and testing in this area have shown these concepts to be valuable and powerful tools. Although early research produced mixed, inconclusive results on a hypothesis on PRS-related eye movement (Owens 1977; Thomason, Arbuckle, and Cady 1980), most research confirmed the effectiveness of NLP's basic theories. Confirmation was achieved through clinical studies where researchers "matched predicates" or communicated with subjects in their predominant modality (visual, auditory, kinesthetic). This produced more effective communication (Dowd and Pety 1982; Yapko 1981). The discovery by Cheney of the "multimodal experience" phenomena provided, at least in part, an explanation of previous eye-movement research, and most subsequent investigation has supported the hypothesis (Gumm, Walker, and Day 1982; Yapko 1981).

As with group dynamics, discussed earlier, communication–both internal and external is critical.

> When you communicate with another person, you perceive their response, and react with your own thoughts and feelings. Your ongoing behavior is generated by your internal responses to what you see and hear . . . . Your partner is responding to your behavior in the same way. You communicate with your words, with your voice quality, and with your body: postures, gestures, expressions. You cannot not communicate. Some message is conveyed even if you say nothing and keep still. (O'Connor and Seymour 1990, 47)

> If the words are the content of the message, then the postures, gestures, expression, and voice tonality are the context in which the message is embedded, and together they make the meaning of the communication . . . . To be an effective communicator, act on the (NLP)

principle that: The meaning of the communication is the response that you get. (O'Connor and Seymour 1990, 49)

NLP is the ability to respond effectively to others and understand and respect their model of the world . . . . You already influence others, the only choice is whether to be conscious or unconscious of the effects you create. The only question is, can you influence with integrity? Is the influence you are having in alignment with your values? NLP techniques are neutral. (O'Connor and Seymour 1990, 49)

O'Connor and Seymour (1990) maintain the importance of both verbal and non-verbal interaction in the free flow of communication for rapport, pacing, and leading. When two individuals' bodies and words are "in sync" they are "engaged in a dance of mutual responsiveness." Therefore, if the meaning of communication is the response the dance elicits, gaining rapport is the ability to elicit responses (O'Connor and Seymour 1990). If rapport allows an individual to build a bridge to another person so that the individual can have some point of understanding and contact, pacing is establishing the bridge through respectful attention to the person's state in the moment (Young 1994). Leading is changing one's behavior in gradual increments so that the other person follows. O'Connor and Seymour (1990) believe that leading will not work without rapport, and that one must first build a bridge and then lead people over the bridge.

Beyond the basic notions of outcome specification, sensory acuity, elicitation and calibration of states, anchoring, representational systems, establishing rapport, and pacing and leading, Bandler and Grinder (1975) developed a model language use they termed Meta-Model. This model employs questions to elicit specificity and clarity and is used to bring to awareness an individual's tendencies to generalize, presuppose, construct equivalencies, use nominalizations, and engage in cause-effect thinking and mind-reading.

Although this study uses only the most basic parts of NLP, understanding the powerful thoughts on which these tools are based, and the amount of additional growth that can occur if the group desires to make the effort is important.

Neurolinguistic Programming is clearly aligned with social systems thinking and Robertson's (1988) conception of the individual as a mind and body system, and also supports Senge's (1990) ideas on differentiating thoughts (mental forms) from thinking (mental processes). NLP's techniques for "parts work" (six-step reframing, visual squash, etc.) reinforces the belief that change operates from a systems perspective. Submodality work and language patterns address the contents of the mind, while strategy work and other language patterns address process, and each affect the other. Robertson (1988) suggests that distinguishing whether to work on thoughts, feelings, or values versus thinking, feeling, or valuing is a significant step in any development effort. Now, communication can be viewed as a system in itself. The senders and receivers process the data on several levels based on their "programming" of conscious and unconscious perceptions, beliefs, and behaviors, and the "data" they process consist of the nonverbal signals they send with their body and the imperfect verbal code called language.

Language, Learning, and Frameworks

Cunningham's (1988) research on self-managed learning explores the area of language with particular interest in the NLP questioning techniques presented in The Structure of Magic Volumes I and II (Bandler and Grinder 1975, 1976). The objective of

the process was to obtain sensory-specific data by challenging ambiguous language in order to gain clarity.

> What it convinced me of was the centrality of language. That our language was imprecise, ambiguous and woolly, and that I could see little progress in this field (management development) unless we developed more rigorous and sophisticated ways of dealing with language patterns. The situation, as I see it, is that we have a mass of unclear terms . . . which are allowed to masquerade as precise and with agreed to meaning. (Cunningham 1988, 165)

Cunningham (1988) was studying management developers, specifically instructional staff charged with providing assistance to learners and learning groups who take charge of their own curriculum. As Cunningham's (1988) focus does not closely follow that of this study, an in-depth discussion of his research is not germane. However, some review of Cunningham's (1988) work is appropriate as his work relates to NLP's Outcome Chain Model.

One of the dilemmas Cunningham (1988) found to be significant for study and support group advisors was the determination of to what degree advisors should either support or confront group members. Cunningham's (1988) solution—one supports being and one confronts doing—expresses a fundamental concept of NLP. Cunningham (1988) went on to develop a research framework comprising five interconnecting methods:

> I wanted to emphasize the value of a method of researching which uses
>
> 1. existing theories and ideas (contextual locating)
> 2. situations and contexts of human action (action research)
> 3. the interaction with others (dialogic research and collaborative research)
> 4. and acknowledges and utilizes one's self (experiential research). (Cunningham 1988, 172)

> The ideal is to run these modes almost concurrently. As I am
> talking with others I am aware of myself as well as the other(s); I am aware
> of existing theoretical and conceptual schema and I am aware of the
> context of the action. (Cunningham 1988, 172)

When applied to group interactions, Cunningham's (1988) model provides a useful

descriptive tool that complements the NLP Outcome Chain Model, which will be

described shortly. Cunningham's (1988) dialogue context centers on two-person

interaction, and is most applicable to this study and to the NLP Outcome Chain Model. In

this interaction two people dialogue to "find out." Cunningham's (1988) dialogue model

can be used to either test and develop concepts, models, or propositions produced

elsewhere or to provide these same elements as inputs to other contexts. In one sense

Cunningham's (1988) dialogue is a subset of the collaborative context that is limited to

two as opposed to three or more from the group. The context occurs on occasions when

discussion and verbal sharing take place either between and among two or more group

members, or in some cases episodes of self-talk. Cunningham's (1988) model

encompasses an exchange of divergent thoughts, ideas, and beliefs, which cause the

participants to become acutely aware of and often to reassess their own perspectives in a

way that prompts each to create new meanings.

Cunningham's (1988) collaborative context involves groups that share topics and

processes. There are two types: in the first type the group works on issues or events that

involve the group; the second type involves the group working on an issue that has

happened outside the group and may not affect the group's own processes or experiences.

Both of the dialogue and collaborative contexts are flavored by the environment in which

they operate, the individual knowledge, experiences, values and beliefs of the individuals, and the surroundings in which they live and work. Cunningham (1988) refers to this process as contextual locating, which defines the common core with which the individuals and groups start.

The slight, but necessary, aforementioned digression brings us to the NLP Outcome Chain Model, which can be used to establish goals and behaviors, and to access the beliefs and values that drive and influence them. The outcome model has two distinct parts. One part is designed to elicit a chain of outcomes associated with the structure of an individual's belief and value systems (Young 1994). This part begins by asking what the individual wants–what is the immediate outcome desired? The response is followed by a series of iterative questions that ascertain what the outcome will do for the individual, what will make the desired outcome possible, or what the individual would prefer to have even more than the originally specified outcome. The objective is to continue the question-response pattern until the individual comes to the end of the chain and there are no further responses available. In other words, there is nothing beyond this particular "core outcome" from the desire that was initially stated.

NLP practitioners believe that distinctly different starting points or intermediate outcomes will often lead to the same core outcome, and that individuals have several such core outcomes that represent ultimate goals in their lives. These are the transcendent goals and identifying elements that individuals will attempt to achieve and that will be manifested in their actions. NLP presupposes there is a positive intent behind every

behavior and this, in turn, refers to the individual's core outcomes and the intermediate

outcomes, which are linked together with the behaviors individuals exhibit in order to

achieve specific outcomes.

Figure 2.1. NLP Outcome Chain Model (Part 1)
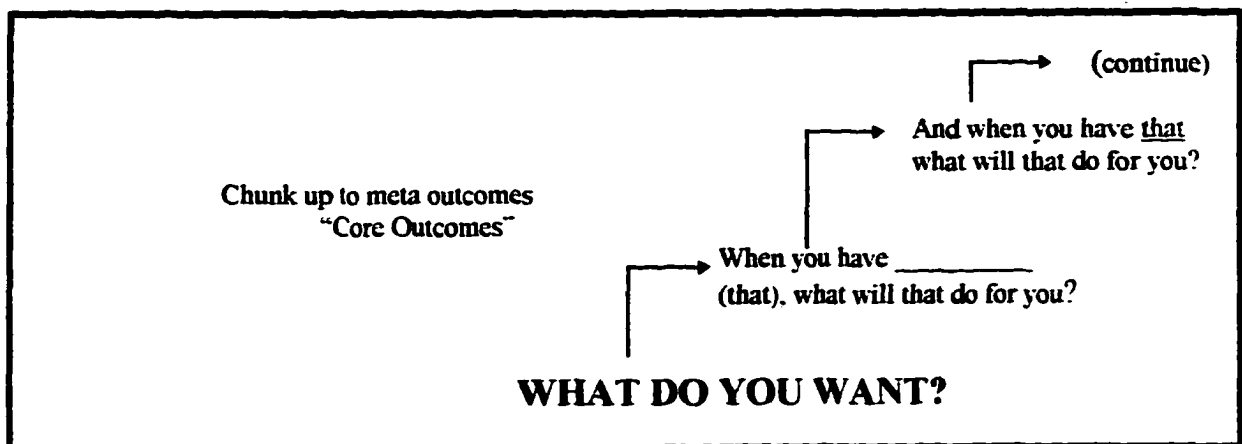

```
                                                              ┌───► (continue)
                                                              │
                                              ┌───► And when you have that
                                              │      what will that do for you?
      Chunk up to meta outcomes              │
           "Core Outcomes"                    │
                                              │
                                 ┌───► When you have _____
                                 │      (that), what will that do for you?
                                 │

                  WHAT DO YOU WANT?
```

Source: Young, J. A. 1994. <u>Developing leadership from within: A descriptive study of</u>
<u>the use of Neurolinguistic Programming practices in a course on leadership</u>. Ph.D. diss.,
Ohio State University: 96.

By encouraging individuals to become aware of and to articulate their own core

outcomes, the NLP hopes to provide an awareness of what motivates a person's behavior

at the deepest levels. This awareness should allow individuals to recognize where they

need more choice in their behavior so that they can work to increase their repertoire of

responses (Young 1994). As a result, a person's behavior can be aligned more closely

with who he or she wishes to be, and can more directly support his or her efforts in

becoming that person.

The second part of the Outcome Chain Model is constructed by questions that move away from the abstract and toward the concrete. Here the person is questioned on evidence criteria, contextual attributes, resources, and personal ecology in an effort to "specify" the outcome sufficiently in order to be able to plan and take effective action toward achieving that outcome (Young 1994). The evidence question asks an individual to describe what he or she will see, hear, and feel, which will provide proof that a desired outcome has been achieved—the evidence question is sensory based. The context question is designed to make the individual aware of others who may be affected by either the outcome the individual is seeking, or by the efforts the individual is making to achieve the outcome. Knowing this should allow the individual to communicate with these people and to try to elicit their support.

One of the more interesting questions in this model is, "What stops you from already having your outcome?" The question asks for insights on both external obstacles and internal resistance. Together these factors address the "ecological" issues surrounding attempts to achieve a desired outcome. This refers to the "ripple" effects of growth and change, which are necessary to fully understand both sides of this issue, considering the impact our changes will have on others, and the second and third order effects the changes will have on ourselves (Robertson 1988).

Understanding the external obstacles, not only what the obstacle is, but why the obstacle is there, is necessary if one is to be fully effective in overcoming the obstacle.

Understanding one's own internal resistance may be even more important in order to avoid unconscious sabotage of one's conscious efforts.

In order to properly administer the model applying what Neurolinguistic Programming calls the well-formedness conditions for the outcome specification is important, which states certain rules that responses to the questions must meet. The responses must be positive, under the control of the individual, addressed to the issues of behavior, and narrow enough to list specific action steps so the individual can then start down the path toward success. Outcomes that are too general become unmanageable and discouraging.

Adequately articulating both internal and external resources is also important. One must not only know what the resources are, but the characteristics of the resources. This knowledge creates an understanding of what the individual has available that he or she has used (or not used), and may reveal resources of which the individual is unaware. Strategies can then be built to efficiently use what resources are available, and if necessary to acquire new resources.

Mental Organization

As with much of the previous research, the information that will be provided to the study subjects is intended for basic self-knowledge, and provides the opportunity to begin traveling down the path of personal mastery toward a better understanding of one's co-workers. The work done by Dilts (1990) and Bateson (1972) on the organization of our mental system adds to our understanding of how the brain functions, and provides a

Figure 2.2. NLP Outcome Chain Model (Part 2)
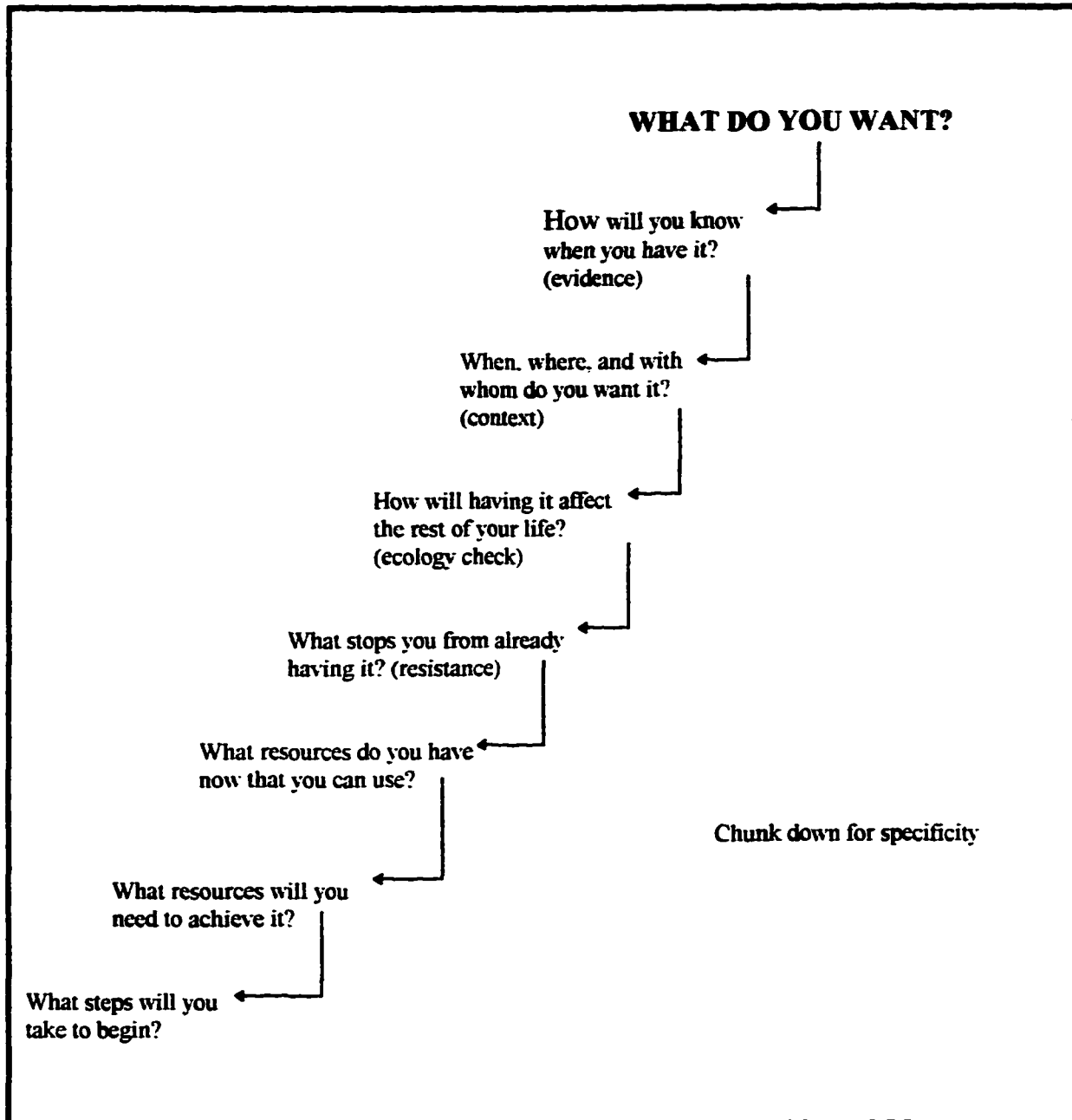
WHAT DO YOU WANT?

How will you know
when you have it?
(evidence)

When, where, and with
whom do you want it?
(context)

How will having it affect
the rest of your life?
(ecology check)

What stops you from already
having it? (resistance)

What resources do you have
now that you can use?

Chunk down for specificity

What resources will you
need to achieve it?

What steps will you
take to begin?

Source: Young, J. A. 1994. Developing leadership from within: A descriptive study of the use of Neurolinguistic Programming practices in a course on leadership. Ph.D. diss., Ohio State University: 41.

framework for the neurology of our learning and communication. This research relates to another of Senge's (1990) disciplines–mental models. Once again, the detail provided in this research is not necessary for the study subjects; however, the detail provides a useful understanding of the information the subjects will receive.

Dilts (1990), drawing on the work of Bateson (1972), identifies six neurological levels that are believed to form the basic organization of our mental system. Bateson's (1972) four logical learning levels can be summarized as follows:

> The first is the level of content, and this is the level at which most people spend their lives. Here one learns how to tie one's shoes, cook a meal, drive a car, and so on. Some people become acquainted with second level learning: the learning of context, or learning how to learn. People who operate at this level may rapidly learn any new content-specific area, because they are capable of moving through the learning process in an efficient, effective manner. In rare cases, persons may rise to the third logical level of learning, the learning of how to learn context. In this case one is operating at a level of contextual pattern recognition; one is able to easily identify and operate on the structure of any experience. It is at this level that Bandler and Grinder operate when they are modeling [or teaching modeling to] some one. Bateson reserved his fourth class of learning for those accomplished persons like yogis and Zen masters. (Einspruch and Forman 1985, 590)

Both Bateson (1972, 1991) and Dilts (1990) believe that any biological or social system is organized into levels. The function of each level is to organize the information below. As our brains operate at different levels, we are capable of different levels of thinking and being.

The most basic level in the hierarchy of Dilts (1990) model is that of the environment, which is where external constraints are encountered. Through our behaviors we operate in the environment guided by our mental maps and repertoire of strategies.

Internally, these define our capabilities, and are organized by our beliefs and values, which are organized by our identity. Dilts (1990) identifies the level beyond identity as spirituality, and is currently researching a level beyond that level. When a person is experiencing difficulty Dilts (1990), referencing his framework, asks if the difficulty is coming from one of the following: (1) from his or her external context?; (2) from not having a specific sort of behavior required by that context?; (3) from not having developed the appropriate map or strategy to generate that behavior?; (4) from a lack of belief or conflicting belief which interferes?; or (5) from some interference at the level of identity? As with Bateson's (1972) hierarchies, Dilts (1990) believes that these are important distinctions, which have significant implications for communication, learning, and change.

A logical consequence of Dilts' (1990) hierarchy is that in order to effect change at any of the levels the issue must be addressed from the level above. Thus, a change at any level will automatically affect the levels below. For example, to change a behavior one should deal with the behavior from the capability level or a level above that, and a change made in belief will spontaneously bring about changes in both capabilities and behaviors. Therefore, one of the goals of working with a people's inner, unconscious world is to uncover beliefs, values, and parts of their hidden identities that hold them back from obtaining what they want, in addition to those that support their efforts.

Dilts (1990) defines beliefs as "generalizations about relationships between experiences," and claims that there are three main types of belief issues: beliefs that deal

with causal relationships, beliefs that deal with meaning relationships, and beliefs that deal with limits. These categories are: (1) hopelessness (if the outcome is not possible, why bother?); (2) helplessness (that may be true for some people, but I don't have what it takes); and (3) worthlessness (I don't deserve it) (Dilts 1990).

Table 2.2. Dilts' Logical Levels

Spiritual (Who Else?)	- Who do we serve and why? By stepping into the metaphor described below we can expand and enrich our lives.
Identity (Who am I?)	- Involves a metaphorical statement of identify, generally connected with a higher mission involving how we serve others. This organizes and explains most of an individual's life history.
Beliefs/Values	- Arises from our sense of purpose and mission in life.
Capabilities (How?)	- In addition to creativity, analysis, and criticism there are "people" skills, sports, and learning. Capabilities can be by-products of preferences for people, places, activities, knowledge, and things. These are elicited in the personal preference section.
Behaviors (What?)	- Concerns skills and capabilities. One way to differentiate the two is to compare typing and writing. Typing is a skill, writing is a capability. The NLP meta-programs are basic skills, away/toward, big picture/detail, procedures/options, and so on. These supply the elements necessary for the capabilities of creativity, analysis, and criticism.
Environment (Where?)	- The lowest level, addresses our preferences for "where and when." Information on this provided in the places and timeline (past, present, future) measures.

Source: Engel, G., and J. Arthur. 1996. The NLP personal profile guide book. Denver, CO: LifeStar: 10.

Dilts (1990) goes on to say:

> One of the interesting things about beliefs is that because they are
> on a different level than behavior or capabilities, they don't change
> according to the same rules . . . . When you have a belief, even
> environmental and behavioral evidence will not change it, because a belief
> is not a reality. You have a belief in place of knowledge about reality.
> Beliefs are about things that nobody can know in reality . . . . The function
> of belief has to do with the activation of capabilities and behaviors. (Dilts
> 1990, 68)

Dilts (1990) cites the work of Bandura (1977) when comparing actual

performance and expectations, and says that the behavior curves rise more sharply as

individuals learn strategies for how to do something. Bandura (1977) refers to this as self-

efficacy–expectation, a belief in one's own effectiveness at doing something (Bandura

1977). This supports the importance of maps and strategies (capabilities) residing at a

level between behaviors and beliefs. Dilts (1990) states, "Beliefs are intended to provide a

motivation and a vision so that actual behavior can begin to develop and rise to meet

them," and "Readiness for change, other major life changes, and the permissions given are

all important with regard to changing beliefs" (Dilts 1990, 73).

This part of the literature review presented the ideas of the earlier section on group

dynamics and social systems thinking and added the notions, first introduced by Bandler

and Grinder (1975, 1976), which state that people can understand how their brains work

and effect changes in themselves, which in turn affect other changes in themselves and

impact others. The impact on others changes group dynamics, which, all being part of a

social system, impacts them and completes the cycle and starts the cycle again. Why,

given even a master's level knowledge of Bandura's (1977) third level of learning, are

some of us better mathematicians and lawyers while others of us are better sculptors and artists? The next section addresses possible physical aspects and characteristics of our brains.

Cerebral Dominance

The concept of Cerebral Dominance is based on the idea that different parts of the brain specialize in performing different functions. The variation in the relative strength or weakness of the different parts of the brain in individuals provides a physical explanation for different behavioral strengths and weaknesses of people in a group. This section reviews the background and history of research in this area, discusses the brain's organization and functions, and discusses how this impacts behavior. This section further details specific surgical research, and discusses the behavior patterns derived from the research.

Background

Another approach (that possibly compliments NLP) to understanding thinking style preferences in individuals is through the area of brain research that focuses on cerebral dominance. Studies by Gazzaniga, Bogen, and Sperry (1963), Sperry (1968), Bogen (1969), and Ornstein (1972), suggest that the left and right sides (hemispheres) of the brain process information in a different and unique manner. The specialization or dominance appeared to be related to structural and functional differences between the two nearly identical halves of the brain. ". . . the two halves of the brain have different functions and are different in the ways they relate to the world. Each hemisphere

processes through different modes" (Saks 1979, 25). Logically, this implies that cerebral dominance results in a preferential mode of processing for individuals.

Many of these assumptions were formed by observing the changed behavior of individuals who underwent surgery on parts of their brain to seek relief from epileptic seizures. Known popularly as split-brain research, these studies later came under considerable criticism by new researchers for their narrow interpretation of the brain's functions (Levy 1976; Franklin and Franklin 1979; Hardyck and Haapanen 1979). These authors believe that the brain functions as a single unit through the use of the corpus callosum, a bundle of nerve fibers that serve as a bridge between the two hemispheres. Meyers (1982) argued that the brain functions as a unified whole, communicating between the halves via the corpus callosum, which serves as a communications link (Meyers 1982). Meyers 1982 believed that the possibility existed for an individual to integrate the artistic and scientific potential within himself or herself. Garrett (1976) supported this position, and stated that the two hemispheres of the brain must cooperate with each other in producing ideas.

Functions associated with the left hemisphere involve linguistic, analytical, and sequential information, while functions associated with the right hemisphere involve nonlinguistic or spatial information in a holistic manner (Sperry 1976; Witelson 1976). Each half of the brain is specialized for different cognitive functions; thus, there should be two perceptions of reality—one based on a linguistic, mathematical system of thought processed by the left hemisphere, and another based on a visual, artistic system of thought

processed by the right hemisphere (Schwartz 1980). Delineating the characteristics

defined by the research, as appropriate to each hemisphere, can help us recognize the

influence of the dominant brain hemisphere on the formation of our cognitive mode of

thinking and learning (Narsiah 1995).

Rennels, (1976) on the other hand, argued in favor of neurological symmetry. This

concept focuses on total reasoning processes, meaning that an individual's neural

functions in both hemispheres must be combined to achieve balanced thinking—a capacity

for intelligence as well as imagination. Rennels (1976) identified the functions most

frequently associated with the brain's left hemisphere as verbal, numerical, linear,

Euclidean, rational, logical, and geometric. Rennels (1976) identified the right side of the

brain's functions as visual, spatial, perceptual, intuitive, imaginative, fantasy, imagery,

metaphoric, and sensory. Movement of "processed" or "pre-processed" information

between the two hemispheres, across the corpus callosum, provides a "holistic" perception

(Grady and Lueuke 1978). Integrated thinking and stimulation of both hemispheres is

relevant, and possibly vital, to the development of well-rounded managers and leaders.

Those who are forced to continually adapt to continuous or rapid change are likely to

benefit from additional right hemisphere stimulation to develop greater creative behaviors.

Garrett (1976) observed that "creative thinkers are alike in their process of perceiving the

world, intuiting phenomena, emotional responses, or interrelationships, and finding the

appropriate mode of expressing their visions" (242). In other words, creative thinkers

seem to demonstrate a capacity to gain from both the "rational left" and "intuitive right"

hemispheres. The following review of the history and findings of the research in this area is presented to provide the background and context for the information that will be provided to the study subjects. As with NLP, the subjects do not need the level of detail for initiation into this area.

History

One of the earliest references to a theory of discrete brain functions in localized brain structures can be found in the Ebers Papyrus of Egypt, which describes the plight of a man who suffered a head injury that resulted in speech difficulty without paralysis of the tongue (Hecaen and Albert 1978). A major contributor to the understanding of the brain and its function was the Greek Physician, Galen (130-200 C. E.) who wrote nearly 500 volumes on the subjects of medicine and philosophy. Galen made the first documented attempt to study the spinal cord to determine its sensory and motor functions. Galen has also been credited with demonstrating that injuries to one side of the brain cause disorders in the opposite side of the body (Durant and Durant 1967).

By the beginning of the nineteenth century, the accepted teaching posited the brain to be the principal organ of the mind, and stated that the brain operated as a whole, "not a concatenation of parts" (Levy 1985, 433). This idea gained even greater acceptance after René Descartes, the famous seventeenth-century philosopher, proposed the theory on the source of the mind and soul. Descartes argued that the brain must act as a unified whole to grasp a mental picture. Descartes also identified the pineal gland in the brain as the seat

of the mind or soul. Although Descartes erred in some aspects, such as the location of the mind for instance, Descartes supported the notion of holistic thinking (Lambert 1982).

Organization of the Brain

During the nineteenth century, there was considerable debate on the topic of the neurological organization of the human brain. According to Benton (1972), the nineteenth-century investigators had essentially ignored the right hemisphere functions, as they considered the right hemisphere to be a minor side of the brain. In 1844, Wigan first proposed that each person might be operating two conscious brains in his or her head, but this hypothesis did not gain support until Bogen's (1869) split brain experiments 120 years later (Puccetti 1973). The proponents of the duality of the mind concept believed that the two hemispheres of the brain had identical functions. One of the principal issues discussed by researchers became that of the localization of functions in the cerebral hemispheres--do different areas of the cerebral cortex serve distinct and different behavioral functions?

This question was addressed in the early 1800s, by Franz Josef Gall who believed that different regions of the brain controlled various and specific functions (Harris 1985). Gall divided the brain into 27 organs, and assigned responsibility for a specific physiological function to each part. Gall's principal opponent on this issue was Pierre Florens who argued that the brain "acted as a whole." What is apparent here is that while Gall advocated a theory of cortical localization of brain function, Gall did not go far enough to identify the functional differences between the cerebral hemispheres (Narsiah 1995).

Discrete Functions of the Brain

In the mid-1800s, a French physician named Paul Broca (1865) authored a classic

work that documented much modern, seminal research supporting the theory of

localization of brain functions. Broca (1865) examined two patients who had lost the

ability to speak before they died, and, during subsequent autopsies, identified damaged

areas in the frontal part of the cortexes. Broca (1865) noted that in both cases the damage

was located in the same part of the left hemisphere of the brains. This discrete area

became known as the Broca's area because a lesion here produced a certain type of speech

and language disruption, which was referred to as Broca's expressive or motor aphasia.

Broca (1869) argued that the asymmetry of language was due to early development of the

left frontal lobe as proposed by Pierre Gratiolet (Harrington 1985). Broca (1869)

postulated that the two lobes are functionally identical in the initial stages, but that they

relate differently to the outside world; thus, he attributed functional asymmetry to the

effect of education and civilization that favored, for the most part, the left hemisphere of

the brain (Broca 1869). However, Broca (1869) rejected the idea of an innate capacity of

the left hemisphere for exclusive acquisition of language. Broca (1869) thought that injury

or disease to the left side of the brain could result in the involvement of the right

hemisphere to carry out the same functions. Broca (1869) was reluctant to generalize

further based on this research and called for more investigation that followed.

In 1874, Wernicke identified a discrete area in the brain concerned with the

understanding of spoken words. Wernicke (1874) found that a specific area in the

temporal lobe of the left hemisphere processed auditory information, and damage to this area caused Wernicke's (or sensory) aphasia. Wernicke (1874) theorized that both Broca's area and Wernicke's area were connected by a bundle of nerve fibers known as the cerebral commissure.

During this same period research began on the right hemisphere. In 1864, Hughlings Jackson observed a patient with a right hemisphere tumor. The individual exhibited difficulties in knowing objects, persons, and places. Jackson called these symptoms "imperception," a defect as severe as aphasia (Taylor 1958). Jackson (1932) believed that the right hemisphere was responsible for processing verbal information for visuoperceptive, visuo-spatial, and visuo-constructive activities (Benton 1977; Jackson 1932). Jackson's (1932) views on the role of the right hemisphere received little support from his contemporary researchers; however, years later in 1935, Weisenberg and McBride (1935) reported that patients with right hemisphere injuries exhibited a specific difficulty in the manipulation of forms, and in the appreciation of spatial relationships.

Cerebral Dominance and Behavior

Within the last forty years the concept of lateral asymmetry of the brain—examining the structural and functional differences of the hemispheres—has begun to receive focused scientific attention (Benson and Zaidel 1985). Earlier, most investigations focused on individuals with damaged brains. Significant findings advanced the understanding of cerebral asymmetry and laterality, particularly in the areas of vision, hearing, touch, and motor control, and a majority of the researchers believed that the left side of the brain was

dominant not only for speech, but also for the processing of all sensory input and control of motor output (Levy 1976).

The idea that only the left hemisphere is used for cognition, and crediting the right hemisphere as having only a minor cognitive function, from a behavioral perspective, generated intense controversy. Springer (1983) suggested that for processing of information, generally the right hemisphere was non-critical while the left hemisphere constantly checked for accuracy.

Initially, cerebral dominance—hemispheric specialization—was applied to language fluctuations mediated by the left hemisphere. This term was later expanded to include the nonlinguistic cognitive functions of the brain as well (Witelson 1976). A number of investigators including Paterson and Zangwill (1944), McFie, Piercy, and Zangwill (1950), Ettlinger, Warrington, and Zangwill (1957), Reitan and Tarshes (1959), and Hecaen and Angelergues (1962), have suggested a right hemisphere superiority regarding some aspects of cognition.

Split Brain Research

In the early 1940s, a pioneering surgical procedure, sectioning the corpus callosum (a major set of nerve fibers forming the cerebral commissure), was developed as a means of reducing the severity and frequency of epileptic seizures (Van Wagenen and Herren 1940). Akelaitis (1943) recognized the value of these surgical operations as a means to gain a better understanding of such specialized hemispheric functions as language and logic in the left hemisphere, and orientation to environment and response to stimuli in the

right hemisphere. Bogen and Vogel (1962) published a second series of split-brain studies in 1962, discussing a patient who had surgically had all neocortical commissures severed. Bogen and Vogel (1962) reported that the patient performed normally on a naming task when objects were placed in the right hand or when objects were placed in the right eye's field of view. However, the patient was totally unable to describe the objects placed in the left hand or the left eye's field of view. These results suggested that each hemisphere was totally out of conscious touch with the other. In addition, the investigators also reported that the left hand was unable to carry out typical skilled motor tasks upon verbal command, but was superior to the right hand in visual constructional tasks such as drawing--a right hemisphere function. Bogen and Vogel's (1962) studies provided initial scientific evidence that demonstrated separate consciousness for each hemisphere of the brain. Subsequent studies by Sperry, Gazzaniga, and Bogen (1969), suggested that each side of the brain had its own perceptions, motivations, memories, and level of consciousness totally isolated from the other.

Left Hemisphere Patterns

For over 100 years the left hemisphere has been identified as a specialized part of the brain associated with language functions, and has often been labeled the "linguistic" or "verbal" hemisphere (Dimond and Beaumont 1974; Doty and Overmann 1977; Gazzaniga 1967; Geschwind 1979). That there is another function that exemplifies split-brain research on asymmetry of the brain better than the linguistic function housed in the left hemisphere is doubtful. Other functions attributed to this hemisphere include

mathematical ability (Gardner 1975), naming (Nebes 1978), analysis of sensory input (Nebes 1978; Dimond and Beaumont 1974; Hamilton 1977), "serial" information processing (Kimura 1975; Hamilton 1977; Kinsbourne 1978; Harcum 1978), controlling verbal behavior and handedness (which are sequential motor activities) (Kimura 1975), storing verbal engrams (Nebes 1978), and mediating rational consciousness (Ornstein 1972; Nebes 1978). One question that is appropriate at this point is, do the hemispheres actually process information differently or do they merely produce a different cognitive style?

The left hemisphere's cognitive styles are considered to be predominantly analytical in thinking, logical in reasoning, digital in the use of numbers, and temporal in keeping track of time (Narsiah 1995). Completing tasks using sequential or linear approaches is also associated with left hemisphere processing. Finally, the left hemisphere's cognitive styles include the temporal type of propositional factors, as well as factors for thinking in words rather than in images (Narsiah 1995).

Right Hemisphere Patterns

The right hemisphere is considered to be superior in construction of visuo-spatial arrangements (Nebes 1978; Geschwind 1979), provides for creativity (Dimond 1972), generates emotional feelings (Geschwind 1979; Hopkins and Kuypers 1976), uses a holistic or gestalt approach to problems (Ornstein 1972; Dimond and Beaumont 1974; Hamilton 1977; Carmon 1978; Trevarthen 1978), and creates spatial and cognitive maps (Nebes 1978), while developing intuitive thinking patterns (Ornstein 1972; Nebes 1978).

Nebes (1978) also maintains that there is a variation in the degree of cerebral dominance, and that there is some evidence that suggests the right hemisphere is capable of some speech comprehension (Gardner 1975; Nebes 1978). The length of a linguistic signal may have something to do with the right hemisphere's verbal comprehension. Zaidel (1978) noted that the right hemisphere is much better at comprehending verbs than nouns.

The right hemisphere's cognitive styles include predominantly synthetic and emotional thinking, intuitive reasoning, and the use of holistic simultaneous processing of environmental information. The right hemisphere is more adept at processing spatial or oppositional concepts than is the left hemisphere. In addition, the right hemisphere is superior in dealing with music or art (Narsiah 1995). The right hemisphere is believed to cause individuals to think in terms of images rather than words (Bakan 1976; Garrett 1976; Goleman 1977; Brook 1978; Grady 1978; Franklin and Franklin 1979). The cognitive functions of attention (Mesulam 1985), perception (Hier, Mondlock, and Caplan 1983), orientation (Fisher 1966), integration (Whitehouse 1981), and memory (Hecaen and Albert 1978) are all attributed to the localized functions of the right hemisphere.

These hypotheses did not provide a clear explanation of how logical distinctions are generated in the brain (Kinsbourne 1980). Kinsbourne (1980) and others believed that cerebral specialization aided some cognitive processes, but did not suggest that the left hemisphere was incapable of adapting to the functions of the right hemisphere or vice versa. A leading advocate for what he termed "appositional thinking," Bogen (1969) coined the term to describe information processing of the right hemisphere in well-

lateralized right-handers. Further research by French and Painter (1991) showed right hemisphere superiority in extracting spatial information from images such as dot patterns in both right and left visual fields (Narsiah 1995).

Inter-Hemispheric Patterns

Research shows that when the dominant hemisphere is disconnected, or experimentally turned off, the minor hemisphere is sometimes capable of the skills that are usually the exclusive domain of the major hemisphere (Dimond 1972; Gazzaniga 1974, 1977; Nebes 1978). Gazzaniga's (1974, 1977) argument to support a more dynamic model of brain organization is a vital step in understanding cerebral dominance with reference to language and cognition. The two halves of the brain are connected through the corpus callosum cerebral commissure (Dimond 1972; Gardner 1975; Watts 1975; Carpenter 1978). This connection allows inter-hemispheric communication to take place— a pathway for information to be transferred from one hemisphere to the other (Gardner 1975).

Gazzaniga (1985) postulates a modular organization for the brain, and believes the notion of linear, unified conscious experience is wrong. Instead, Gazzaniga (1985) believes the brain's relatively independent functioning units work in parallel ways rather than sequential progression. Gazzaniga (1985) further theorizes that these modules frequently operate apart from conscious verbal levels. Gazzaniga's (1985) skepticism on the issue of lateral dominance has continued through to the present.

Figure 2.3. Resident Functions of the Left and Right Hemispheres
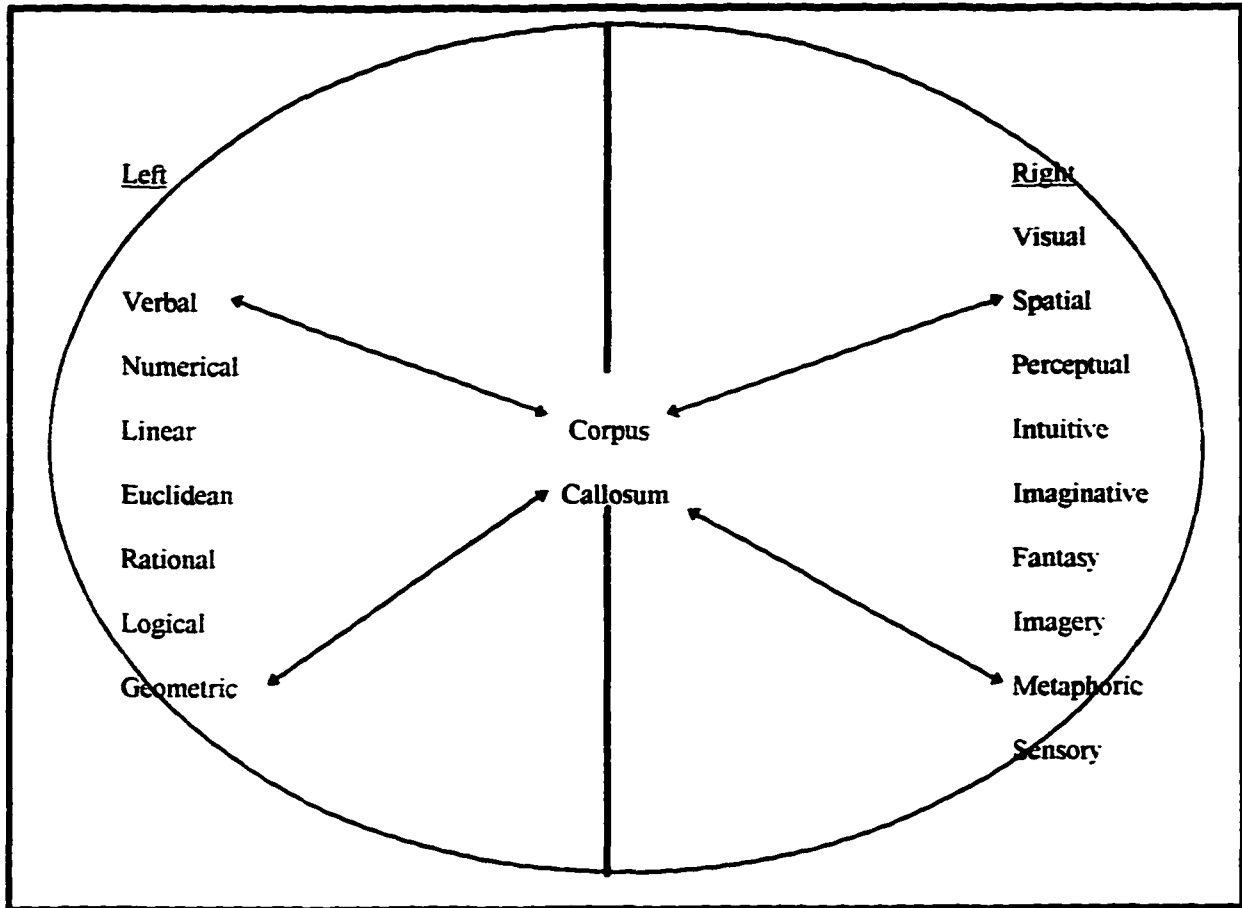
Source: Rennels, M. R. 1976. Cerebral symmetry: An urgent concern for education. Phi Delta Kappan, n.s., 57: 471.

Note: According to figure 2.3, the two hemispheres of the brain are specialized to perform certain discrete functions, and yet would exhibit hemispheric dominance in their perceptions and behaviors. This also implies that stimulation of both hemispheres of the brain is necessary to achieve the benefit of a balanced thinking (Narsiah 1995). Coordination of the brain, functions by allowing independent development of each hemisphere and integration of functions across hemispheres to provide a "holistic" perception (Grady and Lueuke 1978).

One of the research tools that is successfully being used to determine brain

preference is the Electro-encephalogram (EEG). This instrument measures electrical

impulses as they occur in the brain. Using the EEG at Michigan Technical University, Glassner (1982) found that during the writing process, students in the sample group used the left hemisphere of the brain to deal with verbal tasks, and the right hemisphere to deal with non-verbal tasks. Glassner (1982) concluded that in order to produce a fully developed piece of writing the students had to combine both hemispheres of the brain.

In order to clarify the distinctions between the left and right hemispheres and their cognitive functions, Schwartz (1980) postulated that individuals are able to perceive reality in two separate, distinct ways simultaneously—one based on a mathematical, linguistic system of thought, and the other based on a visual, artistic system of thought. Laterality should not be understood in simple left/analytic or right/holistic terms. Brown and Kosslyn (1993) suggest that the differences may best be viewed in terms of different relative abilities as opposed to absolute capabilities. As an example, Brown and Kosslyn (1993) suggest that the left hemisphere is better than the right hemisphere in perceiving visual imagery, while the right hemisphere is better than the left hemisphere in encoding overall patterns and spatial relationships. Therefore, claims for differential cognitive styles, based on cerebral dominance, should not be taken to imply that each hemisphere is incapable of the activities for which the other is specialized (Kinsbourne 1980).

Numerous researchers maintain that structural and functional maturation of the brain is based on progressive lateralization by utilizing both hemispheres with associated changes over time (Satz, Strauss, and Whitaker 1990). Similar statements are made on the issue of left and right processing based on the nature of the task and stimulus material

(Trope, Rozin, Kemler, and Gur 1992). In summary, while individuals may display different classifiable cognitive styles, which can be useful for managers and leaders, one should be cautious in interpreting and basing the absolute reasons for this on lateralization until more biological research can be conducted (Corballis 1980).

Personal Profile System (PPS)

The previous sections dealt with our ability to perceive, learn, and communicate. They provided theories on the structure of our mental organization, and the psychological and perhaps, biological reasons for our learning proclivities and our individuality. This section deals more with the "what" than the how or why of human behavior. This section reviews the background, theoretical underpinnings, and techniques associated with the Personal Profile System (PPS), an instrument used to describe and measure behavioral responses.

Background

The study of human behavior is a search for answers to perplexing questions about human nature. Understanding and directing human behavior has been a goal of politicians, social scientists, religious leaders, educators, and leaders of business and industry as far back as history records (Hersey and Blanchard 1988). Many approaches have been used to understand and to label the basic human characteristics. One popular type of instrument that has come into widespread use in the last few decades is the self-scoring psychological test. These tests are designed to assist individuals in understanding their own behavior and the behavior of their co-workers, and have touched almost every area

Table 2.3. Basic Managerial Brain Processing Functions

	Left Brain Processing Preferences
1. Inductive:	Deals with specifics—(parts to whole)
2. Analytic:	Separates wholes into systematic and sequential parts
3. Verbal:	Precise oral and written communications
4. Linear/Sequential:	Detailed. precise. consistent
5. Logical:	Consistent with universal and known laws
6. Rational:	Consistent with abstract and intellectual reasoning
	Right Brain Processing Preferences
1. Deductive:	Deals with whole concepts—(whole to parts)
2. Synthetic:	Combines parts into holistic concepts
3. Non-verbal:	Precise visual and non-verbal communication
4. Metamorphic:	Non-uniform. changeable. holistic
5. Non-logical:	Consistent with intuitive insight
6. Creative:	Indirect and apriori reasoning

Source: Narsiah, R. E. 1995. Cerebral dominance, leadership behavior and leadership effectiveness among special education principals. Ph.D. diss., Galladut University: 45.

of our society; however, the use of these instruments has been controversial (American Psychological Association 1985). One such instrument, the Personal Profile System (PPS), is a successful self-scoring instrument that measures an individual's behavioral responses along four dimensions: Dominance (D), Influencing (i), Steadiness (S), and

Compliance (C). The PPS claims to provide a systematic and comprehensive perception

of one's behavioral tendencies (Henkel 1989).

Geier (1979), the instrument's author, used Marston's (1928) procedure for

clustering human traits for the four dimensions. Geier (1979) crafted the test to be

consistent with Cattell's (1946) belief that "one could arrive at a short list of the main

common traits, then characterize a person according to a trait profile or psychograph."

The instrument is very popular, and has been used to measure millions of people since its

publication in 1977 (Performax Systems International 1984). Organizations in the private

and public sector have invested large amounts of money and energy, and made extensive

use of the PPS in hiring, placing, developing leadership skills, promoting, and for building

world teams (Henkel 1989), based on Geier's (1979) claim that the PPS provides a good

insight into a person's behavioral strengths and weaknesses. The United States Armed

Forces, and the United States Air Force (USAF) in particular, have made extensive use of

the PPS in Professional Military Education (PME) and in USAF Quality Centers to

provide tools for individuals to gain insight on themselves, peers, supervisors, and

subordinates.

Theoretical Underpinnings of the Personal Profile System (PPS)

As described earlier, the PPS measures behavioral traits in dimensions of

Dominance, Influencing, Steadiness, and Compliance.

> People with Dominant tendencies have the results they want well in
> mind. Their messages are designed to stimulate and prod others to
> untested action. They are attentive to communication which will speed up

the action. Questions about the right action are shrugged away. These individuals feel they can change the course of action. (Performax Systems International 1986, 7)

People with Influencing tendencies also want to shape and mold events and have an active voice. Their messages are designed to stimulate and prod others to action by working with and through people. They are interested in people and like to make people feel good about themselves. They are particularly attentive of the personal needs of others and search for ways in which to meet these needs. Messages about how to actually accomplish this task are often deemed unimportant; these stimuli are at the far range of their attention span. (Performax Systems International 1986, 7)

People with steadiness tendencies are interested in the how and why—a product orientation. They send messages which reflect their interest in maintaining a stability within themselves and the situation, between the old and the new. Messages which urge action before knowing how to do things fall on deaf ears. (Performax Systems International 1986, 7)

People with Compliance (to their standards) tendencies reflect their product orientation when they send messages which ask the reasons for change. "Why" is a favorite question. They have concern for doing it "accurately." They are receptive to messages which reassure them they are doing it correctly. Messages which ignore this tend to go unheeded. (Performax Systems International 1986, 7)

Geier (1979) and the authors of PPS view the four behavioral dimensions as

situational, as people respond to the requirements of various situations differently.

"Whatever the person's biological diversities, they [sic] will, if capable of learning, take on

the attributes the situations call for" (1979, 23). Geier (1979) expanded upon Marston's

(1928) theory that there are two dimensions (active and passive), built on four basic

behaviors people display–Dominance (D) and Inducement (i) for active behaviors, and

Submission (S) and Compliance (C) for passive behaviors. Geier (1979) believed

Marston's (1928) theory was consistent with what Jean Piaget called active component

assimilation, meaning the environment is made to provide the satisfaction one desires. The passive component is labeled accommodation, and implies that one learns to live with whatever the environment offers (Flavell 1966). Geier (1979) used Marston's (1928) procedure for clustering the descriptors for the four dimensions, but changed Marston's (1928) term Submission to Steadiness, and Inducement to Influencing, with out an explanation, when developing the PPS. A representative listing of the traits correlated to each of the dimensions is listed in table 2.4.

Geier (1979) maintained that Marston's (1928) formulation for understanding human behavior could be applied to personal situations and the work environment. Geier (1979) used Marston's (1928) four dimensional constructs as a framework for a psychological testing instrument for research, and by 1977 claimed the instrument was a complete educational system that could be self-administered, self-developed, and self-interpreted. Originally called the Personal Work Profile (PWP), after being revised in 1979, Geier (1979a) renamed the instrument the Personal Profile System (PPS). The PPS was revised again after Henkel (1989) demonstrated a weaknesses in the instrument.

Technique

The current PPS is a revision of the 1989 instrument, and contains a measurement device that generate scores for each dimension, a graph for plotting obtained scores, directions for interpreting scores, and interpretational formats. The respondents select from 28 panels consisting of two columns labeled MOST and LEAST. Each column in each panel contains four descriptors. For each panel respondents choose the descriptor

that is most like themselves in the MOST column, and least like themselves in the LEAST column (Performax Systems International 1986).

Scores are plotted on three graphs each of which represents different interpretations of the scores. The graphs are labeled as: Graph I behavior–expected by others, Graph II behavior–instructive response to pressure, and Graph III behavior–self-perception (Performax Systems International 1986). These graphs produce behavioral patterns that may or may not be different for each graph. A respondent will have 1 to 3 patterns out of a possible 18; 15 of which have been collected in the Library of Classical Patterns (Geier and Downey 1982). The patterns describe inclinations of the subject regarding emotions, goals, method of judging others, method of influencing others, value to an organization, overuse of behaviors, manner and attitude, conduct to be expected under pressure and fear, and ways to increase personal effectiveness. Geier (1979) reported individuals could use this instrument to report on themselves and others with a high degree of accuracy.

The PPS also serves as the basis for over a dozen other very successful learning instruments published and distributed by Performax (the current owner of PPS). These other instruments include the Job Factor Analysis System, the Action Projection System, the Listening Climate Indicator, the Climate Impact Profile System, the Values Analysis Profile, the Child's Profile, the Performance Pathfinder, the Persona Matrix, and the Activity Perception System. Although research results on the effectiveness of the PPS

have been mixed (Henkel 1989), the instrument's commercial success indicates that those

who use the PPS believe that the instrument provides them with valuable information.

Table 2.4. Personal Profile System Four Dimensions of Human Behavior and Descriptors

DOMINANCE	INFLUENCING	STEADINESS	COMPLIANCE
adventurous	admirable	accommodating	accurate
aggressive	affectionate	attentive	adaptable
argumentative	animated	cheerful	adherent
arrogant	attractive	companionable	agreeable
assertive	boastful	confidential	calculating
bold	charming	considerate	calm
brave	companionable	contented	cautious
competitive	confident	controlled	conformist
daring	convincing	deliberate	consistent
decisive	cordial	earnest	contemplative
defiant	energetic	easy mark	cultured
determined	expressive	even-tempered	devout
direct	fervent	friendly	diplomatic
eager	flexible	generous	easily-led
fearless	fluent	gentle	exacting
firm	good mixer	good-natured	fearful
force of character	high-spirited	gracious	fussy
forceful	inspiring	hospitable	God-fearing
inquisitive	jovial	kind	harmonious
inventive	joyful	lenient	humble
irritable	life-of-the-party	loyal	logical
nervy	light-hearted	mild	objective
original	open-minded	moderate	obliging
outspoken	optimistic	modest	peaceful
persistent	persuasive	neighborly	precise
pioneering	playful	nonchalant	receptive
positive	polished	obedient	resigned
rebellious	popular	patient	respectful
restless	prideful	peaceful	soft-spoken
rigorous	proud	possessive	strict
self-reliant	responsive	reliant	systematic
stubborn	self-assured	sentimental	tactful
unconquerable	spirited	sympathetic	timid
vigorous	talkative	trustful	tolerant
willpower	trusting	willing	well-disciplined

Source: Geier, J. G. 1979. Emotions of normal people. Minneapolis, MN: Persona Press: 72.

Summary

Human beings are social animals, their membership and participation in groups and group activities is at the core of their existence. Although management fads have come and gone, group and team performance has always been recognized as being important to the health and success of an organization. In today's global economy, the "quality" example being that of Japanese management, with its emphasis on leadership and teams, effective team performance can make a critical difference to competitiveness, and success or failure. Yet the nature of our fast-paced, highly mobile society can make building cohesive groups much more difficult.

George Barna (1990), among others, believes that the high level of our culture's transience makes building and maintaining significant relationships difficult, and interferes with our ability to communicate effectively. This fact has serious implications for the kind of primary groups addressed in this study. Studies by Sherif and Sherif (1953) indicate that cohesiveness in small groups is critical to success. Further research by Girard (1964) shows that personal interactions are the key factors in group formation and cohesiveness, and that interaction skills and communication skills are essential ingredients to success.

Recent management theory on learning organizations, by Senge (1990) and others, follows this reasoning by emphasizing the importance of developing the individual. Two of Senge's (1990) five disciplines address this thought. Personal mastery is concerned with continual development of the individual's potential, as an ongoing process of self-understanding, enlightenment, and improvement. Mental models are concerned with

improving and expanding the way an individual thinks–a process of increasing the options

individuals perceive by understanding our though process and enlarging our field for

possibilities. These disciplines are then combined to create a group synergy using the

disciplines of shared vision and team learning.

At several levels, systems thinking pertains to both the personal level and the

group level. Social systems can be described in terms that are compatible with general

systems definitions, and both groups and individuals can be described as social systems.

The key to applying this description, for the purpose of this study, is the implication that

systems are constantly in a state of flux, and that a change in any component will have

some effect on related components. This mutual causation can be understood in terms of

interactional dynamics. Simply put, if an individual is in a social system and his or her self-

knowledge is changed, this change should, in some way, change his or her behavior, which

will then effect other changes. In a group or team, which is another social system, the

changed behavior of one individual should cause changes in the group, which, in turn,

causes a change in the individual and starts the cycle over again. As Montgomery and

Fewer (1988) point out, communication and interaction are at the heart of social systems.

Communication in its simplest form consists of a transmitter, receiver, and

message. Human transmitters and receivers have a plethora of filters that color or flavor

the message. If we give individuals a better understanding of who they are and how they

communicate, communication should become more effective, the individual's group

should become more cohesive, and group performance should improve. The study uses three different self-assessment tools to measure these goals.

Neurolinguistic programming (NLP) is a set of models, skills, and techniques that can be applied to communicating and learning. One important NLP theory is that people view the world and learn through their senses, and that one sense is generally dominant— Visual, Auditory, or Kinesthetic. If people understand in which "modality" they are, and in which modality their co-workers are, they can learn and communicate more effectively. Learning how to "read" language preferences and eye movements are clues that can be a powerful tool to help either to initiate or to facilitate change.

An approach to understanding basic personality preferences is based on the idea that certain thinking and personality traits reside in different parts of the nearly identical halves of the brain, and in most individuals, one part or the other will be dominant in producing certain characteristic tendencies. This "cerebral dominance" has been increasingly studied since the 1940s, and can indicate where an individual's inherent strengths and weaknesses lie. The left brain has often been labeled the linguistic or verbal hemisphere and is thought to include, among others, mathematical ability, naming, and serial information processing. The right brain, on the other hand, is though to include visual or spatial processing, and intuition. Understanding these inherent strengths and weaknesses should provide a valuable insight to an individual's interaction in a small group.

The Personal Profile System (PPS), developed by Geier (1979) provides fundamental information on basic tendencies (dominant, influencing, steadiness, and compliance) that are combined to form behavior patterns. These basic tendencies describe an individual's inclinations with regard to emotions, goals, method of judging and influencing others, conduct under pressure, and areas of most value to an organization. Once again, this knowledge provides an insight that can substantially improve an individual's self-knowledge and improve his or her ability to interact with others.

In addition to self-assessments based on NLP, Cerebral Dominance, and the PPS, the study will provide a simple guide (also based on NLP, Cerebral Dominance, and the PPS) that will help individuals recognize the traits and idiosyncrasies of their coworkers. This information provides individuals with the opportunity and tools to start down the path of personal mastery and improved mental models.

In summary, the literature provides a social systems framework that states groups influence and are influenced by their members. A change in a group member should change the group. Further, the literature indicates that interaction, based on personality, learning and communication, and behavior plays a key role in group identity, power, and performance. The research also provides an explanation and description of useful tools to increase awareness of personality, learning and communication, and behavior. The research question, presented in chapter 1, seeks to understand how these tools affect the performance and cohesion of a group with a transient population. The research question's propositions seek to understand how the tools affected individual group member's

awareness of personality, learning and communication, and behavior. Based on the

literature, the research should indicate a convergence of data that points to increased

individual awareness and increased group cohesion and performance.

CHAPTER III

METHODOLOGY

This chapter contains a summary of the key assumptions and hypotheses of the research, and describes the research design, research procedures, research training material, and research limitations. The review of procedures includes a description of the organization (including demographics), survey instruments, and performance measurements.

Assumptions and Hypotheses

Four assumptions, derived from the literature review in the chapter 2, support two hypotheses that are central to this research. The first assumption is that groups are critical to all parts of society in general and specifically to the work place. The second assumption is that groups with higher cohesion will outperform groups with lower cohesion in most situations. A third assumption is that individual personality and behavioral styles, and learning and communication styles are important elements in group interactions that affect cohesion. The fourth and final assumption is that a change in part of a social system (an individual) will affect the system, which will in turn affect the part in a continuing cycle. Based on these four assumptions two working hypotheses can be derived. First, improving individual group member's understanding of how he or she and his or her co-workers learn, communicate, and behave will improve group cohesion.

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Second, improving individual group member's understanding of how he or she and his or her co-workers learn, communicate, and behave will result in improved group performance.

The research area was further narrowed by the limitations and exigencies of the work place. Many organizations do not have the resources to provide in-depth, lengthy training in these areas, particularly when the work force is constantly changing. The training material had to be reputable, commercially available, inexpensive (in terms of time and money), and easily administered.

General Research Objective

The aim of this study is to determine if the administration of personality, learning and communication, and behavior self-assessment tools and training aids to individuals in a small transient group will improve group cohesion and group performance. The study's research plan incorporates a modified explanatory case study method with converging, multiple sources of evidence (Yin 1994). The method uses surveys, interviews, and performance data. Construct validity is established by the use of validated survey instruments and performance data, as well as procedures listed in the Design and Procedures section of this chapter. Internal validity is confirmed by showing a causal relationship via data analysis. Procedures for analysis are discussed in the Analysis section of this chapter, as well as in chapter 4. External validity, which "establishes the domain to which a study's findings can be generalized" (Yin 1994, 33), is supported by the research through a detailed description of the size, transient nature, and demographics of the group

studied in the Research Procedures, Organization Studied section of this chapter. Finally, reliability is addressed in the Design and Procedures section of this chapter by plainly demonstrating the data collection procedures so that they can be replicated.

Case studies investigate contemporary phenomena within real-life context, especially when the boundaries between phenomena and context are not clearly evident (Yin 1994, 13). Case studies cope with situations in which there may be more variables of interest than data points, which is one reason they rely on multiple sources of data that converge. Case studies also benefit from the prior development of theoretical propositions (Yin 1994). Moreover, evidence from more than one strategy can be incorporated into a case study format to provide converging lines of evidence. Two conditions that have a large influence on study design are the type of research question posed and the control an investigator has over actual events (Yin 1994). "How" and "Why" questions, which are explanatory in nature, favor the use of case studies, experiments, and histories because these questions deal with operational links that must be traced over time. A case study is preferred when examining events where relevant behaviors cannot be manipulated directly, precisely, and systematically, but direct observation and systematic collection of contemporary data can be accomplished (Yin 1994, 8). One of the five different applications of a case study in evaluation research is to describe an intervention and the real-life context in which the intervention occurred (Yin 1994, 15). This application describes the environment of this research. Using previously developed theoretical propositions on personality, behavior, communication, learning, and social systems as a

framework to link group cohesion and performance, the study uses "before and after" survey and performance information, and "after" survey related interview data, plus other descriptive data to describe the affects of an intervention in real-life context. Given the preceding discussion, and the assumptions and hypotheses listed earlier, an overview of the study's procedures, questions, and analysis is appropriate.

Design and Procedures

The study spanned a seven-month period. Selection of the group and group performance data was conducted in April, 1996. Permission to study the group and gain access to the group's performance data was also obtained at this time. The group selected for study was based on the researcher's knowledge of organization and accessibility. The parent group was large enough to provide a large (more than 30 individuals) "control" group as well as a large "experimental" group. The selection of "Suspense" data as a measurement for group performance was based on the researcher's knowledge of group activities and accessibility. Most of the group's activities and "products" were classified—the suspense data were not. Group performance data collected in April and May, 1996 were selected for a measurement of pre-training performance. The survey instrument, which will be described later, was selected in May, 1996. This instrument was chosen because not only was the instrument a validated instrument, but also the instrument had been used to measure group cohesion in similar situations. Selection criteria for the training instruments that were used is described in detail in the Training Materials section

in this chapter. Primary consideration was given to ease of administration, low time and cost, and "user friendliness."

In July, 1996 the researcher administered a 120-minute training session that started with the subjects' completion of a release form and a demographic form (appendix A and appendix B) and a Research Pre-Survey (appendix D). Three self-assessments on Neurolinguistic Programming, Cerebral Dominance, and the Personality Profile System, and a brief explanation of a researcher-developed reference guide were then accomplished. In order to minimize the potential impact of the Hawthorne effect the researcher did not discuss the research with any of the subjects after the July, 1996 training, except to answer specific questions on the self-assessments or the reference guide. Suspense data collected in September and October, 1996 were used for measuring post-training group performance. A Research Post-Survey was completed by the subjects on 1 November, 1996.

Questions

The research question is as follows:

1. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group cohesion and group performance?

Two primary case study questions were developed from the research question. The primary questions were derived from the research question by separating the issue of cohesion and group performance to facilitate measurement.

1. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group cohesion?

2. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group performance?

The four secondary case questions, taken directly from the supporting propositions listed in chapter 1, remain the same, and are as follows:.

A. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group members' understanding of how they learn and communicate?

B. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group members' understanding of how their coworkers learn and communicate?

C. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personal Profile System Self-Assessment, and training affect group members' understanding of their personality and behavioral idiosyncrasies?

D. How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personal Profile System Self-Assessment, and training information affect group members' understanding of their coworkers' personality and behavioral idiosyncrasies?

Analysis

Analysis of the data collected in this study falls into two categories: descriptive and explanatory. The descriptive category included information on the group and environment so future researchers can understand the specific context of the research. Information in the explanatory category is used to draw conclusions, and specifically to answer the questions posed by the study. The hypotheses, based on the research reported in chapter 2, assert that improving understanding of behavior, personality, learning, and communication in individuals, will result in improved group cohesion and improved group performance (Bales 1950; Girard 1964; Montgomery and Fewer 1988; Rogers 1961; Senge 1990; Sherif and Sherif 1953). In order to accept these assertions for the particular situation this research is studying, there must be a consistency or convergence of multiple sources of evidence. If the individuals in the group believe they better understand behavior, personality, learning, and communication, *and* if the group cohesion index rises, *and* if the group performance improves, the assertions can be accepted without qualification. If the evidence is not consistent the assertions must either be rejected, or accepted with qualifications that explain the inconsistency and point toward additional clarifying research. For this study, analysis will initially be done with pattern matching–a

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simple "eyeball test" (Yin 1994, 25) consisting of "has there been an increase or decrease [or 'no-change']" after the intervention. If the results "pass" this first analysis, because the data are quantifiable, further analysis is then possible to determine the "statistical" validity of the results. The tests for this second level will be described in depth in chapter 4. For unqualified acceptance of the hypotheses the data must support a level of significance of at least 0.05 ($\alpha = 0.05$). The research procedures that follow provide detailed information on the group studied, and the tools used to measure both attitude and performance.

Research Procedures

This section describes the parent organization and structure of the group studied, and reviews the demographics of the group. This section also discusses the instrument used to measure group attitudes on cohesion, learning and communication, and personality and behavior. Finally, the method used to measure group performance is reviewed.

Organization Studied

In the Department of Defense, an organization with a broad continuing mission, under a single commander, and composed of significant assigned components of two or more of the Services (e.g., Army, Navy, Air Force), is designated by the President as a "Unified Command." This is usually done by the Secretary of Defense who publishes a Unified Command Plan. Unified Commands can be regional, such as United States European Command, or functional, such as United States Transportation Command.

United States Space Command (USSPACECOM) is a Unified Command that was formed

in 1985 to direct, organize, and employ forces for all aspects of space operations (United

States Space Command 1996).

USSPACECOM's missions include ballistic missile early warning and space

surveillance support for the North American Aerospace Defense Command (NORAD),

responsibility for operating space lift systems and satellites in orbit, and providing support

to "terrestrial" forces with space-based weather, navigation, communication, and

surveillance systems (United States Space Command 1995). Like most unified

commands, USSPACECOM is organized into a command element, with such functions as

Protocol, Public Affairs, History, and Judge Advocate (legal), and six major subdivisions

called "directorates" with a "flag" officer (Army, Marine or Air Force General, Navy

Admiral) in charge. These directorates are Personnel (J1), Intelligence (J2), Operations

(J3), Logistics (J4), Plans (J5), and Communications (J6). The Operations Directorate

exercises combatant command of Department of Defense space assets, and provides space

support to National Command Authorities and other combatant commands. The

Operations Directorate develops operational inputs to, and executes operations plans for,

space operations that include space surveillance and control, space launch and satellite

operations, and strategic and theater ballistic missile warning. Additionally, the

Operations Directorate manages and executes the oversight of the space-related portion of

joint training and exercises, and establishes guidance and policy for USSPACECOM's

four mission areas: Force Enhancement, Space Forces Operations, Force Application, and Space Control (United States Space Command 1995).

The Operations Directorate is further divided into three divisions. The Space Systems Division (J33), consisting of approximately 70 people, is responsible for developing operational requirements and strategy for assigned space systems that include launch, satellite, early warning, and command and control. The division develops policy, standards, and directives for dedicated and augmented space forces. The division monitors modifications and improvements to all assigned space systems, and coordinates space activities with component commands (Air Force Space Command, Army Space Command, and Naval Space Command), the Joint Staff, other Department of Defense agencies, and other government departments and agencies (State Department, Department of Transportation, NASA, etc.) (United States Space Command 1995). J33 is further divided into five branches.

Two of the branches, consisting of approximately 39 people, were used as the experimental group for this study, the remaining three branches were the control group. The Mission Operations Branch (J33O), consisting of 19 people, is responsible for Force Enhancement (space-based support to air, land, and sea forces), launch systems, satellite and ground based ballistic missile warning systems, satellite communications and satellite control, and sensor networks (United States Space Command 1995). A detailed list of system and operational responsibilities for the Mission Operations Branch is listed in table 3.1. The Space Control and Information Warfare Branch, consisting of 20 people, is

responsible for all Space Control (surveillance of objects in earth orbit, protection of US

and allied satellites, prevention of hostile exploitation of US and allied space systems, and

negation of hostile space systems), Information Warfare (IW), and Special Technical

Operations (STO). The Space Control and Information Warfare Branch has responsibility

for all space surveillance systems, is the focal point for all special access security

programs, and is the focal point for all space control and IW concepts, planning, and

interface with outside agencies (United States Space Command 1995). A detailed list of

system and operational responsibilities for the Space Control and Information Warfare

Branch is listed in table 3.2.

Group Demographics

A total of 31, out of the possible 39, people were subjects in the experimental

group for this research. Air Force policy did not allow the four US Air Force civilian

employees in this group to participate in the research. Of the remaining 35 people, in

August two were sent to Washington, DC on four month temporary duty (TDY), and one

was transferred to a new base. In early September, another individual was removed from

the organization due to court-martial proceedings. The remaining 31 individuals were

present from mid-July through the end of October.

Individuals in the group were from all four services and included both officers and

enlisted personnel. As most of the systems controlled by United States Space Command

(USSPACECOM) are "owned" by the Air Force, most of the personnel, almost half, were

Air Force personnel. The joint or unified nature of the command was demonstrated by the

presence of seven Navy, five Marine Corps, and four Army personnel (figure 3.1 and appendix C).

Individuals in the group came from diverse backgrounds (appendix C). Only 16 had previous experience in space operations, and military service ranged from 6 to 21 years (figure 3.2). Almost half the group (14) had experience with some previous personality self-assessment in the past.

All but one of these individuals had taken a Meyers-Briggs Personality Test. The research was particularly interested in the group factors that determined transience. These factors included the number of months individuals had been assigned to USSPACECOM, the number of months individuals had been in their present job, and finally, the number of days individuals were gone for temporary duty (TDY). The average time assigned to USSPACECOM was 14 months; however, the range of time was almost evenly spread from 1 month to 48 months (figure 3.3 and appendix C). The numbers for months in the job were very similar, with the average time at just under 11 months and the spread ranging evenly from 1 to 48 months (figure 3.4 and appendix C). The average length of TDY was 23 working days. This was less evenly spread with 38% (12 people) being gone 20 to 30 days, and 29% (9 people) being gone 10 to 15 days. Three people had no TDY commitment at all, and the remaining seven were spread between 40 and 65 days (figure 3.5 and appendix C).

Several conclusions about the group can be drawn from the demographics. There are very few long-time "veterans" with USSPACECOM in the group. Only two

Table 3.1. Mission Operations Branch

Space Operations Section	Air Force Satellite Control Network (AFSCN)
	Blue Space Order of Battle
	Civil Environmental (GOES, NOAA, TIROS)
	Consolidated Domestic Launch Forecast
	Defense Meteorological Satellite Program (DMSP)
	Domestic Launch Manifest, Mission Model, and History
	Errant Domestic Launch Reporting
	GLONASS Issues
	Global Positioning System (GPS)
	LANDSAT/SPOT
	Launch Correlation Unit
	NASA Memorandum of Agreement (Commercial Launch)
	Satellite Control (NAVSOC)
	Space System Integration Planning
	Navigation Element Assessment Working Group (EAWG)
Sensors Warning Section	Defense Support Program (DSP)
	DSP Scheduling and Performance Analysis
	PAVE PAWS Missile Early Warning System
	Ballistic Missile Early Warning System (BMEWS)
	PARCS radar
	Pirinclik radar
	Ground Based Radar Scheduling and Performance Analysis
	ITW/AA Command Lead
	Space Based Infrared System (SBIRS)
	Mobile Ground System (MGS)
	NUDET Surveillance
	Theater Event System (TES)
	Shared Warning System
	Theater Operations Support Steering Group
	Joint Space Support Team Augmentation
	Operation Review Board Oversight

Source: United States Space Command. 1995. UMD38-4 (HQ USSPACECOM Command organization and function. Colorado Springs, CO: HQ USSPACECOM: 18-19.

individuals had 24 months or more time in the command, and only seven individuals had more than 18 months. As previously mentioned, the remaining individuals' time varied from 1 to 17 months (figure 3.3 and appendix C). There were even fewer long-term veterans in the group itself. Only one individual had more than 18 months. Group

membership time was very evenly spread from 1 to 18 months (figure 3.4 and appendix

C). This indicates a high turnover rate, i.e., a high level of transience. In addition, almost

half of the group members had substantial TDY commitments, which kept them physically

apart from the group for 30 to 60 out of the 260 working days of the year (figure 3.5).

This number does not include the 30 days of annual leave each group member is

authorized.

Table 3.2. Space Control and IW Branch

Special Technical Operations (STO) Section	Oversees staff and component STO activity
	Operational plans for STO programs
	STOMF POC
	STO exercise integration
	Oversees STO development programs
	STO command and control links
Information Warfare (IW) Section	Oversees staff and component C2W
	USSPACECOM C2W strategy
	Appendix 10 to Annex C for supporting plans
	C2W support for CAT/Battle Staff
	USSPACECOM SPECAT Program
	Electronic Warfare Operations
	C2W hardware/software integration
	C2W integration exercise integration
	PSYOP Program
Space Control Section	Operations policies/procedures concerning space surveillance, protection, prevention and negation
	Space-related targets/Target Steering Group
	Space Surveillance Network (SSN)
	Space Debris/Collision Avoidance
	Laser Clearinghouse Program

Source: United States Space Command. 1995. UMD38-4 (HQ USSPACECOM
Command organization and function. Colorado Springs, CO: HQ USSPACECOM: 20.

Figure 3.1. Group Personnel
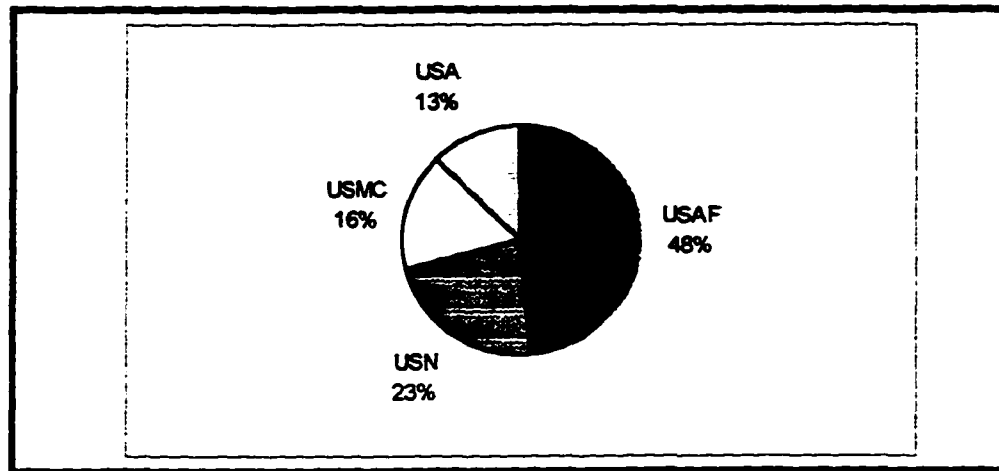
Group Attitudes

Viewing humans as social beings whose interactions shape one another and shape

the realities they are co-creating is fundamental to this research; therefore, gauging the

collective perception of the group's cohesion is central to the design of the study. This

section will review the instrument used to measure group cohesion and the foundations on

which the instrument is based. Additionally, this section will briefly describe

measurements of learning and communication, and personality and behavior that were

obtained.

Cohesion

The concept of a "glue" that holds individuals together and helps them perform in

a group is the sociological concept of cohesion. The studies of cohesion, and our

understanding of the concept, have continued to grow along with our growing

understanding of the essential importance of groups and group performance. Today, discussions on cohesiveness can be practically divided into two categories. The first category is concerned with the attraction of group members to each other and group membership. The second category, and the one on which this research focuses, is concerned with distinct aspects of group behavior where cohesion influences levels of group efficiency at various tasks. In this case, the feeling among group members is less important than the ability to function at a certain level. Taken together in a single concept, cohesion can be defined as the average resultant force acting on members with direction toward the group (Festinger 1950).

Today most theorists support the principle that as cohesion increases in a group, the power of the group to influence its members will increase. Research has shown that the power of the group is equal to the magnitude of the force on the member to be a part of the group. The greater this force is the more influence the group will have on its members (Thibaut and Kelly 1959). Johnson and Johnson (1975) created schematics for showing the cause and effect, and determinants and consequences of group cohesiveness (244). Important factors they include are trust, acceptance, support, openness, sharing, and cooperation. Another important factor, group productivity, will be covered later in this chapter in the section on performance.

Cohesion was measured through a before and after questionnaire originally developed by Widmeyer, Brawley, and Carron (1985) for research on sports teams. Based on the work of Johnson and Johnson (1975) the instrument measures cohesion on

four dimensions: attraction to group-social, attraction to group-task, group integration-task, and group integration-social. The instrument has been supported as valid and reliable for cohesion research in two ways (Carron, Widmeyer, and Brawley 1985; Widmeyer and Williams 1991; Williams and Widmeyer 1991; Brawley, Carron, and Widmeyer 1993). First, through factor analysis, the research can be used to examine how different factors influencing cohesion interact and affect a group. The second and simpler use for this research is for the calculation of a group cohesion index. Two minor modifications were made to the instrument. Two questions that pertained to satisfaction with the amount of playing time were dropped from the questionnaire, and "group" was substituted for "team" (appendix D and appendix E). When asked by the researcher, both Widmeyer and Carron stated this would not impact the reliability of the instrument for content validity (determining a cohesion index). The group cohesion index is obtained by determining an average of the answers from the 20 questions for each subject, and then calculating an average score for all the subjects in the group. Procedures for analysis of the data produced by the questionnaire will be discussed in chapter 4. Finally, the research looks for a consistency (or convergence) between a change in the group's perception of cohesion, as determined by this instrument, and group performance as measured by the procedures that will be described later in this chapter.

Learning and Communication

Measuring a change in the group's understanding of learning and communication was not a central focus of the research. However, to increase convergence of evidence,

Figure 3.2. Group Demographics Years of Service

YEARS OF SERVICE
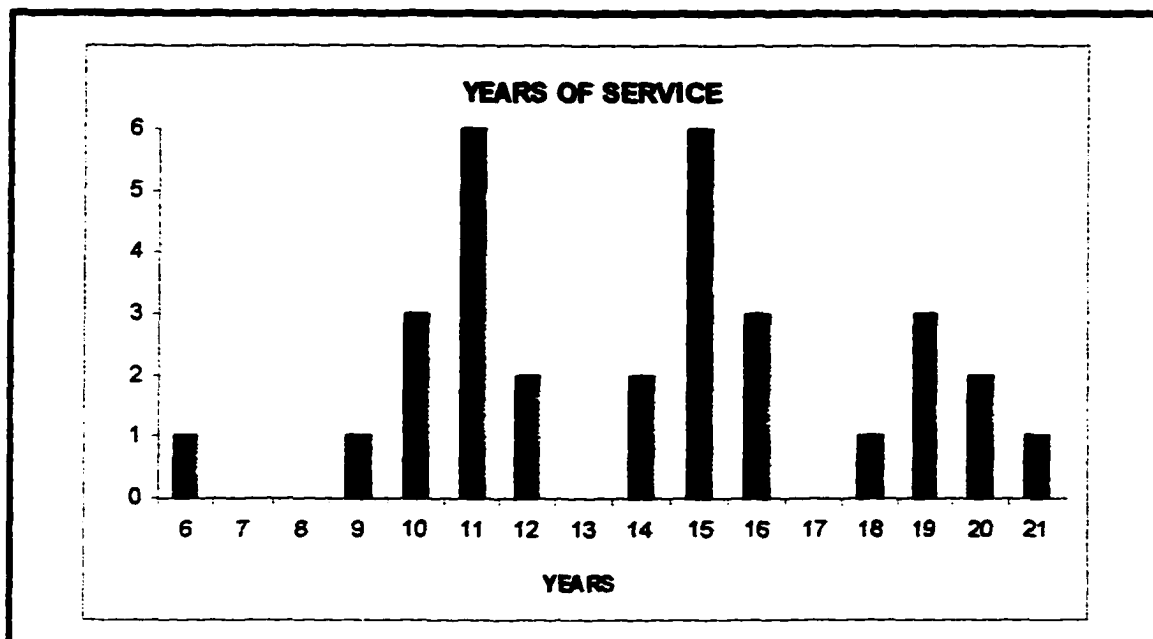
Figure 3.3. Group Demographics Months in USSPACECOM

MONTHS IN USSPACECOM
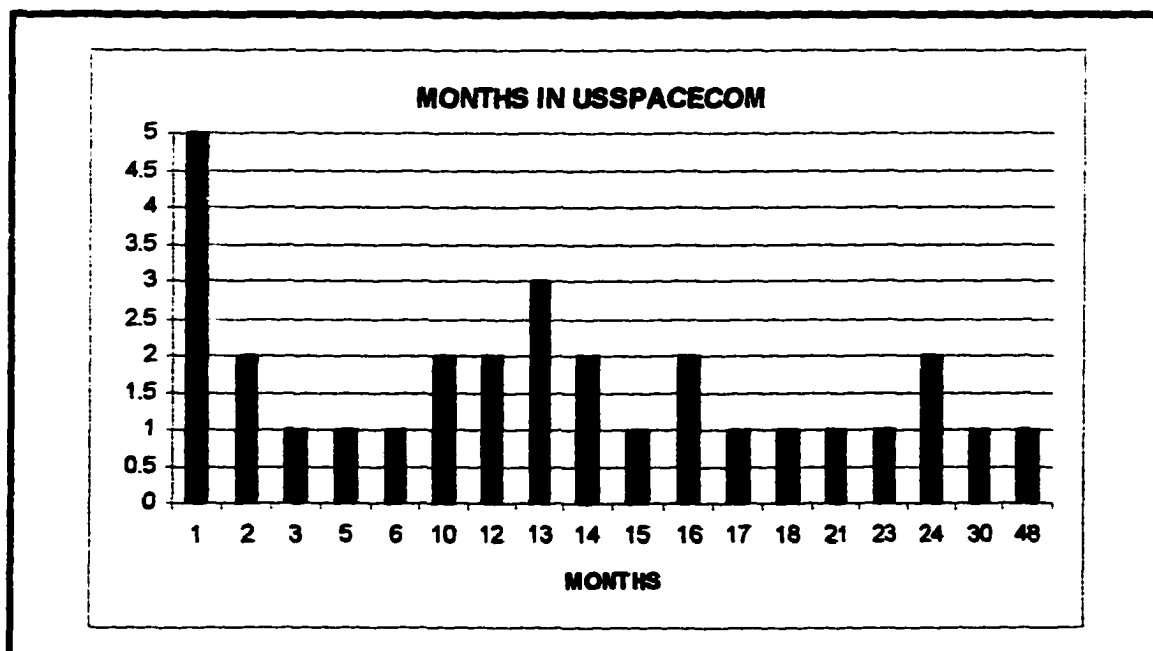
Figure 3.4. Group Demographics Months in Job

MONTHS IN JOB

(bar chart, x-axis labeled MONTHS: 1, 2, 3, 4, 5, 6, 8, 10, 12, 13, 14, 16, 17, 18, 48; y-axis 0 to 6)
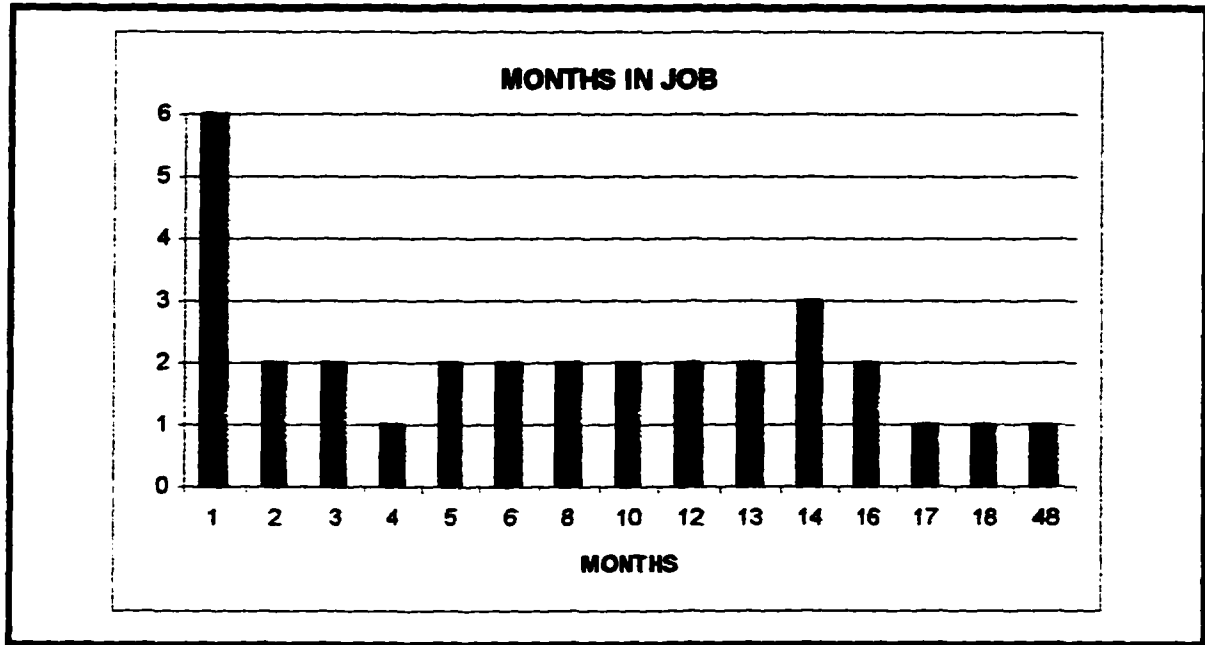
Figure 3.5. Group Demographics Days TDY

DAYS TDY

(bar chart, x-axis labeled DAYS: 0, 10, 15, 20, 25, 30, 40, 45, 50, 60, 65; y-axis 0 to 6)
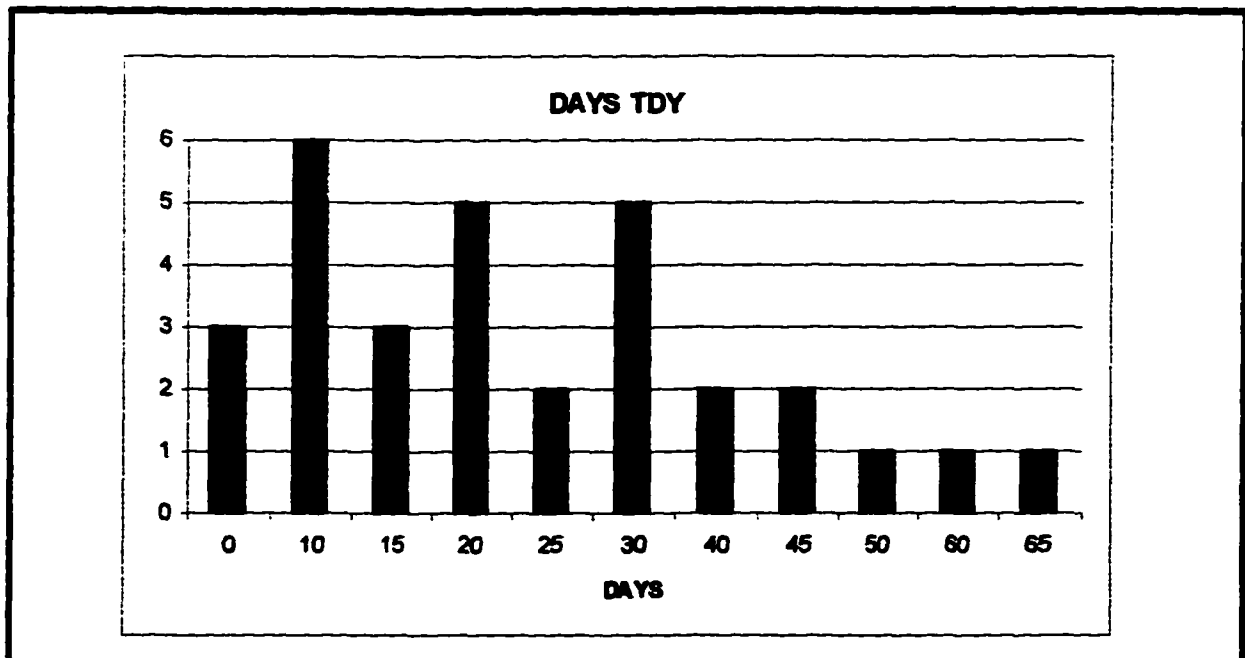
and in order to gauge the usefulness of the commercial training aids and researcher developed reference, two questions (21 and 22, appendix D and appendix E) were added to both questionnaires along with four "interview" questions included in the Post-Research Questionnaire (appendix E). The questionnaire responses were intended to provide a before and after measurement of the group members' collective understanding of their own and their coworkers' learning and communication styles. This was accomplished by comparing the group's average score for each question. A detailed explanation of this will be provided in chapter 4. The interview questions were used to give the subjects an opportunity to provide feedback on the strengths and weaknesses of the training materials. Subjects were asked to provide specific examples of what had been helpful in the training materials. If available, this information would add to the credibility of the material.

Personality and Behavior

Interest, importance, and information on changes in the group's understanding of personality and behavior exactly paralleled that in the area of learning and communication. Two questions (23 and 24, appendix D and appendix E) were added to both questionnaires, and the last four interview questions also covered this area in the Post-Research Questionnaire. These questions were handled in exactly the same manner as the questions on Learning and Communication.

Group Performance

The group studied was a staff organization responsible for monitoring space systems, and planning for and guiding their use--they created no physical "product" as

would a group in manufacturing. There was a tracking system in place; however, which

was suitable for measuring group performance. The majority of the group's work, and its

primary responsibility, was to review, update, comment on, or generate documents.

Requests for this activity, whether internally generated by other organizations in

USSPACECOM, or externally generated from organizations outside USSPACECOM,

were usually, though not always, accompanied by a requested completion date called a

"suspense." Suspenses are documented on a small form, often called a "blue slip" because

of the form's color. Blue slips were sent alone, when the request involved generating a

document, or attached to a document that required review, comments, or an update. Blue

slips were also used to make other types of requests, such as providing a group member

for VIP escort duty, but most requests involved some type of document. Group responses

were required to be attached to the blue slip that generated the request. Completed blue

slips contained two dates: the due date of the request and the actual date the request was

fulfilled by the group. Not all group taskings were documented with a blue slip. Some

taskings are so minor that generating a blue slip would require more work than

accomplishing the assigned task. Some tasks are sent directly to sections or individuals

and never documented, and finally, some taskings are generated within the group and not

tracked in order to ease the administrative workload. The documented blue slips were

tracked by the group, as well as by the group's parent division and directorate. The

suspense tracking system provided a reliable source of data on group performance without

burdening the group with any additional workload for the research. The suspense tracking

system also had the added advantage of being a stable procedure that was the primary instrument used to indicate the group's performance by the group's chain of command.

Group performance was measured by the percentage of suspense dates "met" (the number of suspenses returned on or before the due date), and by the suspense "time," the average of the differences between the two dates (date accomplished minus date requested). Of the two measurements the latter was more accurate and more reliable than the first. Suspenses met on the due date or five days prior to the due date count the same when measured as "met or not met." When measured by suspense time, the difference between "on time" and "five days early" is reflected in the measurement. Research concentrated on suspense time for evaluation. Procedures for analysis of the group performance data produced by suspense tracking will be discussed in chapter 4.

Training Materials

As previously discussed, four training instruments were used to provide self-assessments and education on learning, communication, personality, and behavioral styles. Selection of the three self-assessment instruments considered the criteria mentioned earlier: ease of administration, low time and cost, and "user friendliness." Although not critical, the research used previously validated material, when possible, to minimize questions on the instrument's value. The researcher-developed reference booklet was derived from materials discussed in chapter 2, and the guidebooks were provided with the commercial instruments.

Neurolinguistic Programming (NLP) Personal Profile

The NLP Personal Profile Self-Assessment (Engel and Arthur 1996) is a four part self-administering, self-assessment developed by Engel and Arthur, and edited by Andreas and Andreas (1990) (close colleagues of Bandler and Grinder (1982), the original developers of NLP). The NLP Personal Profile guidebook (Engel and Arthur 1996) costs $29.95, and each Personal Profile costs $5.95. The Personal Profile is designed to be completed in 35 to 45 minutes. Each section contains a well-documented subsection that explains how to use and interpret the self-assessment, as well as the thinking and research behind the self-assessment. The guidebook provides further information on the research behind the Personal Profile, and also provides information on how to develop and administer an NLP-based course to foster personal mastery and learning organizations.

The first section, The World Around Us, starts with a brief overview of NLP presuppositions taken from Bandler and Grinder (1976, 1982), Andreas and Andreas (1987, 1989, 1994), Dilts (1990), and O'Connor and Seymour (1990). A small section provides instructions on how to take the surveys, and is followed by a nine-question survey that shows the "VAK" (visual, auditory, and kinesthetic) preference of the subject. This section is followed by an explanation of the sensory channels or modalities (Bandler and Grinder 1975; Andreas 1994).

The second section, Life Preferences/Processing Your World, starts with another nine-question survey that shows the subjects' life preferences, which is followed by an explanation and method for interpreting the survey results. This section is followed by a

brief discussion of NLP's view of how humans process information from the world around them (Andreas and Andreas 1989; Andreas 1994; Bandler and Grinder 1975; Robertson 1988; Cunningham 1988; O'Connor and Seymour 1990).

The third section, Our Internal Programming, contains six nine-question surveys-- five surveys on meta-programming and one survey on timelines. Once again this is followed by a method for interpreting the survey results and an overview of the concept and significance of meta-programs (Cunningham 1988).

The final section, Life Choices, calculates composite scores, and then provides an interpretation. This section also provides questions and thoughts for the subjects, which are tailored to encourage introspection on personal attributes, goals, and aspirations (Andreas 1994; Bandler and Grinder 1979; Bateson 1991; Dilts 1990).

This instrument was administered in 30 minutes. Of all the surveys this instrument generated the most interest and the most requests for information, particularly requests for obtaining the guidebook and textbook titles on the subject of NLP.

Human Information Processing Survey (HIPS)

The Human Information Processing Survey (HIPS) (Taggart and Torrance 1984) is a 40-question, self-administered survey used to measure an individual's cerebral dominance preferences. Published by Scholastic Testing Service, the Research Edition consisting of the Administrator's Manual (Taggart and Torrance 1984), 20 reusable Survey Forms, 20 Response Sheets, and 20 Strategy Profiles costs $70.10. Additional

packages of 20 Strategy Profiles and Response Sheets are available for $21.00. The instrument is designed to be administered in less than 40 minutes.

The HIPS validity and reliability was established at .84 for right hemisphere scales, .86 for left hemisphere scales, and .82 for integrated style scales, according to initial research by Taggart and Torrance (1984, 28), and verified by five additional test-retest studies reported by Reynolds, Riegel, and Torrance (1977). Further testing by Denny and Wolf (1980) confirmed the instrument's validity, reliability, and high measure of internal consistency. The HIPS was administered to the group in approximately 20 minutes.

Personality Profile System (PPS)

The Personal Profile System (PPS) has already been discussed in chapter 2. The PPS is a self-administered survey that identifies behavioral profiles, provides suggestions on ways to capitalize on behavioral strengths, anticipate and minimize potential conflicts, and increase appreciation of different profiles. The survey consists of 28 word groups–subjects are directed to pick the "most" and "least" descriptive words from each group. The instrument then takes the subjects through step-by-step scoring and interpretation of the survey. The interpretation sections first describe the four major responses described in chapter 2 (Dominance, Influencing, Steadiness, and Compliance), and then go through sixteen "Classic Profile Patterns." The PPS costs $9.00 per survey.

Commercial success of the PPS has stimulated much research on its validity. In 1982, Aamodt and Kimbrough reported that the PPS possessed at least a moderate degree of face validity (Does the person taking the test believe the items are appropriate?). A

further study by Kaplan and Kaplan in 1983 compared the PPS to five well-known psychological testing instruments (the Weschler Adult Intelligence Scale, the Meyers-Briggs Type Indicator, the Cattell 16 Personality Factor Questionnaire, the Minnesota Multiphasic Personality Inventory, and the Strong-Campbell Interest Inventory), and concluded that the PPS correlated to all the instruments. Finally, in 1989, Henkel performed a factorial validation study on PPS. Henkel (1989) concluded that the PPS was "effective in getting people interested in their own behavior and to better understand the behavior of others" (1989, 123). Henkel (1989) also found the PPS effective in revealing the Dominance and Influencing dimensions, but less so for the Compliance and Steadiness dimensions. Following Henkel's (1989) report, Performax revised the survey by adding several word groups. Initial results from an analysis of the current survey indicate that cluster analysis using a plus/minus database produces four clear clusters (Marble 1996).

The PPS was administered in 30 minutes and was clearly the most well received of the three self-assessments. Unlike the previous two surveys there was a great deal of animated discussion and sharing of profiles among the group members. There was also a great deal of good natured banter about the accuracy of the instrument.

Reference Booklet

The reference booklet was designed to support administration of the three self-assessments, and to provide supplemental information on NLP, Cerebral Dominance, and the PPS that was not contained in the self-assessments; moreover, the material in the reference book focused on recognizing patterns in others wherever possible. The

Reference Booklet contained an introduction, which gave instructions and an explanation

of the survey and training's intent, and three main sections: Communication, which

focused on NLP; Personality, which focused on Cerebral Dominance; and Behavior, which

focused on the PPS (appendix F). After the group completed each self-assessment, the

corresponding section in the booklet was reviewed for approximately ten minutes, and

then the next self-assessment was administered.

The Communication section started with an introduction that concentrated on

NLP's view of the world and theory on information processing (Bandler and Grinder

1975; Andreas and Andreas 1990; Andreas 1994; Engel and Arthur 1996; O'Connor and

Seymour 1990; Young 1994). This section then provides a review of the three main

"VAK" (visual, auditory, and kinesthetic) modes, and a suggested aid for improving

communication with individuals in the different modes (Andreas 1994; Bandler and

Grinder 1975; Falzett 1981; Owens 1977; Thomason, Arbuckle, and Cady 1980;

O'Connor and Seymour 1990; Cooper and Monroe 1992).

The Personality section started with a scoring key and conversion table for the

HIPS survey (Taggart and Torrance 1984, 9, 27). A brief review of Cerebral Dominance

followed along with a table of characteristics (Taggart and Torrance 1984, 1-4, 11-13;

Rennels 1976; Sperry, Gazzaniga, and Bogen 1969; Sperry 1976; Gazzaniga 1967).

The final section on the Personality Profile System opened with an overview of the

PPS, and was followed by a review of the four tendencies--Dominance, Influencing,

Steadiness and Compliance (Performax Systems International 1984, 1986; Geier 1979).

The remainder of the section consisted of tables, which included suggestions on how to understand and work with the basic behavior types. This information included characteristics, queuing (or recognizing the four types), understanding each type's motivation, skills for effectively working with the four types, and finally, techniques for applying the skills (Cooper and Monroe 1992; Geier 1979; Geier and Downey 1982; Performax Systems International 1984, 1986).

Through the course of the research the Reference Booklet generated the most questions, particularly for clarification on the eye movement portions of the NLP section. Fifteen copies of Goleman's article, "People Who Read People" (1979) were provided to group members due to the interest in this area.

Limitations

The study was limited in three major areas. First, the amount of "formal" time the researcher was allowed for group training was restricted to a two-hour block that included the group's normal lunch hour. The senior decision makers in United States Space Command believed that the tempo of operations and the personnel's workload did not allow more time for this training. As a result, a planned one-hour "mid-research" review was canceled. Cancellation of this "mid-research" review was somewhat mitigated by the fact that individual group members sought answers to questions informally.

A second limitation was the restriction on identifying individual's characteristics based on responses to "educational" (cognitive, diagnostic, aptitude, achievement) tests (Institutional Review Board 1996). An original part of the research design included a

small booklet listing each group member along with his or her "profile" (right/left brain, visual/auditory/kinesthetic, PPS Classic Profile). Given the limited duration of the research, which will be discussed next, this booklet would have helped group members to understand each others traits and characteristics more quickly.

The amount of time allowed for the "experimental" portion of the research was a third limitation. Collection of data had to be complete by early November, 1996, in order to complete the analysis by the end of the allotted course time. Initial literature review, drafting, and obtaining approval of the initial portions of the dissertation, obtaining permission to proceed from the University and USSPACECOM, and restrictions from work limited the group-related research to a four-month period from early July, 1996 to the end of October, 1996. This was mitigated somewhat by being able to collect "pre-research" suspense data for April and May, 1996.

Issues of construct validity, internal and external validity, and reliability have already been discussed in the section on General Research Objectives. In summary, this research uses three different types of converging evidence: survey information, performance data, and interviews. The convergence of these data follow theoretical predictions. This strongly infers, but does not prove, a causal relationship. Case studies normally rely on analytical generalization to establish external validity (Yin 1994, 36). The research should try to generalize findings to theory, analogous to the way a scientist generalizes from experimental results to theory (Yin 1993, 37). This study, which documents research on small transient staff groups, is generalized to the small group

i

theory discussed in chapter 2. This theory states that cohesiveness in small groups is critical to success (Sherif and Sherif 1953). The theory further states that personal interactions are the key factors in group formations and cohesiveness, and interaction skills and communication skills are critical to success (Girard 1964). The study plainly establishes the collection procedures so they can be replicated at a later date. A detailed description of the procedures and results of the two-level analysis follows in chapter 4.

CHAPTER IV

ANALYSIS

This chapter presents the results, and analysis of the results, obtained by the research. This chapter addresses the hypothesis that improving group members' understanding of how they and their co-workers learn, communicate, and behave will improve group cohesion. This chapter will look at the group's collective understanding of their ability to understand learning and communication, and behavior and personality idiosyncrasies, as well as their perception of the training's effectiveness. Finally, this chapter addresses the hypothesis that improving group members' understanding of how they and their co-workers learn, communicate, and behave will result in improved group performance.

Group Cohesion Perceptions

Data from both the Pre- and Post-Research Surveys were compiled, and average scores were calculated by question and respondent (appendix G). Average scores were used to calculate "group indexes" for purposes of comparison. As described earlier, the cohesion index was calculated by obtaining an average of the answers from the 20 questions for each subject, and then calculating an average score for all the subjects in the group. The group's Pre-Research Cohesion Index in July was 3.87. After training, in October, at the end of the experiment, the group's Post-Research Cohesion Index was

104

4.30. This first level of review indicates that the training produced improved group

cohesion. To determine if this increase is "significant" a rigorous comparison of the Pre-

and Post-Research results is necessary.

This research was a case study, not an experiment, due to the limited amount of

researcher control; however, using some of the analytical formats and techniques of an

experiment is useful for the second step of the study's analysis. Summarizing from the

previous chapter; the research investigates the links between learning, communication,

personality, and behavior, with the hypothesis that improved understanding in these areas

will improve group cohesion and performance; therefore, group cohesion (and

performance which will be covered later) should increase after training is provided in these

areas. If an "eyeball" or pattern matching test is passed a further analysis, using more

rigorous statistical methods, with a minimum 0.05 level of significance as a decision rule is

applied. This means that the probability of rejecting a null hypothesis which is true is 0.05.

In general, when the level is between 0.01 an 0.05 the result is called significant. When

the level is smaller than 0.01 the result is called very significant (Aczel 1993, 270). This

general procedure applies to all the survey analysis as well as the performance data

analysis. As a Case Study looks for "triangulation" or convergence of evidence, the

results from the survey, performance, and "interviews" should be consistent for the

hypothesis to be accepted without qualification.

The survey was taken by 31 individuals. The before and after survey data elements

were rank ordered: 1, 2, 3, 4, 5, where 1 was worst and 5 was best; however, there was

no way to determine how much better either 5 is from 4, or 4 is from 3. This type of data

is defined as "ordinal" (Aczel 1993, 22). Moreover, no assumptions could be made that

the populations were normally distributed with equal variance. The only exact

measurements that were made determined the relative magnitudes of the observations. In

such cases the Wilcoxen Signed-Rank test is a good alternative to compare two

populations. The Wilcoxen test accounts for the magnitude of differences between paired

values by considering the ranks of the differences (Aczel 1993, 650). The null hypothesis

for the Wilcoxen Signed-Rank Test is that the median difference between the two

populations is zero. The alternative hypothesis is that the median difference between the

two populations is not zero. Assumptions for this test are that the distribution of

differences between the populations is symmetric, the differences are mutually

independent, and the measurement scale is ordinal. The assumption of symmetry allows

the hypothesis to be stated in terms of means (Aczel 1993, 50). Moreover, the alternative

hypothesis may be a directed one: That the mean of one population is greater than the

mean of the other population (Aczel 1993, 650). The Wilcoxen T statistic is defined as

the smaller of the two sums of ranks–the sum of the negative or the positive ones.

$T = (\Sigma(+), \Sigma(-))$ where $\Sigma(+)$ is the sum of the ranks of the positive differences and

$\Sigma(-)$ is the sum of the ranks of the negative differences.

For this research the working hypothesis is that the training will produce greater

cohesion (or a higher cohesion index), i.e., the mean of population 1 is less than the mean

of population 2. In the Wilcoxen Signed-Rank test a two-tailed test is used for the Paired-

Observations Two-Sample Test when the hypothesis test looks for a median difference between two populations of zero or not zero (Aczel 1993, 650). A one-tailed test is used when the hypothesis test is that the mean of one population is greater than the mean of the second population (Aczel 1993, 651) As a result, a one-tailed test is used and the sum of the positive differences is used. The test is carried out on the left "tail" of the distribution, and the null hypothesis is rejected if the computed value of the statistic is less than the critical point from the table for a given level of significance (Aczel 1993, 651). The null and alternative hypotheses are shown as:

$$H_0: \mu_1 \geq \mu_2$$

$$H_1: \mu_1 < \mu_2$$

For this test the null hypothesis (H_0) is rejected if the computed value of T is less than the critical point at a level of significance $\alpha = 0.05 = P$ (Reject H_0 when H_0 is true). The test can be used to determine to what level of significance the test is valid. This is done by comparing the test statistic to the critical points from the table at different values of α.

Wilcoxen Signed-Rank Test calculations for the group cohesion index are shown in appendix I. The difference between the before and after surveys for each subject $(D = X_1 - X_2)$ produced no ties $(n = 31)$, and a Test Statistic of 121.5, $(T = \Sigma(+) = 121.5)$. The table for Critical Values of the Wilcoxen T Statistic (One-Tailed, $\alpha = 0.05$) provides a value of 163 (Aczel 1993, 887).

According to the decision rule the null hypothesis (H_0: $\mu_1 \geq \mu_2$) is rejected and the alternative hypothesis (H_1: $\mu_1 < \mu_2$) is accepted as $121.5 < 163$. The lowest value at which the null hypothesis is rejected is 130, $\alpha = 0.01$ (Aczel 1993, 887). The conclusion can be made that the increase in group cohesion, at the end of the study, was "significant" at both $\alpha = 0.05$ and $\alpha = 0.01$.

Group Learning and Communication Perceptions

In addition to demonstrating that the training provided during the research improved group cohesion, the study was interested in understanding how group members felt about their ability to understand learning and communication. Further, the researcher was interested in how the group felt about the training instruments. This evidence was also used to increase the "convergence" of the Case Study. Questions 21 and 22 on the Pre- and Post-Research Surveys (appendix D and appendix E) looked at learning and communication. As mentioned earlier, learning and communication are closely related, and use many of the same mechanisms. Learning is inwardly focused while communication is externally focused. The group index for Question 21, "I understand how I learn and communicate," was 3.83 prior to the training and 4.52 after the training. The group index for Question 22, "I understand how my coworkers learn and communicate," was 3.26 before the training and 4.06 after the training. The increase in these scores "pass" the eyeball test. To more rigorously compare these results the same test and procedure was used that was used for comparing the results on cohesion.

As the nature of the data and conditions were the same for these two questions as for the cohesion index, the assumptions about the data, and the null and alternative hypotheses were also the same. Wilcoxen Signed-Rank Test calculations for these questions are presented in appendix I. For Question 21, the difference between the before and after surveys, for each subject ($D=X_1 - X_2$), produced ten ties ($n = 21$), and a Test Statistic of 32 ($T = \Sigma(+)$ 32). The table for Critical Values of the Wilcoxen T Statistic (One-Tailed, $\alpha = 0.05$) provides a value of 68 (Aczel 1993, 887).

According to the decision rule the null hypothesis (H_0: $\mu_1 \geq \mu_2$) is rejected, and the alternative hypothesis (H_1: $\mu_1 < \mu_2$) is accepted as $32 < 68$. The lowest value at which the null hypothesis is rejected is 43, $\alpha = 0.005$ (Aczel 1993, 887). The conclusion can be made that the increase in understanding, at the end of the study, was "significant" at both $\alpha = 0.05$ and $\alpha = 0.005$.

For Question 22 the difference between the before and after surveys, for each subject ($D=X_1 - X_2$), produced eleven ties ($n = 20$), and a Test Statistic of 21 ($T = \Sigma(+) = 21$). The table for Critical Values of the Wilcoxen T Statistic (One-Tailed, $\alpha = 0.05$) provides a value of 60 (Aczel 1993, 887).

According to the decision rule the null hypothesis (H_0: $\mu_1 \geq \mu_2$) is rejected, and the alternative hypothesis (H_1: $\mu_1 < \mu_2$) is accepted as $21 < 60$. The lowest value at which the null hypothesis is rejected is 37, $\alpha = 0.005$ (Aczel 1993, 887). The conclusion can be made that the increase in understanding, at the end of the study, was "significant" at both $\alpha = 0.05$ and $\alpha = 0.005$.

In order to get group members' feedback on the training and training tools eight "interview" type questions were asked at the end of the Post-Research Survey. The first four questions paralleled Questions 21 and 22 on the survey and asked for specific examples (appendix D and appendix E). Nine of the 31 subjects did not respond. Two subjects circled "no" to the question, "Did the training you receive help improve your understanding of how you learn and communicate?" Four subjects circled "no" to the question, "Did the training you received improve your understanding of how your coworkers learn and communicate?" All other subjects' responses were "yes."

For the first question asking for specific examples, subjects listed the NLP Personal Profile (10) and the NLP section in the reference booklet (9) as having provided greater self-awareness. One subject said the information in the HIPS was of great benefit. Twelve of the 18 subjects who responded "yes" on the second question listed the reference booklet's NLP Characteristics of Communication Styles and Suggested Aid to Communication table as great aids for "reading" their co-workers. Particular comments were made on the use of eye movements to "read" an individual's VAK modality. Eight of the 12 subjects stated they used this with superiors and peers outside the group as well.

Group Personality and Behavior Perceptions

The study's interest in understanding how group members felt about their ability to understand personality and behavior exactly paralleled the interest in learning and communication; therefore, the same procedures were used to look into this area as in the last area. Questions 23 and 24 on the Pre- and Post-Research Surveys (appendix D and

appendix E) looked at personality and behavior idiosyncrasies. Summarizing from earlier chapters, personality idiosyncrasies were based on cerebral dominance and provide a physical basis for individual traits. Behavioral idiosyncrasies were based on the Personal Profile System. The group index for Question 23, "I understand my personality and behavior idiosyncrasies," was 4.13 prior to the training and 4.58 after the training. The group index for Question 24, "I understand my coworker's personality and behavior idiosyncrasies," was 3.45 before the training and 4.23 after the training. Once again, there is an increase—consistent with the results found for cohesion, and learning and communication. To more rigorously compare these results the same test and procedures were used that were used for comparing the results on cohesion, and learning and communication. As the nature of the data and the conditions were the same for these two questions as for the last two questions, the assumptions about the data, and the null and alternative hypotheses were also the same. Wilcoxen Signed-Rank test calculations for these questions are presented in appendix I.

For Question 23 the difference between the before and after surveys, for each subject ($D = X_1 - X_2$), produced seventeen ties ($n = 14$), and a Test Statistic of 15 ($T = \Sigma(+) = 15$). The table for Critical Values of the Wilcoxen T Statistic (One-Tailed, $\alpha = 0.05$) provides a value of 26 (Aczel 1993, 887).

According to the decision rule the null hypothesis (H_0: $\mu_1 \geq \mu_2$) is rejected, and the alternative hypothesis (H_1: $\mu_1 < \mu_2$) is accepted as $15 < 26$. The lowest value at which the null hypothesis is rejected is 16, $\alpha = 0.01$ (Aczel 1993, 887). The conclusion can be

made that the increase in understanding at the end of the study was "significant" at both α = 0.05 and α = 0.01.

For Question 24 the difference between the before and after surveys, for each subject ($D=X_1 - X_2$), produced thirteen ties (n = 18), and a Test Statistic of 18 ($T = \Sigma(+)$ 18). The table for Critical Values of the Wilcoxen T Statistic (One-Tailed, α = 0.05) provides a value of 47 (Aczel 1993, 887).

According to the decision rule the null hypothesis (H_0: $\mu_1 \geq \mu_2$) is rejected, and the alternative hypothesis (H_1: $\mu_1 < \mu_2$) is accepted as 18 < 47. The lowest value at which the null hypothesis is rejected is 28, α = 0.005 (Aczel 1993, 887). The conclusion can be made that the increase in understanding at the end of the study was "significant" at both α = 0.05 and α = 0.005.

As with learning and communication, "interview" type questions were asked at the end of the Post-Research Survey in order to get group members' feedback on the training and training tools. The last four questions paralleled Questions 23 and 24 on the survey and asked for specific examples (appendix D and appendix E). Nine of the 31 subjects did not respond. One subject circled "no" to the question, "Did the training you received help improve your understanding your personality and behavior idiosyncrasies?" Five subjects circled "no" to the question, "Did the training you received improve your understanding of your coworkers' personality and behavior idiosyncrasies?" All other subjects' responses were "yes."

Fourteen subjects pointed to the PPS Classic Profile Patterns as helpful for self-discovery, and stated they became more aware of their own behavior; therefore, they became better able to control their own behavior. Two of these subjects mentioned they "traded" to better utilize their strengths. Five subjects pointed to the NLP Personal Profile–three subjects pointed to the Life Preferences section, and two subjects pointed to the Internal Programming section. Three subjects found the HIPS useful; however, they gave no specific examples of what they used or found helpful.

Twelve of the seventeen subjects who responded "yes" to the last question listed the reference booklet's PPS section as most helpful in understanding and dealing with their coworkers' behavior and personality traits. Of the remaining five subjects, two subjects gave no examples, and three subjects listed the PPS General Highlights on page 7 of the PPS Self-Assessment. As with the section on learning and communication, several of the subjects stated they also used the knowledge from the training in dealing with both superiors and peers outside the group.

Group Performance

Group performance data were taken for both the experimental and control groups for April/May and September/October. This was done in order to compare the experimental group to the control group to see if similar performance changes were noted. In April/May the experimental group recorded 119 tasked suspenses and successfully completed the tasking, turned in the required document on or before the suspense date, 63 times–a 53.94% success rate. During the same period the control group recorded 53

tasked suspenses and logged a success rate of 49.06% (26 suspenses on time, or ahead of

time) (spreadsheet, appendix H). An unexpected event that impacted this study was a

complete turnover in USSPACECOM senior personnel, followed by a sharp rise in group

tasking that was reflected by a corresponding rise in suspense tasking. This phenomena

was command wide and not limited to the group being studied. In September/October the

experimental group's suspense tasking increased by 53% and the control group's tasking

rose 49%. During this period the experimental group, which had received the training,

met 112 of 183 recorded suspenses for a 61.20% success rate, while the control group

met 34 of 79 recorded suspenses for a 43.04% success rate. In addition the average

suspense completion time for the experimental group went from 8.14 days before the

research to 6.62 days at the end of the research, while the control group's average

suspense time went from 8.03 days to 9.53 days. Based on this information the

assumption can be made that the mechanism that influenced the tasking and suspense rate

for the experimental group was not affecting the control group. The performance data

pass an initial "eyeball" or pattern matching test as the group's performance went up, and

the pattern showed a faster response time for suspense taskings (appendix H). Further,

this pattern was not matched by the control group. If the control group's pattern was the

same as the experimental group's pattern, this would indicate that something other than

the training caused the pattern shift. Figure H.1 and figure H.2 in appendix H graphically

depict the group's tasking in April/May and September/October. A comparison shows a

large increase in September/October, particularly for the short (0.5, 1-day and 2-day)

suspenses. Figure H.3 and figure H.4 in appendix H graphically show the average response time per category for April/May and September/October. A tabular comparison of the combined information from these figures (table H.1, appendix H), provides a more thorough and revealing look at the data for a pattern matching test.

Only 21 of the categories in table H.1 can be compared as 12 of the categories have no tasking in either April/May or September/October. Comparison shows that group performance (determined by average days to complete) improved in 12 of the 21 cases, covering 139 of 183 tasks. Also, in four of the remaining nine cases, the difference in average time to complete was less than one day. This further review also passes the eyeball test; however, was the change in the experimental group's performance "significant?" As mentioned earlier, a minimum level of significance of $\alpha = 0.05$ was used for this second level of analysis. Group suspense performance data are on a ratio scale. The distance between pairs of data have a meaning, the ratios of the distances have a meaning, and there is a meaningful zero (Aczel 1993, 22).

A Chi-Square Test for Goodness-of-Fit can be used when data are enumerative (the data are counts or frequencies), and the observations are on at least a nominal scale (Aczel 1993, 669). Although there are other tests, such as the Kolmogorov-Smirnov, which can be used to compare expected frequencies, the Chi-Square Test for Goodness-of-Fit is more common, and more readily supports Case Study reliability through ease of replication. The goodness-of-fit test is a statistical test of how well data support an assumption about the distribution of a population of interest, and determines how well an

assumed distribution fits the data (Aczel 1993, 670). Steps in the Chi-Square analysis include: Hypothesizing about a population by stating a null and alternative hypothesis, computing frequencies of occurrence of certain events expected under the null hypothesis, collection of observed data points in different cells, calculating the difference between the observed and expected counts leading to computation of the Chi-Square statistic, and finally, comparing the value of the Chi-Square statistic with the critical points of the Chi-Square distribution to make a decision (Aczel 1993, 669).

The Chi-Square statistic is calculated by summing the "observed" minus "expected" value (squared), divided by the "expected" value for each cell (Aczel 1993, 670). The expected value for each cell is equal to the probability of success, *times* the number of trials (Aczel 1993, 672). A further requirement is that the expected count in each cell must be at least 5; however, combining the cells is possible so that the expected number has at least 5 (Aczel 1993, 673). The Goodness-of-Fit test used for this research is for a Multinomial Distribution. There are more than two cells ($k > 2$), and the degree of freedom (df) for calculating the Chi-Square Statistic equals $k-1$ (Aczel 1993, 673). Based on the eyeball test, the distribution for the September/October data is assumed to be different than the distribution for the April/May data. The April/May data are used to calculate an "expected" value for comparison with the "observed" data in September/October. The null and alternative hypotheses are:

H_0: Group response times in September/October follow the distribution from the group response times in April/May.

H_1: Group response times in September/October do not follow the distribution from the group response times in April/May.

The data in table H.2 (appendix H) show the actual "number accomplished" count

for each category of suspense task (table H.1, in appendix H, shows the number "tasked"

not accomplished). These data were used for the calculations in table H.3 (appendix H).

In order to ensure a count of at least 5 in every cell the categories were combined as

shown in the first (SUSPENSE) column of table H.3 in appendix H. The next column lists

the April/May count in each of the 14 cells. The third column (p) calculates a probability

for each, which, when multiplied times 183 ("n"), yields an "expected" value in the fourth

column (E). The fifth column (O) shows the observed data from September/October, and

the last column shows the results of the "Chi-Square" calculation at the top of the column.

The value for the Chi-Square statistic is shown at the bottom of the column (86.62). This

value is compared with critical points of the Chi-Square distribution. The entering

arguments are df = 13 (14 - 1) and $\alpha = 0.05$. This yields a value of 22.3621 (Aczel 1993,

863). As the computed value is much greater than the critical point at $\alpha = 0.05$ (86.62 >

22.3621) the null hypothesis is rejected (Aczel 1993, 672). The Chi-Square statistic was

also compared to the critical point at $\alpha = 0.005$ ($\chi^2_{.005} = 29.1894$) (Aczel 1993, 863). As

the Chi-Square statistic is much greater than this critical point (86.62 > 29.1894) the null

hypothesis is rejected, and the alternative hypothesis (the group response time in

September/October does not follow the distribution from the group response time in April/May) is accepted at a level of significance of $\alpha = 0.005$.

Analysis of the survey and performance information gathered during the case, along with the interview data, demonstrate that the evidence converges to support the case study hypotheses. The survey and performance data not only pass the first pattern matching test, but also pass a further statistical analysis at a level of significance of at least $\alpha = 0.05$. Conclusions and recommendations, based on this information, follow in chapter 5.

CHAPTER V

CONCLUSIONS AND POSSIBLE APPLICATIONS OF FINDINGS

This chapter summarizes the results of the research, and presents the context and rationale of the study, reviews the research, and discusses the findings. This chapter addresses the specific research questions and the results the study produced. Finally, this chapter considers the implications of the research for "real world" application and possible areas for further research.

The Context

The context selected for the research was a staff section of Headquarters United States Space Command, and the focus was administration of training designed to improve a group's cohesiveness and performance by increasing individual self-awareness, and awareness of co-worker traits in the areas of learning, communication, personality, and behavior. The training was aimed at a "transient" group with a high turnover of personnel, and limited time and resources. Groups of this kind fall somewhere between the temporary Process Action Teams that exist to find solutions to temporary problems and then disband, and long term groups whose make-up changes little over long periods of time. Training was based on three theories: (1) Cerebral Dominance postulates a predilection for personality based on individual predominance of specialized functions in different physical parts of the cerebellum; (2) Neurolinguistic Programming, which is a

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study of subjective experience, and postulates increased ability to learn and communicate through an understanding of the conscious and unconscious workings of the mind and senses; and finally (3) the Personality Profile System, which defines behavior using four "dimensions," and through the permutation and combination of these dimensions describes classic personality profiles with identifiable traits.

The Rationale

The rationale for providing this training was rooted in the theories of social systems thinking and learning organizations. As social systems, groups influence and are influenced by their members. A change in any "component" will have some effect on related components and on the group as a whole, and interaction between group members plays a key role in group identity, power, and performance. Three of Senge's (1990) five disciplines for a learning organization—systems thinking, personal mastery, and mental models, focus on the skills needed for individuals to be better group members. By providing information to enhance personal mastery, and to better understand co-workers, the study intended to improve cohesiveness by improving the quantity and quality of interaction. Based on most small group research, improved cohesion should be reflected in improved group performance in most situations.

The Research

The essential aspects of the study were the use of commercially available, low-cost, easily administered instruments that were not time consuming. The instruments, along with a researcher-developed reference booklet, provided personal self-assessments

on learning, communication, personality, and behavior, and provided hints on how to
recognize these traits in others. Would these tools be effective in increasing and
"improving" interaction among group members? As a result of this training, would
perceived group cohesion increase? Would this increase be reflected in improved group
performance?

The research was conducted using both qualitative and quantitative methods. Six
weeks prior to, and after training, group performance was measured using a system that
tracked the group's ability to respond to taskings from inside and outside
USSPACECOM. A before and after survey was used to calculate a group cohesion index,
and to collectively look into the group's perceptions of its understanding of learning,
communication, personality, and behavior. Limitations included the limited time (two
hours) available for training, and the limited duration of the study.

The Findings

All findings were consistent and converged. A summary of the study's
performance and survey findings are presented in table 5.1 and table 5.2, which are linked
to the research questions. The research questions, including the two hypotheses, are then
discussed in detail. Potential application and suggestions for future research are then
addressed.

Hypotheses

The first case study question, "How did the Neurolinguistic Programming Self-
Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-

Assessment, and training information affect group cohesion?" was the basis of the first

hypothesis and a part of the core research question. The cohesion indexes calculated from

a validated instrument, using data from the before and after surveys in this study, showed

a 10.9% increase of .42 (3.88 to 4.30, table 5.2). Using the Wilcoxen test, described in

chapter 4, this improvement was demonstrated to be significant at $\alpha = 0.05$. Therefore,

this question can be answered "The training materials and self-assessments improved

group cohesion," and the first hypothesis, "Improving individual group members'

understanding of how they and their co-workers learn, communicate, and behave will

improve group cohesion," can be accepted.

Table 5.1. Summary of Findings Group Performance

		PRE-RESEARCH	POST-RESEARCH
EXPERIMENTAL	SUSPENSES MET/TOTAL	63/119	112/183
	PERCENT MET	52.94%	61.20%
	AVERAGE TIME	8.14	6.62
CONTROL	SUSPENSES MET/TOTAL	26/53	34/79
	PERCENT MET	49.06%	43.04%
	AVERAGE TIME	8.03	9.53

Table 5.2. Summary of Findings Group Attitudes

	PRE-RESEARCH	POST-RESEARCH
COHESION	3.88	4.30
LEARNING/COMMUNICATION	3.84	4.52
CO-WORKER LEARNG/COMMUNICATION	3.26	4.06
PERSONALTY/BEHAVIOR	4.13	4.58
CO-WORKER PERSONALITY/BEHAVIOR	3.45	4.23

The second case study question, "How did the Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group performance," was also in the core research question and formed the basis of the second hypothesis. Data from the study show that, in spite of a 53% increase in the sample size for taskings, the group's performance increased both in the percentage of suspenses "met" (52.9% to 61.2%, table 5.1) and the average time required to compete a suspense (8.14 to 6.62 days, table 5.1). During this same time period the control group's tasking rose less, by 49%, and its performance fell (49% to 43% taskings met, and 8.03 to 9.53 average days to complete a suspense, table 5.1). Using the Chi-Square test described in chapter 4 to compare two population means, the improvement in the group's performance was shown to be significant at $\alpha = 0.05$. Therefore, the answer to this question is "The Neurolinguistic Programming Self-Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information improved group performance," and the second hypothesis "Improving individual group member's understanding of how they and their co-workers learn, communicate, and behave will result in improved group performance," is also accepted.

Research Proposition Questions

The research also addressed four case study questions related to the research question's propositions. These questions added convergence and consistency to the case study. The first of these (Question A) was, "How did the Neurolinguistic Programming

Self- Assessment, Cerebral Dominance Self-Assessment, Personality Profile System Self-Assessment, and training information affect group members' understanding of how they learn and communicate?" Data from the before and after surveys in this study showed a 17.6% increase of .68 (3.84 to 4.52, table 5.2) in this area. Using the Wilcoxen test described in chapter 4, this improvement was demonstrated to be significant at $\alpha = 0.05$. Therefore, the conclusion can be made that the self-assessments and training materials improved the group members' understanding of how they learn and communicate. However, this conclusion does not have the same degree of validity as the conclusion on the cohesion index. The cohesion index was measured with a validated instrument, while this measurement was made, as an item of interest, using only one question on the survey. The results are consistent with the rest of the study; however, and consistent with the feedback from the group members. As described in chapter 4, feedback was generally positive for the research materials (the NLP Personal Profile and the reference booklet) used for learning and communication. Although the HIPS was expected to be of some help in this area, only one subject mentioned the HIPS in the Post-Research Survey Interview Question.

The next question (Question B) is related to the previous question, but focuses on the group members' understanding of how their co-workers learn and communicate. The data from the before and after surveys, in this study, showed a 24.7% increase of .80 (3.26 to 4.06, table 5.2) in this area. Using the Wilcoxen test described in chapter 4, this improvement was demonstrated to be significant at $\alpha = 0.05$. Therefore, the conclusion

can be made that the self-assessments and training information contributed to a greater

understanding in group members of how their co-workers learn and communicate.

However, this conclusion does not have the same degree of validity as the cohesion index

for the same reasons discussed in the previous paragraph.

The last two questions deal with personality and behavior. The next question

(Question C) was, "How did the self-assessments and training information affect group

members' understanding of their personality and behavioral idiosyncrasies?" Information

on this question was derived from the study data in the same manner as the previous two

questions. An increase of .45 or 10.9% (4.13 to 4.58, table 5.2) was seen in this area.

The same Wilcoxen test described in chapter 4, demonstrated this change to be significant

at $\alpha = 0.05$. Given the caveats listed for the previous two questions, the answer to this

question is "The self-assessments and training improved group members' understanding of

their personality and behavioral traits." Feedback from the group members indicated that

the PPS and the NLP Personal Profile were very useful. Only three subjects mentioned

the HIPS, and they did not give specific examples of what, for them, the HIPS provided.

The final question (Question D) is related to the previous question, but focuses on

the group members' understanding of their co-workers' personality and behavioral

idiosyncrasies. Data show a 22.4% increase of .78 (3.45 to 4.23, table 5.2) in this area.

The Wilcoxen test found this increase to be significant at $\alpha = 0.05$ as well. Therefore, the

conclusion can be made that the self-assessments and training improved group members'

understanding of their coworkers' personality and behavioral traits. All the caveats

mentioned in the three previous questions hold true for this question as well. Respondents listed the reference booklet and the PPS booklet as most useful in this area.

Recommendations

Lessons learned from this research, both data and personal experience, are provided in this section. Applications of lessons learned for a business and industrial setting are covered, as well as suggestions for future research. This study reports successful results, in terms of increased performance and greater group cohesion, after NLP, PPS, and Cerebral Dominance training. However, the tools and the manner in which they were administered should not be regarded as panaceas. Rather, this study indicates that tools, and an approach, are available to build cohesion for small groups with transient work forces.

Applications

This study used instruments based on three different approaches to human personality, behavior, and learning and communication. The strengths and weaknesses of these theories were reflected in the workplace when they were applied.

The argument that there is a physical basis for individual human personality, and that by understanding this concept people can better understand their strengths and weaknesses, makes Cerebral Dominance a powerful tool. The Human Information Processing Survey (HIPS) tool used in this study uses a Tactics Profile that places individuals in four categories, Right, Left, Mixed, and Integrated. Right and Left dominance were described at length in chapter 2, Mixed dominance indicates individuals

who use either right or left in different situations, and Integrated dominance indicates individuals who use right and left simultaneously. The theory, and the instrument, is logical, well-documented, and easily understood, and as such, is very useful for self-discovery, and particularly for pure and applied research. In the commercial world the HIPS can be applied toward either understanding the most desirable characteristics for a particular job, or used to screen for individuals who have certain characteristics when hiring: although, as mentioned in chapter 1, this use is coming under increasing scrutiny. For this study, the HIPS did not seem to be as effective as the other self-assessment tools and the booklet. Both the theory and the HIPS provide an analysis and then stop. In the environment in which this study's results would be applied, the subjects would be interested in going beyond the self-assessment to the question of "How can I use this information to make a positive change?" In applying the results of this study to other small groups, the cost and time of using the HIPS or another Cerebral Dominance measurement tools should be carefully weighed against the expected benefit. If time and resources are especially tight supervisors might decide to forego this tool.

Neurolinguistic Programming addresses the basic way people process information from their environment. The NLP goes into the beliefs on which behaviors are based, and provides tools that can be used to tap people's powerful unconscious minds. The NLP can be used to make changes as well as to make assessments. As such, the NLP takes a much needed further step than the HIPS Cerebral Dominance assessment. The NLP makes use of "body language," as well as language patterns to understand how people are

communicating. Another important feature for applied use is the NLP's emphasis on specificity and clarity in the use of language. The NLP Personal Profile and the Reference Booklet together, fully used the aforementioned facets, which were very well received. While the NLP profile concentrated more on self-assessment, tools for maximizing individual strengths and making personal change were addressed, and the Reference Booklet concentrated more on tools for recognizing the learning and communication modes of others. In the study the aforementioned area evoked the most interest. In future applications, supervisors should make use of this tool, or another NLP tool, unless there are very severe time constraints. At least 60 minutes should have been allowed for the administration of the self-assessment and for training. Future applications should allow for this time factor, as well as for refresher training. According to information revealed during conversations with the subjects, this area required more time and attention, but had a much higher "return on investment."

The PPS was the most easily used and understood tool. The PPS was complemented by the Reference Booklet's suggestions for dealing with the four different behavioral styles. Inexpensive, in terms of time and resources, this tool is a good "stand alone" instrument for future applications when supervisors are under severe time and resource constraints.

One technique that could not be used in the study, but that would be effective in the workplace will now be described. Once the PPS (and other) surveys are accomplished, supervisors could compile a small office book that contains the classic

pattern and traits of each employee. In the researcher's opinion use of a book of this sort would also help "institutionalize" the techniques. Due to the highly transient nature of the group, in this study, the effect of the intervention is not estimated to be long lasting unless the "training" is repeated in some manner. The biggest PPS discussions the researcher had with subjects during the research consisted of requests for just such a pattern and trait book. The information in the Reference Booklet provides clues for determining this information, along with other tips for successfully dealing with the various behavioral styles. This information, which is readily available should be provided for any future cohesion-building use of the PPS.

Future Research

Future research should look into groups with different demographics, analysis of the individual training tools, and both "vertical" and "horizontal" application of the training. The group studied was small and highly transient; however, the educational level of the group was higher than what could be expected in a normal population. The group consisted of 25 officers and 6 enlisted personnel. All of the officers had at least four years of college and three of the enlisted personnel had at least two years of college. A group this educated might be able to understand more easily and apply the information provided by the training. Therefore, a study of this type should be accomplished with a group that consists of individuals who more closely resemble an average educational level. The amount of training and duration of the study was limited during this reasearch. Further research should be conducted to determine how long lasting this type of training is, and

how the affects of this training vary with group transience. This research could produce a practical tool for determining how often training should be provided to different groups based on the rate of personnel turnover. Moreover, the aforementioned research will either produce additional data that will confirm a causal relationship between the training and improved group cohesion and performance, or indicate further areas of research.

This study used three commercial instruments in addition to the Reference Booklet. No effort was made to determine which instruments provided the most value or which instrument, if any, could be discarded. A study that provides different combinations of instruments to different groups should be undertaken to determine the optimum mix. Such a study would provide better information on how to provide the necessary information in the minimum time at the minimum cost.

During the research process a great deal of positive feedback was received, particularly on the reference booklet. As a result, the booklet was provided to the Peterson Air Force Base Quality Center, Separation/Retirement Transition Assistance Center and Noncommissioned Officer Academy. Further distribution of the booklet is expected after it is recorded as a publication by the Library of Congress.

Finally during the study, much of the informal feedback involved the subjects using the information to improve working conditions above and below the chain of command, as well as laterally. If this type of training can improve cohesion within a group, can the same type of training improve cohesion between groups vertically and horizontally? Social systems thinking would indicate this result is a good possibility. This type of

training could very well be a tool to help build cohesion between such traditionally distant groups as marketing and production, and production and engineering.

In summary, this study supports the premise that groups of people who know themselves and their co-workers are more cohesive and productive. Moreover, reliable, inexpensive tools are commercially available to help people either gain or improve this type of knowledge.

APPENDIX

A. TEAM COHESION STUDY CONSENT FORM

TEAM COHESION STUDY CONSENT FORM

You are invited to be in a research study on building team cohesion. You were selected as a possible participant because you are a member of a small staff group that experiences rapid turnover in personnel. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Colorado Technical University

Background Information
The purpose of this study is to see if team cohesion in small staff groups (that have rapid turnover of personnel) can be improved by providing individuals in the group a better understanding of themselves and ways to better understand their coworkers.

Procedures
If you agree to be in the study, we would ask you to do the following things. There will be one session (45 to 60 minutes) at the beginning of the study and one session (10 to 15 minutes) at the end. During the first session you will be asked to take a 10 question demographic survey, and a 22 question pre-research survey. Following this you will be given a pamphlet containing personality, learning/communication, and behavioral self-assessments, along with information on what the self-assessments are based and how the information in them can be used. The pamphlet will be yours to keep after the data in them is collected for statistical analysis. At the end of the study a 25 question post-research survey will be administered.

Compensation
You will not receive payment for participating in the research.

Confidentiality
The records of this study will be kept private. Names will not be associated with any of the statistical analysis and you will keep the only record of the self-assessments. In any sort of report we might publish, we will not include any information that will allow for you to be identified as a subject. Research records will kept in a locked file; only the researchers will have access to the records.

Voluntary Nature of the Study
Your decision, whether or not to participate, will not affect your current or future relations with the United States Space Command, the Operations Directorate, or the Space Systems Division. If you decide to participate, you are free to withdraw at any time without affecting those relationships. Further, any significant new findings developed during the course of the research that may relate to your willingness to continue to participate will be provided.

Contacts and Questions
The researchers conducting this study are Marc J. Dinerstein and Dr. Frank Prochaska. You may ask any questions you have now. If you have questions later, you may contact them at 282-1240 or 598-0200. You will be given a copy of this form to keep for your records.

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Statement of Consent
I have read the above information. I have asked questions and received answers. I consent to participate.

Signature _____ Date _____

Signature of Investigator _____ Date _____

APPENDIX

B. RESEARCH DEMOGRAPHIC QUESTIONNAIRE

RESEARCH DEMOGRAPHIC QUESTIONNAIRE

The following information, along with the data from the survey's self-assessments, is needed for statistical analysis as part of dissertation research. Names and personal information will not be divulged or used in any part of the dissertation. If you are reluctant to provide any of the information requested below please see me.

NAME (Last, First)_____

SERVICE_____

AGE_____

RANK/GRADE_____

YEARS OF SERVICE_____

SPECIALTY/RATING_____

MONTHS AT USSPACECOM_____

MONTHS AT CURRENT JOB_____

DAYS PER YEAR TDY CURRENT JOB_____

HAVE YOU HAD PREVIOUS COMMUNICATION/PERSONALITY SELF-ASSESSMENTS YES/NO

IF YES HOW LONG AGO?_____**WHAT TYPE?**_____

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APPENDIX

C. GROUP DEMOGRAPHIC INFORMATION

GROUP DEMOGRAPHIC INFORMATION

SPC?	SRVC	AGE YRS	RANK	YRS SRVC	USSPC MNTH	JOB MNTH	TDY DAYS	TRNG ?	TYPE	YRS AGO
N	N	36	O-4	15	18	6	25	N		
N	F	34	E-6	15	17	17	0	Y	MBPT	3
Y	F	46	O-4	16	16	16	20	Y	TQM	2
Y	F	33	O-3	10	5	5	30	Y	MBPT	12
N	M	39	O-4	15	13	8	50	N		
N	F	37	O-4	15	12	3	15	N		
N	F	38	O-3	19	2	2	10	Y	MBPT	2
Y	F	37	O-4	14	10	10	20	N		
Y	F	42	O-5	20	1	1	15	Y	MBPT	4
N	F	35	O-4	13	12	12	45	N		
N	N	36	O-4	14	12	12	45	N		
Y	F	33	O-3	12	16	16	30	N		
Y	F	36	E-7	19	24	14	20	Y	MBPT	1
Y	N	37	O-4	15	12	1	10	Y	MBPT	3
N	F	36	O-4	14	1	1	40	Y	MBPT	1
N	M	32	O-3	10	12	12	20	Y	MBPT	2
N	M	38	O-4	16	1	1	10	Y	MBPT	1
Y	F	34	O-4	12	14	14	20	Y	MBPT	2
Y	F	40	O-4	16	23	4	5	Y	MBPT	3
N	N	33	O-4	11	14	14	30	N		
Y	F	33	O-3	11	1	1	24	N		
Y	F	41	O-5	18	1	1	15	Y	PPS	5
Y	F	31	O-3	9	6	6	0	N		
Y	F	44	O-5	21	15	31	30	Y	MBPT	8
N	N	37	O-4	15	21	18	60	N		
Y	N	36	O-3	11	13	12	45	N		
Y	F	35	E-6	15	39	27	14	N		
N	M	38	O-4	20	13	13	30	N		
N	N	28	E-5	6	30	6	5	N		
N	M	30	E-5	6	18	4	0	N		
Y	F	38	E-7	18	48	48	30	N		

Note: TRNG ?: Y=YES; N=NO. SRVC: A=ARMY; N=NAVY; M=MARINES; F=AIR FORCE

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DATA FOR FIGURE 3.2

YEARS SERVICE	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
NUMBER	1	0	0	1	3	6	2	0	2	6	3	0	1	3	2	1

DATA FOR FIGURE 3.3

MONTHS USSPC	1	2	3	5	6	10	12	13	14	15	16	17	18	20	21	23	24	30	48
NUMBER	5	2	1	1	1	2	2	3	2	1	2	1	1	1	1	1	2	1	1

DATA FOR FIGURE 3.4

MONTHS JOB	1	2	3	4	5	6	8	10	12	13	14	16	17	18	48
NUMBER	6	2	2	1	2	2	2	2	2	2	3	2	1	1	1

DATA FOR FIGURE 3.5

DAYS TDY	0	10	15	20	25	30	40	45	50	60	65
NUMBER	3	6	3	5	2	5	2	2	1	1	1

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APPENDIX

D. PRE-RESEARCH SURVEY

PRE-RESEARCH SURVEY

The following information, along with the data from the survey's self-assessments,

is needed for statistical analysis as part of dissertation research. For each question or

statement below circle the number that most accurately describes your attitude.

1-Strongly Disagree   **2-Disagree**

3-Neutral

4-Agree   **5-Strongly Agree**

1. I offer facts. give opinions and ideas. provide suggestions and relevant information to help group discussions	1	2	3	4	5
2. I express my willingness to cooperate with other group members. and my expectations are that they will also be cooperative	1	2	3	4	5
3. I am open and candid in my dealing with the entire group	1	2	3	4	5
4. I give support to group members who are on the spot and struggling to express themselves intellectually or emotionally	1	2	3	4	5
5. I evaluate the contribution of other group members in terms of whether their contributions are useful to me	1	2	3	4	5
6. I take risks in expressing new ideas and current feelings during group discussions	1	2	3	4	5
7. I communicate to other group members that I am aware of and appreciate their abilities. talents. capabilities. skills, and resources	1	2	3	4	5
8. I offer help and assistance to anyone in the group to bring up the performance of everyone	1	2	3	4	5
9. I accept and support the openness of other group members, supporting them for taking risks, and encouraging individuality	1	2	3	4	5
10. I share any materials, references. sources of information, or other resources I have with other group members in order to promote success of all members and the group as a whole	1	2	3	4	5
11. I level with other group members	1	2	3	4	5
12. I feel like an integral part of the group	1	2	3	4	5
13. I have the opportunity to be heard and involved in the group's decision making	1	2	3	4	5
14. I have the opportunity to be creative and do something important	1	2	3	4	5
15. I would encourage others to become part of this group	1	2	3	4	5
16. I receive recognition for my contributions to the group	1	2	3	4	5
17. Being a member of the group gives me power	1	2	3	4	5
18. I participate in the group more than I did four months ago	1	2	3	4	5

19. I have close friends in this group	1	2	3	4	5
20. This group is an important part of my life	1	2	3	4	5
21. I understand how I learn and communicate	1	2	3	4	5
22. I understand how my coworkers learn and communicate	1	2	3	4	5
23. I understand my personality and behavior idiosyncrasies	1	2	3	4	5
24. I understand my coworkers' personality and behavioral idiosyncrasies	1	2	3	4	5

APPENDIX

E. POST-RESEARCH SURVEY

RESEARCH POST-SURVEY

The following information, along with the data from the survey's self-assessments,
is needed for statistical analysis as part of dissertation research. For each question or
statement below circle the number that most accurately describes your attitude.

1-Strongly Disagree   2-Disagree

<div align="center">3-Neutral</div>

4-Agree   5-Strongly Agree

1. I offer facts. give opinions and ideas. provide suggestions and relevant information to help group discussions	1	2	3	4	5
2. I express my willingness to cooperate with other group members. and my expectations are that they will also be cooperative	1	2	3	4	5
3. I am open and candid in my dealing with the entire group	1	2	3	4	5
4. I give support to group members who are on the spot and struggling to express themselves intellectually or emotionally	1	2	3	4	5
5. I evaluate the contribution of other group members in terms of whether their contributions are useful to me	1	2	3	4	5
6. I take risks in expressing new ideas and current feelings during group discussions	1	2	3	4	5
7. I communicate to other group members that I am aware of and appreciate their abilities. talents. capabilities, skills, and resources	1	2	3	4	5
8. I offer help and assistance to anyone in the group to bring up the performance of everyone	1	2	3	4	5
9. I accept and support the openness of other group members. supporting them for taking risks, and encouraging individuality	1	2	3	4	5
10. I share any materials, references, sources of information, or other resources I have with other group members in order to promote success of all members and the group as a whole	1	2	3	4	5
11. I level with other group members	1	2	3	4	5
12. I feel like an integral part of the group	1	2	3	4	5
13. I have the opportunity to be heard and involved in the group's decision making	1	2	3	4	5
14. I have the opportunity to be creative and do something important	1	2	3	4	5
15. I would encourage others to become part of this group	1	2	3	4	5
16. I receive recognition for my contributions to the group	1	2	3	4	5
17. Being a member of the group gives me power	1	2	3	4	5

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18. I participate in the group more than I did four months ago	1	2	3	4	5
19. I have close friends in this group	1	2	3	4	5
20. This group is an important part of my life	1	2	3	4	5
21. I understand how I learn and communicate	1	2	3	4	5
22. I understand how my coworkers learn and communicate	1	2	3	4	5
23. I understand my personality and behavior idiosyncrasies	1	2	3	4	5
24. I understand my coworkers' personality and behavioral idiosyncrasies	1	2	3	4	5

Did the training you receive help improve your understanding of how you learn and communicate?............Y/N

If yes, could you give specific examples? ....Y/N

Did the training you receive improve your understand how your coworkers learn and communicate? ....Y/N

If yes, could you give specific examples? ....Y/N

Did the training you receive help improve your understanding of your personality and behavior?................Y/N

If yes, could you give specific examples? ....Y/N

Did the training you receive help improve your understanding of your coworkers personality and behavior?..Y/N

If yes, could you give specific examples? ....Y/N

APPENDIX

F. LEARNING/COMMUNICATION, PERSONALITY,

AND BEHAVIORAL SURVEY

LEARNING/COMMUNICATION, PERSONALITY, AND BEHAVIORAL SURVEY

This survey consists of four sections: a learning and communication self-assessment; a 40 question basic personality multiple choice self-assessment; a 28 question "two choice" multiple choice behavioral self-assessment; and a three section education tool that contains amplifying data on what the self-assessments are based and how the information can be used. The intent of the survey is to provide you with basic information on how people communicate and behave, to give you specific information about yourself, and to provide you with tips on how to work more effectively with different types of people.

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COMMUNICATION SELF-ASSESSMENT

Refer to the Neurolinguistic Programming Personal Profile

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COMMUNICATION MODES

John Grinder (a linguist) and Richard Bandler (a mathematician turned therapist)

developed the Theory of Neurolinguistic Programming (NLP) to explain how people

communicate and learn. According to NLP doctrine, everyone perceives the world chiefly

through one dominant sense–seeing (visual), hearing (auditory), or touching/doing/moving

(kinesthetic). Understanding which modality you are in can help you learn and "receive"

communication. Understanding the modality of others can help you "transmit"

communication more effectively. Although some people have a "balance" between two or

even three senses, most people have one sense that is predominant. People who have

equal modality preferences are more flexible learners and communicators. The self-

assessment indicates your strongest modality. The following are suggestions to help you

learn, communicate, and diagnose the modalities of your coworkers.

CHARACTERISTICS OF COMMUNICATION STYLES

VISUAL

LEARNING STYLE	Learns by looking and watching demonstrations
READING	Enjoys descriptions; likes to stop and imagine the scene; has strong concentration
SPELLING	Uses the configuration of words to identify them; recognizes words by sight
HANDWRITING	Good handwriting, especially when young; attentive to spacing and word size; is concerned with a neat appearance; tends to diagram or map things out
MEMORY	Good memory for faces, but not for names; takes down notes
IMAGERY	Lively imagination; thinks by using images; visualizes details
DISTRACTABILITY	Generally not distracted by sounds; distracted by visual irregularities or motion
PROBLEM SOLVING	Careful; decides before acting; arranges ideas by writing them out; makes a list of problems
RESPONSE TO PERIODS OF INACTIVITY	Stares out; writes down scribbles; tries to find visual relief
RESPONSE TO NEW SITUATIONS	Explores new surroundings visually; investigates new structures
EMOTIONALITY	A little restricted; stares out when mad; cries frequently; face lights up when happy; facial expression good indicator of emotional state
GENERAL APPEARANCE	Orderly; tidy; often regular about choices of outfits
RESPONSE TO THE ARTS	Somewhat indifferent to music; favors visual arts; remains quiet about works that are liked, but is nonetheless moved by them; interested in details of art work rather than whole
COMMUNICATION	Does not talk very much; irritated by extensive listening; awkward with some words; describes in vivid detail; favors visual words—notice, picture, appearance, apparent, wish, desire, construct, correlate, dream, see, look, view, focus, observe, perspective, clear, image, vision, hazy, colors
EYE MOVEMENT	Eyes look up when thinking or trying to think or remember

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CHARACTERISTICS OF COMMUNICATION STYLES

AUDITORY

LEARNING STYLE	Learns information verbally by others or through self
READING	Likes plays and dialogues; ignores detailed descriptions; skips over illustrations; lip synchs or subvocalizes
SPELLING	Uses a phonics approach; has auditory word attack skills
HANDWRITING	Has difficulties in the early stages; vocalizes words when writing; generally writes lightly
MEMORY	Good memory for names, but not for faces; remembers best by verbal repetition
IMAGERY	Thinks through use of sounds; subvocalizes; little interest in details; visualizes words and letters versus people and scenes
DISTRACTABILITY	Easily distracted by sounds
PROBLEM SOLVING	Speaks problems aloud; subvocalizes; solves problems by talking them out
RESPONSE TO PERIODS OF INACTIVITY	Talks to others or to self; hums
RESPONSE TO NEW SITUATIONS	Discusses the pluses and minuses of the new situation; talks over the possible solutions
EMOTIONALITY	Verbally explosive, but soon calms down; emotions expressed verbally through changes in pitch, tone, and volume of voice
GENERAL APPEARANCE	Coordinated outfit not necessarily important; is aware of word choice
RESPONSE TO THE ARTS	Likes music very much; does not enjoy visual arts as well, but will talk about art; concentrates on the whole rather than on details; talks more about the artwork than actually spends time looking; develops vocabulary to articulate feelings
COMMUNICATION	Listens well, but is more anxious to speak; lengthy, but repetitive descriptions; enjoys listening to self and others; frequently uses auditory words–buzz, talked, clicks, popped in my head, related, explained, recalled, tone, sounds, vocalize, insult, say, hear, listen, sounds, tune, tingle, note, ring
EYE MOVEMENT	Eyes move to the side when thinking or trying to remember

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CHARACTERISTICS OF COMMUNICATION STYLES

KINESTHETIC

LEARNING STYLE	Learns through direct experience
READING	Strong interest in stories with action, but easily distracted with slow moving stories
SPELLING	Misspells frequently and "feels" out word order
HANDWRITING	Starts out well, but deteriorates with shrinking space; strong handling of writing instrument
MEMORY	Remembers physical aspects of experience well, but has problems with visual and auditory aspects
IMAGERY	Images accompanied by movement are most important
DISTRACTIBILITY	Easily distracted from auditory and visual presentations
PROBLEM SOLVING	Prefers solutions that require taking action; spontaneous
RESPONSE TO PERIODS OF INACTIVITY	Becomes uncomfortable and restless; often moves hands
RESPONSE TO NEW SITUATIONS	Anxious to explore physically; a strong use of tactile sensations
EMOTIONALITY	Emotions reflected in body; grabs things excitedly when happy and destructive toward things when angry
GENERAL APPEARANCE	Not necessarily concerned with neatness
RESPONSE TO THE ARTS	Reacts physically to music; prefers sculpture for tactile qualities and prefers artworks that are physically engaging; little verbal response to art
COMMUNICATION	Use gestures and close proximity to accentuate speech; hard to maintain interest during lengthy discourse. Favors "tactile" words—hard, push, soft, cozy, friendly, feel, sense, grasp, tight, smooth, warm, cold, rough, grasp, grab, clutch, run, fear, anger, happy
EYE MOVEMENT	Eye movement is downward, looking into the body when thinking or trying to remember

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SUGGESTED AIDS TO COMMUNICATION

VISUAL	AUDITORY	KINESTHETIC
Use guided imagery	Use audio	Role play
Form pictures with words	Use music	Use repeated motion
Take notes	Repeat the points orally	Associate concepts/information with feelings
Use "cue" words	Use rhythmic sounds	Physically "do it" when possible
Use notebooks	Have discussions	Use mnemonics
Use color codes	Use oral directions	
Use photographs	Use mnemonics	
Use video/motion pictures		
Use graphs/charts		
Use drawings		

Three of your five senses are primarily used in learning, storing and remembering information. Your eyes, ears, and sense of touch play essential roles in the way you communicate, perceive reality, and relate to others. You learn from and communicate best with someone who shares your dominant modality. Recognizing the modalities of your coworkers and understanding the characteristics of their visual, auditory, and kinesthetic styles can be a great advantage.

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PERSONALITY SELF-ASSESSMENT

Refer to the Human Information Processing Survey (HIPS)

Turn to the next page when you have completed the Questionnaire

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SCORING KEY FOR THE HIPS

1. A-L B-R C-I	11. A-L B-R C-I	21. A-I B-L C-R	31. A-I B-L C-R
2. A-R B-L C-I	12. A-L B-R C-I	22. A-I B-L C-R	32. A-I B-R C-L
3. A-I B-R C-L	13. A-I B-L C-R	23. A-I B-R C-L	33. A-R B-L C-I
4. A-R B-L C-I	14. A-R B-I C-L	24. A-R B-L C-I	34. A-L B-R C-I
5. A-R B-L C-I	15. A-R B-I C-L	25. A-R B-L C-I	35. A-R B-L C-I
6. A-R B-L C-I	16. A-I B-R C-L	26. A-R B-L C-I	36. A-L B-R C-I
7. A-R B-L C-I	17. A-R B-I C-L	27. A-L B-R C-I	37. A-I B-L C-R
8. A-R B-I C-L	18. A-R B-I C-L	28. A-R B-L C-I	38. A-I B-L C-R
9. A-I B-L C-R	19. A-R B-L C-I	29. A-L B-R C-I	39. A-L B-R C-I
10. A-I B-L C-R	20. A-I B-R C-L	30. A-L B-R C-I	40. A-I B-L C-R

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CONVERSION TABLE FOR STANDARD SCORES AND PERCENTILES

Raw Score	Left Standard Score	Left Percentile	Integrated Standard Score	Integrated Percentile	Right Standard Score	Right Percentile
0	50	1	39	0	51	1
1	55	1	43	0	55	1
2	59	2	46	0	59	2
3	63	3	50	1	63	3
4	67	5	54	2	68	5
5	71	8	58	2	72	8
6	76	11	61	3	76	11
7	80	16	65	4	80	16
8	84	21	69	6	84	21
9	88	28	73	9	88	27
10	92	35	76	12	92	35
11	97	43	80	16	96	43
12	101	52	84	21	100	51
13	105	60	88	27	105	59
14	109	68	91	33	109	67
15	113	75	95	41	113	74
16	118	81	99	48	117	80
17	122	86	103	55	121	85
18	126	90	106	63	125	89
19	130	93	110	70	129	93
20	134	96	114	76	133	95
21	139	97	118	81	137	97
22	143	98	121	86	141	98
23	147	99	125	89	146	99
24	151	99	129	93	150	99
25	155	100	133	95	154	100
26	160		136	97	158	
27	164		140	98	162	
28	168		144	99	166	
29	172		148	99	170	
30	176		151	99	174	
31	181		155	100	178	

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CEREBRAL DOMINANCE

In the early 1950s Paul MacLean, currently chief of the Laboratory of Brain Evolution at the Institute of Mental Health, made major breakthroughs in understanding how the physical characteristics of the brain affects personality. MacLean discovered that the brain is physically composed of three successively superimposed layers, each of which carries within its structure a history and a function that developed during the various stages of man's evolution. Although this is still a new area of investigation, research conducted in this area can be used to indicate which part of the brain is dominant. For example, research with electroencephalographs has shown that when we write letters our Left Brain takes charge while the right hemisphere (Right Brain) relaxes and drifts into a trance like state–but when we draw pictures the Right Brain takes charge and the left hemisphere(Left Brain) nods off. The Left Brain is analytical, rational, and practical. The Left Brain is almost entirely responsible for verbal skills. Technocrats, scientists, mathematicians, computer experts, and lawyers tend to be Left Brain dominant. Left Brain people tend to be perceived as driven and single minded. The Right Brain is more intuitive and emotional. Evidence suggests that creativity and spatial perception are centered in the Right Brain. People who are Right Brain dominant tend to have a deep seated musical sense (although, very recent research suggests the left hemisphere (Left Brain) may be more important to music than previously believed), and to be "mellow and laid-back." They tend to remember faces (objects in space), but not names (linguistic constructs). Between the two extremes is the "balanced brain." These people have neither the extreme single mindedness of the Left Brainers nor the terminal mellowness of the Right Brainers. We must remember people are not all one hemisphere or the other hemisphere. We need both hemispheres of our brain to function. The point of the self-assessment, like the previous self-assessment on communication, is to provide you with a clearer view of yourself. The self-assessment should indicate to what extent which hemisphere is dominant. This provides a "physical" basis for your personality that shouldn't change as much as the behavioral self-assessment that is next.

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CEREBRAL DOMINANCE CHARACTERISTICS

LEFT BRAIN	RIGHT BRAIN
Sequential	Holistic
Intellectual	Intuitive
Structured/planned	Spontaneous
Controls feelings	Lets feelings go
Analytical	Creative/responsive
Logical	More abstract
Remembers names	Remembers faces
Rational	More likely to act on emotions
Solves problems by breaking them apart	Solves problems by looking at the whole
Time-oriented	Spatially oriented
Auditory/Visual learner	Kinesthetic learner
Prefers to write and talk	Prefers to draw and handle objects
Follows spoken directions	Follows written or demonstrated directions
Talks to learn and think	"Pictures" things to learn and think
Prefers true/false, multiple-choice and matching tests	Prefers essay tests
Risk averse (more control)	Takes more risks (less control)
Looks for the differences	Looks for similarities
Controls the right side of the body	Controls the left side of the body
Thinks mathematically	Musical abilities
Thinks concretely	Emotional
Thinks of one thing at a time	Thinks simultaneously
Good with languages	

BEHAVIORAL SELF-ASSESSMENT

Refer to the Personality Profile System Survey

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PERSONALITY PROFILE SYSTEM

The last self-assessment is the Personality Profile System (PPS). PPS uses a flexible "behavioral trait" approach to describe differences in individual personalities. PPS accounts for the fact that individuals can possess many traits, and that the intensity of these traits will affect behavior. PPS theorizes that personality is a blend of four elements--dominance, influence, steadiness, and compliance that modify and interact with each other. Each individual's personality is a unique blend of these four elements. Human beings learn and grow as they go through their lives. They also react quite differently according to the "role" they are in (home or family versus work). The PPS self-assessment will change over time; therefore, the PPS self-assessment will change according to the situation. For today's self-assessment, answer the questions from a work place perspective. The back of the PPS booklet contains a lot of information on the various behavioral types. Additional information on the basic behavioral types is provided on the following pages. Remember, there are no "correct" answers or "right" behavioral types. As with everything else, the intent is to provide self-knowledge and tips on how to improve understanding and communication with your co-workers.

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Dominance, Influencing, Steadiness, and Compliance.

People with **Dominant** tendencies have the results they want well in mind. Their messages are designed to stimulate and prod others to untested action. They are attentive to communication that will speed up the action. Questions about the right action are shrugged away. These individuals feel they can change the course of action.

People with **Influencing** tendencies also want to shape and mold events and have an active voice. Their messages are designed to stimulate and prod others to action by working with and through people. They are interested in people, and they like to make people feel good about themselves. They are particularly attentive of the personal needs of others, and they search for ways in which to meet these needs. Messages about how to actually accomplish the task are often deemed unimportant; these stimuli are at the far range of their attention span.

People with **Steadiness** tendencies are interested in the how and why--a product orientation. They send messages that reflect their interest in maintaining a stability within themselves and the situation, between the old and the new. Messages that urge action before knowing how to do things fall on deaf ears.

People with **Compliance** (to their standards) tendencies reflect their product orientation when they send messages that ask the reasons for change. "Why" is a favorite question. They have concern for doing things "accurately." They are receptive to messages that reassure them they are doing things correctly. Messages that ignore this tend to go unheeded.

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UNDERSTANDING AND WORKING WITH
THE BASIC BEHAVIOR TYPES

CHARACTERISTICS

D DOMINANT	Appearance: Strong sense of self-confidence, anxious and impatient, aggressive communication skills
	Possible Strong-Points: Go-getter, goal oriented, takes action, assertive
	Possible Limitations: Abrupt behavior, fast talker, intimidating style
I INFLUENTIAL	Appearance: Friendly, self possessed, fashionable, likes to impress others, dominates conversation
	Possible Strong-Points: positive, likable personality, works well with others
	Possible Limitations: Bad Listener, distracted with details, fails to keep commitments, easily offended
S STEADINESS	Appearance: Calm, helps others, works within patterns, non-aggressive
	Possible Strong-Points: Kind, reliable, time conscious, scheduled, good instructor
	Possible Limitations: Tends to be rigid, stubborn, likes to control things, slow to change
C CONSCIENTIOUS	Appearance: Careful, proceeds cautiously, adheres to protocol, rational
	Possible Strong-Points: Adheres closely to procedures, professional, technically proficient, good with details
	Possible Limitations: Over-anxious, does not handle criticism well, tends to be insecure and indecisive, extremely high expectations

QUEUING

D DOMINANT	Very confident, Aggressive Communicator
I INFLUENTIAL	Friendly, Easy going, Positive
S STEADINESS	Calm, Relaxed
C CONSCIENTIOUS	Careful, Ordered, Rational, Proceeds Cautiously

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UNDERLYING MOTIVATION

D DOMINANT	Desires to establish control: Anxious about being undermined
I INFLUENTIAL	Desires to be accepted: Anxious will not be noticed
S STEADINESS	Desires to be in a secure position: Anxious in a constantly changing environment
C CONSCIENTIOUS	Desires to be well ordered: Anxious about rejection

SKILLS FOR WORKING MORE EFFECTIVELY

D DOMINANT	Promote imaginative thinking Keep them challenged Establish eye contact, then lower eyes and ponder Be forward, establish a dominant position and encourage response Take initial control gently and openly
I INFLUENTIAL	Give praise and attention, boost their sense of self-worth Listen to them talk, and give active listening signals (like head nodding and touch) Be aware of body language Be responsive and understanding Maintain a friendly relationship
S STEADINESS	Be understanding and patient, show concern and interest Be attentive and give support Maintain a dialogue, not a monologue Be truthful and open, stress honesty
C CONSCIENTIOUS	Establish order, use a straight and direct method Be systematic, rational, ordered and precise Acknowledge the importance of detail, provide all relevant information

TECHNIQUES FOR APPLYING SKILLS

D DOMINANT	Assume an authoritative stance
	Speak in a firm, clear tone
	Ask direct, action-oriented questions
I INFLUENTIAL	Use a varied and colorful voice and tone
	Use noticeable body gestures
	Draw them into the conversation
S STEADINESS	Keep the tone of your voice calm
	Maintain visual and open body language
	Show sincere desire to communicate
C CONSCIENTIOUS	Use periods of silence
	Enunciate clearly
	Ask questions that clarify
	Use a point-by-point method
	Be specific

APPENDIX

G. PRE- AND POST-RESEARCH SURVEY DATA

APPENDIX

H. PRE-RESEARCH AND POST-RESEARCH PERFORMANCE DATA

EXPERIMENTAL GROUP SUSPENSE DATA

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CONTROL GROUP SUSPENSE DATA

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Group Performance Data

Number of Taskings/Time Due

Figure H.1. Taskings Per Category, April/May
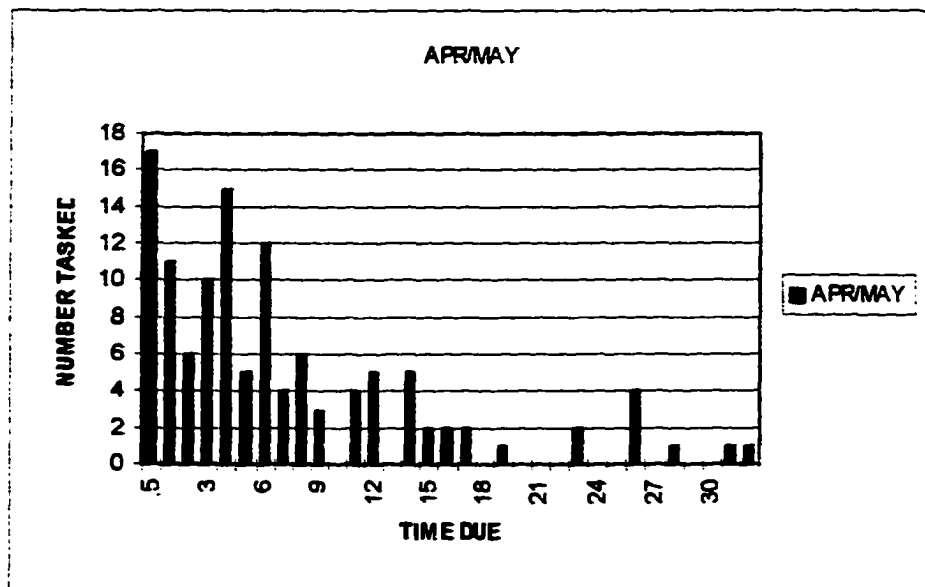
Figure H.2. Taskings Per Category, September/October

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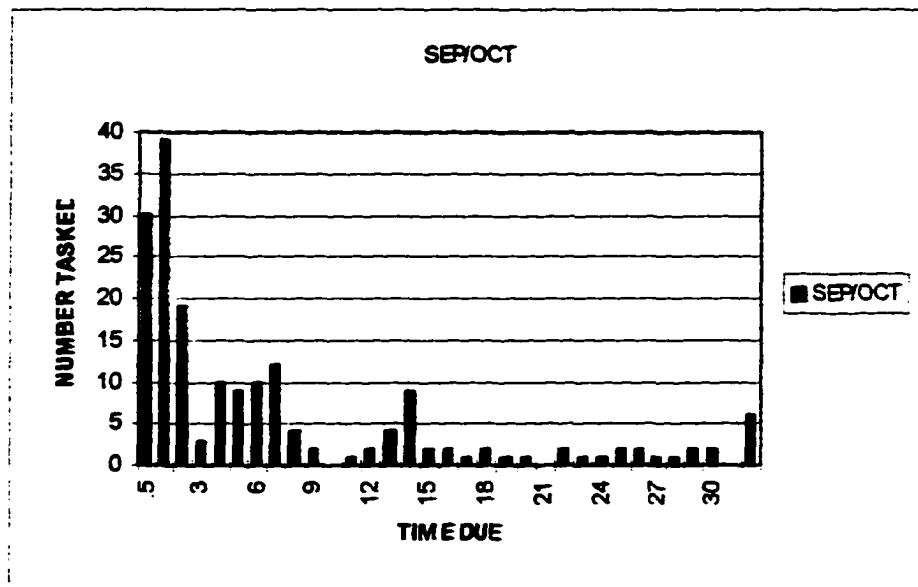
Group Performance Data

Average Time Complete/Time Due

Figure H.3. Average Time To Complete Per Category, April/May
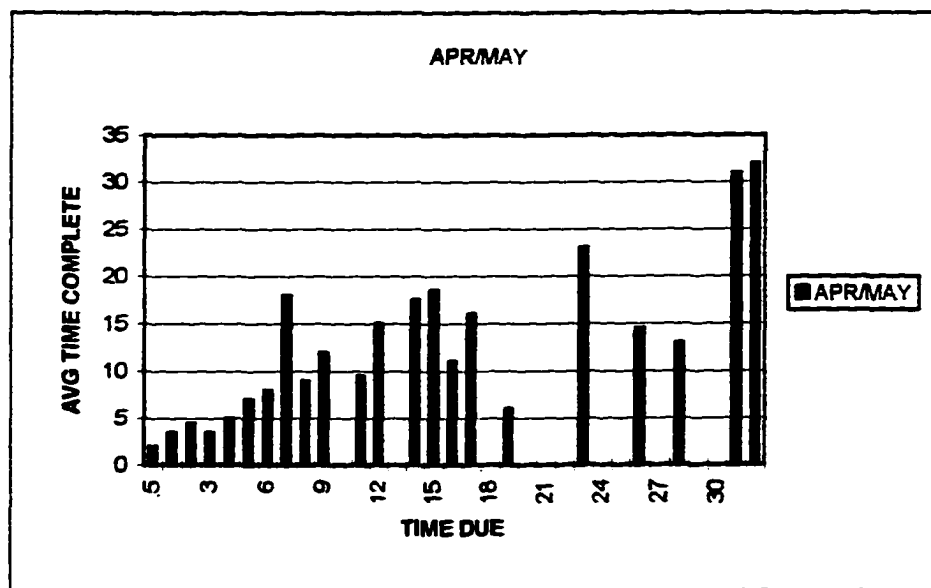
Figure H.4. Average Time To Complete Per Category, September/October

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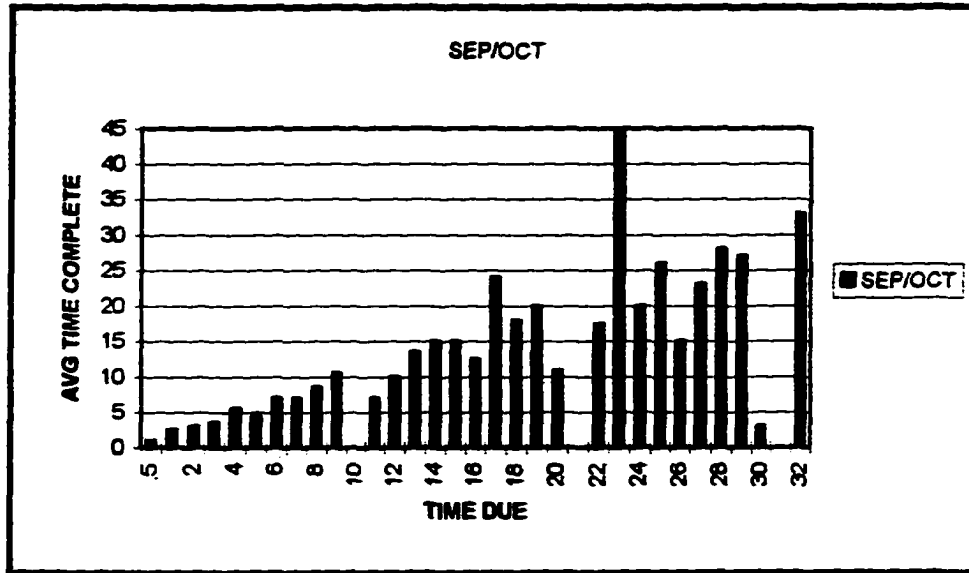
Table H.1. Group Performance Data Comparison

April/May			May/June	
Time Due (Days)	Number Tasked	Average Days Completed	Average Days Completed	Number Tasked
0.5	17	1.71	1.29	30
1	11	3.36	2.49	39
2	6	4.5	3.05	19
3	10	3.65	3.66	3
4	15	4.87	5.5	10
5	5	7.2	4.72	9
6	12	7.75	7	10
7	4	18	7.08	12
8	6	8.83	8.63	4
9	3	12	10.5	2
10	0	N/A	N/A	0
11	4	9.5	7	1
12	5	14.8	10	2
13	0	N/A	13.75	4
14	5	17.6	15.33	9
15	2	18.5	15	2
16	2	11	12.5	2
17	2	16	24	1
18	0	N/A	18	2
19	1	6	20	1
20	0	N/A	11	1
21	0	N/A	N/A	0
22	0	N/A	17.5	2
23	2	23	45	1
24	0	N/A	20	1
25	0	N/A	26	2
26	4	14.38	15	2
27	0	N/A	23	1
28	1	13	28	1
29	0	N/A	27	2
30	0	N/A	3.25	2
31	1	31	N/A	0
32	1	32	32.83	6

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Table H.2. Group Performance Data, Number Accomplished Per Category

Time (days)	APRIL/MAY	SEPTEMBER/OCTOBER
	Number Accomplished	Number Accomplished
0.5	8	38
1	13	30
2	6	16
3	9	11
4	8	11
5	9	6
6	17	9
7	6	9
8	6	9
9	2	1
10	2	1
11	3	2
12	4	2
13	3	2
14	6	10
15	1	4
16	1	1
17	1	2
18	1	2
19	1	0
20	1	3
21	1	1
22	0	0
23	3	2
24	0	2
25	1	0
26	3	2
27	0	0
28	0	2
29	0	0
30	0	1
31	1	0
32	2	4

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Table H.3. Calculation For Chi-Square

SUSPENSE	APR/MAY X	p X/119	E p x 183	SEP/OCT O	$\frac{(O-E)^2}{E}$
0.5	8	.067	12.5	38	52.02
1	13	.109	20	30	5.00
2	6	.050	9	16	5.44
3	9	.075	14	11	0.64
4	8	.067	12.5	11	0.18
5	9	.075	14	6	4.57
6	17	.143	26	9	11.12
7	6	.050	9	9	0
8	6	.050	9	9	0
9-12	11	.092	17	6	7.12
13-14	9	.075	14	12	0.29
15-19	5	.042	8	9	0.13
20-25	6	.050	9	8	0.11
26-32	6	.050	9	9	0
TOTAL	119	1.0	183	183	86.62

Note: H_0: Group response time in September/October follows the distribution from the group response time in April/May as provided in column "E."

H_1: Group response time does not follow the distribution from the response time in April/May.

df = 13 χ^2 .050 = 22.3621, χ^2 .005 = 29.8194

As 86.62 > 22.3621, the null hypothesis is rejected at α = 0.05. As 86.62 > 29.8194, the null hypothesis is also rejected at α = 0.005.

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APPENDIX

I. SURVEY STATISTICAL CALCULATIONS

.

SURVEY STATISTICAL CALCULATIONS

Cohesion Index

SUBJECT	PRE-TEST X_1	POST-TEST X_2	DIFF $D=X_1 - X_2$	RANK $|D|$	RANK (+)	RANK (-)
1	78	81	-3	6		6
2	87	77	10	17	17	
3	75	83	-8	13.5		13.5
4	92	92	10	17	17	
5	73	80	-7	11.5		11.5
6	94	70	24	26	26	
7	81	73	8	11.5	11.5	
8	92	80	12	19	19	
9	95	81	6	10	10	
10	79	77	2	3	3	
11	82	84	-2	3		3
12	80	90	-10	17		17
13	79	95	-16	20		20
14	81	90	-9	15		15
15	70	88	-18	21.5		21.5
16	88	85	3	6	6	
17	77	96	-19	23		23
18	66	96	-30	28		28
19	31	88	-57	31		31
20	88	89	-1	1		1
21	81	99	-18	21.5		21.5
22	92	90	2	3	3	
23	75	70	5	9	9	
24	72	93	-21	24.5		24.5
25	83	86	-3	6		6
26	85	92	-7	11.5		11.5
27	84	88	-4	8		8
28	55	93	-38	30		30
29	55	90	-35	29		29
30	64	91	-27	27		27
31	70	91	-21	24.5		24.5

[$\Sigma(+)$ 121.5 $\Sigma(-)$ 372.5]   [n = 31]

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Question 21

SUBJECT	PRE-TEST X_1	POST-TEST X_2	DIFF $D=X_1 - X_2$	RANK $|D|$	RANK (+)	RANK (-)
1	4	4	0			
2	4	4	0			
3	5	4	1	8	8	
4	4	5	-1	8		8
5	3	4	-1	8		8
6	5	5	0			
7	4	3	1	8	8	
8	3	4	-1	8		8
9	5	4	1	8	8	
10	4	4	0			
11	4	4	0			
12	4	5	-1	8		8
13	4	5	-1	8		8
14	4	5	-1	8		8
15	4	5	-1	8		8
16	4	4	0			
17	3	5	-2	18		18
18	4	5	-1	8		8
19	1	5	-4	21		21
20	5	4	1	8	8	
21	4	5	-1	8		8
22	5	5	0			
23	4	4	0			
24	3	5	-2	18		18
25	4	4	0			
26	4	5	-1	8		8
27	4	4	0			
28	3	5	-2	18		18
29	3	5	-2	18		18
30	4	5	-1	8		8
31	3	5	-2	18		18

$[\Sigma(+)32 \qquad \Sigma(-)209]$ $\qquad\qquad\qquad$ [n = 21]

Question 22

SUBJECT	PRE-TEST X_1	POST-TEST X_2	DIFF $D = X_1 - X_2$	RANK $|D|$	RANK (+)	RANK (-)
1	3	3	0			
2	3	3	0			
3	4	4	0			
4	4	4	0			
5	3	3	0			
6	3	4	-1	7		7
7	4	3	1	7	7	
8	3	3	0			
9	5	4	1	7	7	
10	4	4	0			
11	3	4	-1	7		7
12	4	4	0			
13	3	4	-1	7		7
14	4	5	-1	7		7
15	3	5	-2	15.5		15.5
16	4	4	0			
17	3	4	-1	7		7
18	2	4	-2	15.5		15.5
19	1	5	-4	20		20
20	4	4	0			
21	4	5	-1	7		7
22	5	4	1	7	7	
23	4	4	0			
24	3	5	-2	15.5		15.5
25	1	4	-3	18.5		18.5
26	3	4	-1	7		7
27	3	4	-1	7		7
28	3	5	-2	15.5		15.5
29	3	4	-1	7		7
30	3	4	-1	7		7
31	2	5	-3	18.5		18.5

[Σ(+)21 Σ(-)189]   [n = 20]

Question 23

SUBJECT	PRE-TEST X₁	POST-TEST X₂	DIFF D=X₁ - X₂	RANK |D|	RANK (+)	RANK (-)
1	4	4	0			
2	4	4	0			
3	5	4	1	5	5	
4	4	4	0			
5	3	5	-2	11.5		11.5
6	5	5	0			
7	5	4	1	5	5	
8	3	4	-1	5		5
9	5	5	0			
10	4	5	0			
11	4	5	0			
12	5	4	0			
13	5	4	0			
14	5	5	0			
15	4	5	0			
16	4	4	0			
17	4	5	-1	5		5
18	3	5	-2	11.5		11.5
19	1	4	-3	14		14
20	5	5	0			
21	5	5	0			
22	5	4	1	5	5	
23	4	5	-1	5		5
24	4	4	0			
25	4	5	-1	5		5
26	3	5	-2	11.5		11.5
27	5	5	0			
28	3	5	-2	11.5		11.5
29	4	5	-1	5		5
30	5	5	0			
31	4	5	-1	5		5

[Σ(+)15   Σ(-)90]   [n = 14]

Question 24

SUBJECT	PRE-TEST X₁	POST-TEST X₂	DIFF D=X₁ - X₂	RANK |D|	RANK (+)	RANK (-)
1	3	3	0			
2	4	4	0			
3	5	4	1	6	6	
4	4	3	1	6	6	
5	3	3	0			
6	3	4	-1	6		6
7	4	4	0			
8	3	4	-1	6		6
9	4	4	0			
10	4	4	0			
11	4	4	0			
12	4	4	0			
13	3	4	1	6	6	
14	4	5	-1	6		6
15	3	4	-1	6		6
16	4	4	0			
17	4	4	0			
18	3	5	-2	13.5		13.5
19	2	5	-3	17		17
20	4	4	0			
21	3	5	-2	13.5		13.5
22	4	5	-1	6		6
23	4	5	-1	6		6
24	3	5	-2	13.5		13.5
25	4	4	0			
26	4	4	0			
27	3	5	-2	13.5		13.5
28	3	4	-1	6		6
29	3	4	-1	6		6
30	2	5	-3	17		17
31	2	5	-3	17		17

[Σ(+)18   Σ(-)153]   [n = 18]

WORKS CITED

Aamodt, M. J., and W. W. Kimbrough. 1982. Validity considerations in acceptance of personal profile system interpretations. Educational and Psychological Measurements, n.s., 42: 625-628.

Aczel, A. D. 1993. Complete business statistics. Burr Ridge: Irwin.

Akelaitis, A. J. 1943. Studies on the corpus callosum: VII. Study of language functions (tactile and visual lexia and graphia) unilaterally following section of the corpus callosum. Journal of Neuropathology and Experimental Neurology, n.s., 2: 226-262.

Alexander Hamilton Institute. 1919. The heart of the office, Talk no. 38. New York, NY: Alexander Hamilton Institute.

American Psychological Association. 1985. Standards for educational and psychological testing. Washington, DC: American Psychological Association.

Andreas, S. 1994. NLP the new technology of achievement. New York, NY: William Morrow and Company.

Andreas, S., and C. Andreas. 1987. Change your mind and keep the change. Moab, UT: Real People Press.

_____. 1989. Heart of the mind. Moab, UT: Real People Press.

Andreas, C., and T. Andreas. 1990. NLP comprehensive practitioner training manual. Moab, UT: Real People Press.

Bakan, P. 1976. The right brain is the dreamer. Psychology Today (10 November): 66-68.

Bales, R. 1950. Interaction process analysis: A method for the study of small groups. Cambridge, MA: Addison-Wesley Press.

Bandler, R., and J. Grinder. 1975. The structure of magic I - A book about language and therapy. Palo Alto, CA: Science and Behavior Books.

_____. 1976. The structure of magic II. Palo Alto, CA: Science and Behavior Books.

183

_____. 1979. Frogs into princes. Moab, UT: Real People Press.

_____. 1982. Reframing: Neurolinguistic programming and the transformation of meaning. Moab, UT: Real People Press.

Bandura, A. 1977. Self-Efficacy: Toward a unifying theory of behavioral change. Psychology Review, n.s., 84: 191-215.

Barna, G. 1990. The frog in the kettle. Ventura, CA: Regal Books.

Bateson, G. 1972. Steps to an ecology of mind. New York, NY: Ballantine Books.

_____. 1991. A sacred unity - Further steps to an ecology of mind. New York, NY: Harper Collins.

Bateson, M. C. 1989. Composing a life. New York, NY: Plume Books.

Benson, F., and E. Zaidel. 1985. The dual brain. New York, NY: The Guilford Press.

Benton, A. 1972. The "minor" hemisphere. Journal of the History of Medicine and Allied Sciences. n.s., 27: 5-14.

_____. 1977. Historical notes on hemispheric dominance. Archives of Neurology, n.s., 34: 127-129.

Bogen, J. E. 1969. The other side of the brain II: An appositional mind. Bulletin of the Los Angeles Neurological Society, n.s., 34: 135-162.

Bogen, J. E., and P. J. Vogel. 1962. Cerebral commissurotomy in man: Preliminary case report. Bulletin of the Los Angeles Neurological Society, n.s., 27: 169-172.

Borofsky, G. L. 1993. Pre-Employment psychological screening. Risk Management, n.s., 40: 47-51.

Brawley, L. R., A. V. Carron, and W. N. Widmeyer. 1993. Influence of the group and its cohesiveness on perceptions of group goal-related variables. Journal of Sport and Exercise Psychology, n.s., 15: 245-260.

Broca, P. 1865. Sur le siege de la faculte du language articule. Bulletin of Social Anthropology, n.s., 6: 337-393.

_____. 1869. L'Ordre des primates parallel anatomique del 'homme et des singes. Bulletin of Social Anthropology, n.s., 4: 374-395.

Brook, R. 1978. The relationship between piagetian cognitive development and cerebral cognitive asymmetry. Bethesda, MD: National Institute of Mental Health.

Brown, H. D., and S. M. Kosslyn. 1993. Cerebral lateralization (review). Current Opinion in Neurobiology, n.s., 3: 183-186.

Carmon, A. 1978. Spatial and temporal factors in visual perception of patients with unilateral cerebral lesions. In Asymmetrical function of the brain, ed. M. Kinsbourne, 86-90. Cambridge, UK: Cambridge University Press.

Carpenter, M. B. 1978. Core text of neuroanatomy. Baltimore, MD: The Williams and Wilkins Company.

Carr, L. J. 1929. Experimental sociology: A preliminary note on theory and method. New York, NY: McGraw-Hill.

Carron, A. V., W. N. Widmeyer, and L. R. Brawley. 1985. Development of an instrument to assess cohesion in sport teams. Journal of Sport Psychology, n.s., 7: 244-266.

Cartwright, D., and A. Zander. 1968. Group dynamics. New York, NY: Harper and Row.

Cattell, R. B. 1946. Description and measurement of personality. New York, NY: World Book.

Chairman, Joint Chiefs of Staff, Department of Defense. 1995. Unified command plan. Washington, DC: Government Printing Office.

Cooley, C. H. 1915. Social organization. New York, NY: Scribners.

Cooper, V. L., and P. Monroe. 1992. TQM facilitator course. San Diego, CA: DEMCON Consulting Group.

Corballis, M. C. 1980. Laterality and myth. American Psychologist, n.s., 35: 284-295.

Costa, A. L., and R. J. Garmston. 1986. The art of cognitive coaching - Supervision for intelligent teaching. Sacramento, CA: Institute for Intelligent Behavior.

Cunningham, I. 1988. Interactive holistic research: Researching self-managed learning. In Human inquiry in action - Developments in new paradigm research, ed. P. Reason, 163-181. Newbury Park, CA: Sage Publications.

Dashiell, J. F. 1935. Experimental studies of the influence of social situations on the behavior of individual human adults. In Handbook of social psychology, ed. C. Muchison, 1097-1158. Worcester, MA: Clark University Press.

Davis, J. 1969. Group performance. Reading, MA: Addison-Wesley Publishing.

Denny, D. A., and R. I. Wolf. 1980. Factor analysis of the solat test of left-right brain cerebral hemisphere preference. Norfolk, VA: Eastern Educational Research Association.

Derry, C. J. 1992. Personality impacts job fit. Telemarketing Magazine, n.s., 10: 18-19, 57.

Dilts, R. 1990. Changing belief systems with NLP. Cupertino, CA: Meta Publications.

Dimond, S. J. 1972. The double brain. Edinburgh, UK: Churchill Livingstone.

Dimond, S. J., and J. G. Beaumont. 1974. Hemispheric function in the human brain. New York, NY: John Wiley and Sons.

Doty, R., and W. H. Overmann. 1977. Mnemonic role of forebrain commissures in macaques. In Lateralization in the nervous system. ed. S. Harnad, R. W. Doty, L. Goldstein, J. Jaynes, and G. Krauthamer, 75-88. New York, NY: Academic Free Press.

Dowd, T. E., and J. Pety. 1982. Effect of counselor predicate matching on perceived social influence and client satisfaction. Journal of Counseling Psychology. n.s., 29: 206-209.

Durant, W., and A. Durant. 1967. Rousseau and the revolution. New York, NY: Simon and Schuster.

Einspruch, E. L., and B. D. Forman. 1985. Observations concerning research literature on neurolinguistic programming. Journal of Counseling Psychology, n.s., 32: 589-596.

Engel, G., and J. Arthur. 1996. The NLP personal profile. Denver, CO: LifeStar.

_____. 1996. The NLP personal profile guide book. Denver, CO: LifeStar.

Ettlinger, G., E. Warrington, and O. L. Zangwill. 1957. A further study of visuo-spatial agnosia. Brain, n.s., 80: 335-361.

Falzett, W. C. 1981. Matched versus unmatched primary representational systems and their relationship to perceived trustworthiness in a counseling analogue. Journal of Counseling Psychology, n.s., 28: 305-308.

Festinger, L. 1950. Informal social communication. Psychological Review, (March): 271.

Fisher, C. M. 1982. Disorientation for place. Archives of Neurology, n.s., 39: 33-36.

Flavell, J. H. 1966. The developmental psychology of Jean Piaget. New York, NY: D. Van Norstrand.

Franklin, E., and D. A. Franklin. 1979. The brain research bandwagon: Proceed with caution. Education Digest, n.s., 44: 58-61.

French, C. C., and J. Painter. 1991. Spatial processing of images and hemispheric function. Cortex, n.s., 27: 511-520.

Froiland, P. 1981. Gray matters. Passages, n.s., 37: 22-28.

Gallagher, E. 1992. Start with senior executives. Cultural Diversity at Work, (January): 14.

Gardner, E. 1975. Fundamentals of neurology. Philadelphia, PA: W. B. Saunders.

Garrett, S. V. 1976. Putting our whole brain to use: A fresh look at the creative process. Journal of Creative Behavior, n.s., 10: 239-249.

Gazzaniga, M. S. 1967. The split brain in man. Science American, n.s., 217: 24-27.

_____. 1974. Cerebral dominance viewed as a decision system. In Hemispheric function in the human brain. ed. S. J. Dimond, and J. G. Beaumont, 367-382. New York, NY: John Wiley and Sons.

_____. 1977. Consistency and diversity in brain organization. Annals of New York Academic Science, n.s., 299: 425-433.

_____. 1985. The social brain: Discovering the networks of the mind. New York, NY: Basic Books.

Gazzaniga, M. S., J. E. Bogen, and R. W. Sperry. 1963. Laterality effects in somesthesis following cerebral commissurotomy in man. Neuropsychologia, n.s., 1: 209-221.

Geier, J. G. 1979. Emotions of normal people. Minneapolis, MN: Persona Press.

_____. 1979a. Interpretive introduction to Emotions of normal people, by William M. Marston. Minneapolis, MN: Persona Press.

Geier, J. G., and D. S. Downey. 1982. Library of classical patterns. Minneapolis, MN: PSII.

Geschwind, N. 1979. Specializations of the human brain. In The brain: A scientific American book. San Francisco, CA: W. H. Freeman.

Girard, S. 1964. The transparent self. Princeton, NJ: D. Van Norstrand Rheinhold Company.

Glassner, D. M. 1982. Hemispheric relationships in composing. An EEG study. Houghton, MI: Michigan Technical University.

Goff, L. 1994. Managing at warp speed. Computerworld, n.s., 28: 93.

Goleman, D. 1979. Split-brain psychology: Fad of the year. Psychology Today. n.s. 89: 149-151.

_____. 1979. People Who Read People. Psychology Today, (July).

Gordon, J. R. 1993. A diagnostic approach to organizational behavior. Boston, MA: Allyn and Bacon.

Grady, M. P., and E. A. Lueuke. 1978. Education and the brain. Chicago, IL: University of Chicago Press.

Grau, U., J. Moller, and J. I. Gunnarsson. 1988. A new concept in counseling: A systemic approach for counseling coaches in team sports. Applied Psychology: An International Review, n.s., 37: 65-83.

Gumm, W. B., M. K. Walker, and H. D. Day. 1982. Neurolinguistic programming: method or myth? Journal of Counseling Psychology, n.s., 29: 327-330.

Hall, A. D., and R. E. Fagen. 1975. General systems theory and human communication. Rochelle Park, NJ: Hayden Book Company.

Hamilton, S. F. 1977. An assessment of hemispheric specialization in monkeys. Annals of New York Academic Science, n.s., 299: 222-232.

Harcum, E. R. 1978. Lateral dominance as a determinant of temporal order of responding. In Asymmetrical function of the brain. ed. M. Kinsbourne, 141-266. Cambridge, UK: Cambridge University Press.

Hardyck, C., and R. Haapanen. 1979. Educating both halves of the brain: Educational breakthrough or neuromyth? Journal of School Psychology, n.s., 17: 219-229.

Harrington, A. 1985. Nineteenth-century ideas on hemisphere differences and "duality of mind." The Behavioral and Brain Sciences, n.s., 8: 617-660.

Harris, L. J. 1985. Teaching the right brain: Historical perspective or a contemporary educational fad? In Hemispheric function and collaboration in the child. ed. C. T. Best. New York, NY: Academic Press.

Hecaen, H., and M. L. Angelergues. 1962. Agnosia for faces (Prosopagnosia). A.M.A. Archives of Neurology, n.s., 7: 92-100.

Hecaen, H., and M. L. Albert. 1978. Human neuropsychology. New York, NY: John Wiley and Sons.

Henkel, T. G. 1989. Factorial validation of the personal profile system. Ph.D. diss., Auburn University, 140.

Hersey, P., and K. Blanchard. 1988. Management of organizational behavior. Englewood Cliffs, NJ: Prentice Hall.

Hier, D. B., J. Mondlock, and L. R. Caplan. 1983. Recovery of behavioral abnormalities after right hemisphere stroke. Neurology, n.s., 33: 345-350.

Homans, G. 1950. The human group. New York, NY: Harcourt, Brace and World.

Hopkins, D. A., and H. G. J. M. Kuypers. 1976. Response lateralization and self-stimulation in normal and split brain monkeys. In Brain stimulation reward. ed. E. Wauquier, and E. T. Rolls, 577-579. The Netherlands: North-Holland Publishing Company.

Institutional Review Board, Colorado Technical University. 1996. Use of human subjects in research. Colorado Springs, CO: Colorado Technical University.

Jackson, J. H. 1932. On the nature of the duality of the brain. In Selected writings of John Hughlings Jackson, vol. II. ed. J. Taylor, 129-145. London, UK: Hodder and Stoughton.

Johnson, D. W., and Frank P. Johnson. 1975. Joining together: Group theory and group skills. Englewood Cliffs, NJ: Prentice Hall.

Kagan, J. 1972. Psychology: An introduction. New York, NY: Harcourt, Brace Jovanovich.

Kaplan, S. J., and B. E. W. Kaplan. 1983. <u>A study of the validity of the personal profile system.</u> Chevy Chase, MD: Performax International Systems.

Kiemele, Mark J., and Stephen R. Schmidt. 1991. <u>Basic statistics tools for continuous improvement.</u> Colorado Springs, CO: Air Academy Press.

Kimura, B. M. 1975. Cerebral dominance for speech. In <u>The nervous system vol. 3. Human communication and its disorders.</u> ed. D. B. Tower, 365-371. New York, NY: Raven Press.

Kinsbourne, M. 1978. <u>Asymmetrical function of the brain.</u> Cambridge, UK: Cambridge University Press.

_____. 1980. A model for the ontogeny of cerebral organization in non-right handers. In <u>Neuropsychology of left-handedness.</u> ed. J. Herron, 177-185. New York, NY: Academic Press.

Kroeger, O., and J. M. Thuesen. 1988. Type talk: The 16 personality types that determine how we live, love and work. New York, NY: Dell.

Lambert, A. J. 1982. Right hemisphere language ability: Clinical evidence. <u>Current Psychological Review,</u> n.s., 2: 77-94.

Lee, J. 1983. Preprogramming the patient. <u>Time,</u> (19 December).

Levy, J. 1976. Lateral dominance and aesthetic preferences. <u>Neuropsychologia,</u> n.s., 14: 431-435.

_____. 1985. Right brain, left brain: Fact or fiction. <u>Psychology Today,</u> (May): 38-42.

Marble, D. 1996. Analysis of the PPS. Ph.D. diss., Colorado Technical University.

Marshall, C., and G. Rossman. 1989. <u>Designing qualitative research.</u> Newbury Park, CA: Sage Publications.

Marston, W. M. 1928. <u>Emotions of normal people.</u> New York, NY: Harcourt Brace.

McFie, J., M. F. Piercy, and O. L. Zangwill. 1950. Visual-spatial agnosia associated with lesions of the right cerebral hemisphere. <u>Brain,</u> n.s., 73: 167-190.

Mesulam, M. M. 1985. Patterns in behavioral neuroanatomy: Association areas, the limbic system and hemisphere specialization. In Principles of behavioral neurology. ed. M. M. Mesulam, and F. A. Davis, 177-185. New York, NY: Academic Press.

Meyers, J. T. 1982. Hemisphericity research: An overview with some implications for problem solving. Journal of Creative Behavior, n.s., 16: 197-211.

Montgomery, R., and W. Fewer. 1988. Family systems and beyond. New York, NY: Human Sciences Press.

Narsiah, R. E. 1995. Cerebral dominance, leadership behavior and leadership effectiveness among special education principals. Ph.D. diss., Galladut University, 125.

Nebes, R. D. 1978. Direct examination of cognitive function in the right and left hemispheres. In Asymmetrical function of the brain. ed. M. Kinsbourne, 99-137. New York, NY: Cambridge University Press.

O'Connor, J., and J. Seymour. 1990. Introducing neurolinguistic programming - The new psychology of personal excellence. London, UK: Mandala.

Ornstein, R. E. 1972. The psychology of consciousness. New York, NY: W. H. Freeman.

Owens, L. F. 1977. An investigation of eye-movement and representational systems. Ph.D. diss., Ball State University.

Paterson, A., and O. L. Zangwill. 1944. Disorders of visual space perception associated with lesions of the right cerebral hemisphere. Brain, n.s., 67: 331-358.

Performax Systems International. 1984. New dimensions. Performax product and services reference guide. Minneapolis, MN: Performax Systems International.

_____. 1986. Personal profile system manual and behavioral patterns master guide. Minneapolis, MN: Performax Systems International.

Puccetti, R. 1973. Brain bisection and personality identity. British Journal of the Philosophy of Science, n.s., 24: 339-355.

Reitan, R. M., and E. L. Tarshes. 1959. Differential effects of lateralized brain lesions on the trail making test. Journal of Nervous and Mental Disease, n.s., 129: 257-262.

Rennels, M. R. 1976. Cerebral symmetry: An urgent concern for education. Phi Delta Kappan, n.s., 57: 471-472.

Reynolds, C. R., T. R. Riegel, and E. P. Torrance. 1977. Bibliography on R/L hemisphere function. Gifted Child Quarterly, n.s., 21: 574-585.

Robertson, D. L. 1988. Self-directed growth. Muncie, IN: Accelerated Development.

Rogers, C. 1961. On becoming a person. Boston, MA: Houghton Mifflin Company.

Saks, J. B. 1979. Latest brain research offers lessons in learning. The Executive Educator, n.s., 17: 24-40.

Satz, O., E. Strauss, and H. Whitaker. 1990. The ontogeny of hemispheric specialization: Some of the old hypothesis revisited. Brain and Language, n.s., 38: 596-614.

Schut, J. H. 1994. Killers among us. Institutional Investor, n.s., 28: 125.

Schwartz, H. A. 1980. Cerebral organization, handedness, and education. Academic Therapy, n.s., 16: 95-100.

Senge, P. M. 1990. The fifth discipline. New York, NY: Currency Doubleday.

Shaw, M. E. 1976. Group dynamics: The psychology of small group behavior. New York, NY: McGraw-Hill.

Sherif, M., and C. Sherif. 1953. Groups in harmony and tension. New York, NY: Harper and Row.

Shugart, S. L. 1992. Transforming transients into a team: The development of primary groups within a transient church setting. Ph.D. diss., Drew University.

Sperry, R. W. 1968. Hemisphere disconnection and unity in conscious awareness. American Psychologist, n.s., 23: 723-733.

_____. 1976. Left brain, right brain. Saturday Review, n.s., 27: 30-33.

Sperry R. W., M. S. Gazzaniga, and J. E. Bogen. 1969. Interhemispheric relationships: The neocortical commissures; syndromes of hemispheric deconnection. In Handbook of clinical neurology. ed. P. J. Vinkin, and G. W. Bruyn, 273-289. Amsterdam, NE: North Holland Biomedical Press, 273-289.

Spragins, E. E. 1993. Psychological tests: Inside insight. Inc., n.s., 15: 34.

Springer, J. 1983. Whole brain applied research in training and development. Training and Development Journal, (June): 54-55.

Taggart, W., and E. Paul Torrance. 1984. Administrators manual, human information processing survey. Bensenville, IL: Scholastic Testing Service.

_____. 1984. Human information processing survey (HIPS). Bensenville, IL: Scholastic Testing Service.

Taylor, J. 1958. Selected writings of Hughlings Jackson. New York, NY: Basic Books.

Terkel, S. 1985. Work. New York, NY: Ballentine Press.

Thibaut, J. W., and Harold H. Kelly. 1959. The social psychology of groups. New York, NY: Wiley Publishers.

Thomason, T. C., T. Arbuckle, and D. Cady. 1980. Test of the eye movement hypothesis of neurolinguistic programming. Perceptual and Motor Skills, n.s., 51: 230.

Trevarthen, C. 1978. Modes of perceiving and modes of acting. In Modes of perceiving and processing information. ed. H. Pick, and E. Saltzman, 99-136. Hillsdale, NJ: Erlbaum.

Trope, I., P. Rozin, N. D. Kemler, and R. Gur. 1992. Information processing in the separated hemispheres of callosotomy patients: Does the analytic-holistic dichotomy hold? Brain and Cognition, n.s., 19: 123-147.

United States Space Command. 1995. UMD38-3 (HQ USSPACECOM command organization and function). Colorado Springs, CO: HQ USSPACECOM.

_____. 1996. Mission revalidation to the chairman, Joint Chiefs of Staff. Colorado Springs, CO: HQ USSPACECOM.

US Department of Defense dictionary of military terms. 1987. New York, NY: Greenhill Books.

Van Wagenen, W. P., and R. Y. Herren. 1940. Surgical division of commissural pathways in the corpus callosum. Relation to spread epileptic attack. Archives of Neurology and Psychiatry, n.s., 44: 740-759.

Watts, G. O. 1975. Dynamic neuro-science. New York, NY: Harper and Row.

Weisenberg, T., and K. E. McBride. 1935. Aphasia: A clinical and psychological study. New York, NY: Commonwealth Fund.

Wernicke, C. 1874. The symptom of complex aphasia. In Disorders of the nervous system. ed. A. Church. New York, NY: Appleton-Century-Crofts.

Whitehouse, P. J. 1981. Imagery and verbal encoding in left and right hemisphere damaged patients. Brain and Language, n.s., 14: 315-332.

Widmeyer, W. N., L. R. Brawley, and A. V. Carron. 1985. The measurement of cohesion in sport teams. London, ON: Sport Dynamics.

Widmeyer, W. N., and J. M. Williams. 1991. Predicting cohesion in a coaching sport. Small Group Research, n.s., 22: 558-574.

Williams, J. M., and W. N. Widmeyer. 1991. Cohesion performance outcome relationship in a coaching sport. Journal of Sport and Exercise Psychology, n.s., 13: 364-371.

Witelson, S. F. 1976. Sex and the single hemisphere: Right hemisphere specialization for spatial processing. Science, n.s., 193: 425-427.

Yapko, M. D. 1981. The effect of matching primary representational system predicates on hypnotic relaxation. American Journal of Clinical Hypnosis, n.s., 23: 169-175.

Yin, Robert K. 1994. Case study research, design and methods. Thousand Oaks, CA: Sage Publications.

Young, J. A. 1994. Developing leadership from within: A descriptive study of the use of neurolinguistic programming practices in a course on leadership. Ph.D. diss., Ohio State University.

Zaidel, E. 1978. Concepts of cerebral dominance in the split brain. In Cerebral correlates of conscious experience. Amsterdam, NE: Elssevier/North-Holland Biomedical Press.

Zander, A. 1982. Making groups effective. San Francisco, CA: Josey-Bass.

Zastrow, C., and K. Kirst-Ashman. 1987. Understanding human behavior and the social environment. Chicago, IL: Nelson-Hall Publishers.