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The structuration of brain dominance on organizational communication : a correlational study

Astrid Sheil

To the Graduate Council:

I am submitting herewith a dissertation written by Astrid Sheil entitled "The structuration of brain dominance on organizational communication : a correlational study." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Communication.

Michelle Violanti, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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We have read this dissertation
and recommend its acceptance:

John Haas, PhD

Bonnie Riechert, PhD

John Lounsbury, PhD

Accepted for the Council:

Vice Provost and Dean of Graduate Studies

THE STRUCTURATION OF BRAIN DOMINANCE ON ORGANIZATIONAL COMMUNICATION: A CORRELATIONAL STUDY

A Dissertation
Presented for the
Doctor of Philosophy
Degree

The University of Tennessee, Knoxville

Astrid Sheil
December 2003

DEDICATION

Anyone who has ever attempted to write a dissertation knows that it is not a solo journey and there are numerous pitfalls and setbacks along the way. Many people are involved, both intimately and peripherally, as the work progresses or languishes. To state it simply, this journey would never have been completed without the constant support and encouragement of Dr. Linda Sennett (a world-class thinker and coach in every respect). She never let me give up or give in to the temptation of going back into corporate work before completing this journey. This work is dedicated to her for an uncompromising and unconditional faith in my abilities. I only hope I will be able to inspire such perseverance and dedication in my students.

And to Peter and Maddie: Pursue your dreams. Follow your heart. Keep one set of books and you'll have no regrets. Remember, it's never too late to be what you want to be.

ACKNOWLEDGMENTS & THANKS

As someone who is highly marked as a right-brain dominant thinker (Yellow/Red), I know my limitations. Great ideas race freely through my head, but corralling them into a coherent stream of thought is hard for me. Successfully producing a rational, sequential, and logical dissertation has been the ultimate challenge. That is why I cannot thank Dr. Michelle Violanti enough for agreeing to be my committee chair for this dissertation. As a "World Class Blue," Michelle very patiently pushed and stretched my analytical reasoning and logic. This work is better than I could ever have imagined because of her exacting standards and critical insights. I look forward to future collaborations (although she may need time to recover!)

I especially thank Jim Ethier (Red/Yellow), a Hoya alum and friend who took a chance on me, and in no small way, made it financially possible for me to finish graduate school. To Jim and all the talented folks at his organization I offer my deepest thanks and appreciation. Thanks to my committee members, John Lounsbury, Bonnie Reichert, and John Haas, for their "whole brain" suggestions. Cary Springer in the Statistical Consulting Center was an invaluable asset in helping me sort through data and understand what it all meant. I gratefully acknowledge the influence of my parents, Astrid and Theus Sheil, who shaped my formative ideas about lifelong learning, ethical behavior, and hard work. Finally, I want to thank the late Ned Herrmann for his research and his humanity, and to the folks at Herrmann International who carry on his work and his message.

ABSTRACT

The Structuration of Brain Dominance on Organizational Communication: A Correlational Study

By
Astrid Sheil

The purpose of this study was to examine if the influence of brain dominance as defined by Herrmann (1982, 1995), which includes left-brain/right-brain dominance and cerebral/ limbic dominance, offers predictive capabilities in determining preferences for communication channel selection, feedback frequency, and job satisfaction in organizations. The study also examined whether sex has a determining role in predicting preferences for communication channels, feedback, and job satisfaction.

Raw scores from the Herrmann Brain Dominance Instrument (HBDI) were correlated with responses to a validated survey instrument, which combined items from the International Communication Association (ICA) Audit (Downs, 1988), and the Communication Satisfaction Questionnaire (CSQ) (Downs & Hazen, 1977). Participants were volunteers from four separate organizations who had taken the HBDI as part of a series of workshop seminars on "whole brain" thinking. Of the 210 participants, 108 were male and 102 were female.

Insights into communication patterns in organizations were provided by Structuration Theory (Giddens, 1984), which proposes that social systems are produced and reproduced through daily communication interaction. The patterns that arise from the contradictions and tensions of daily interaction across time and space become real to us

as institutions or organizations. Eleven hypotheses were tested using pairwise comparisons. Three hypotheses were rejected outright: (1) Males prefer left-brain communication channels; (2) Females prefer right-brain channels; (3) Individuals who are multi-dominant (strong preference for more than one type of thinking) are more satisfied with communication than single or double-dominant individuals. One explanation for the rejection of these hypotheses is that the female sample was significantly different than the general population of females. Partial support was registered for the other 8 hypotheses, indicating that brain dominance does influence communication channel preference and feedback.

Unexpected results showed an uncanny consensus *for* certain communication channel preferences across all four quadrants of the brain, and consensus *against* certain communication channels—for all four organizations. These striking results indicated strong support for the effect of structuration in organizational communication. In essence, the power of structuration trumps the influence of brain dominance in organizations.

Future studies will include a sample that is more left-brain/right-brain balanced (i.e. subjects will be chosen from a wide variety of professions, not just business) and the development of an independent survey instrument designed to more accurately measure the influence of brain dominance on communication preferences.

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Chapter 1
Introduction

Communication is an important competency in organizations today (Haines, 1988; Meister, 1998). As noted by one executive, "Communication has refashioned the structure and function of the modern global corporation" (Drobis, 1994, p. 11). Indeed, "nowhere is dependence on communication more visible, essential, and consequential than in today's organizations" (Axley, 1994, p. 7).

In today's fast moving, knowledge-intensive economy, organizations are looking for ways to maximize the capabilities of members and reduce organizational cycle time (Cushman, 2000). Many organizations have jumped on time-based communication strategies for improving organizational performance. Employees are routinely asked to reach beyond their knowledge base and comfort zone to accomplish more in less time, make decisions that at one time had been the exclusive province of managers and supervisors, benchmark their progress in work groups or teams, tolerate organizational ambiguity, and be innovative (Deetz, 1991; Drucker, 1992; Kotter, 1995; Pinchot & Pinchot, 1993).

The forces that have led to sweeping changes in organizations include emergence of the flat, flexible organization; transformation of the economy from manufacturing-based to knowledge driven; increased dependence on technological innovation; shortened shelf life of knowledge; new employment contract which stresses lifetime employability rather than lifetime employment; and the explosive growth of the global marketplace (Griffin, 2000; Meister,

1998). The competitive imperative is "innovate or fall behind" (Leonard and Straus, 1997, p. 111). All of these tasks and initiatives are facilitated by organizational communication. The fact is that one may communicate and never conduct an economic transaction, but one cannot do business without communicating (Horton, 1995). Organizations with a publicized commitment to communication have been shown to be more profitable (Mellor, 1997). Managers from well-performing organizations (defined as organizations whose financial performance was rated as excellent) recognize that effective communication is a key element of their job twice as often as managers in poorly performing organizations (Stewart, 1999).

Organizations can ill-afford a steady stream of miscommunication, misunderstanding, and poor strategic alignment if they are to survive in the hyper-competitive global market. There is little doubt that information exchange and communication clarity are essentials of the coordination of effort and control of organizational processes (Andriessen, 1991). However, much management research has focused on generalized outputs of communication, such as removing communication bottlenecks, standardizing information transfer, and infusing the corporate culture with the language of commitment (Cushman, 1995).

Scholarly organizational research has focused on how communication processes improve or detract from organizations' efforts at productivity and other outcomes (Burrell & Hearn, 1989). For example, much has been made of the importance of communication in the superior-subordinate dyad (Jablin, 1979;

Petit, Goris, & Vaught, 1997). Research has shown that an employee's relationship with his or her supervisor is the key measurement that determines how long a worker stays, how productive and ultimately, how satisfied the worker is. Other studies have produced a measurable relationship between a leader's communication skills and a subordinate's performance and job satisfaction (Mayfield, Mayfield, & Kopf, 1998). Organizational climate has been identified as an antecedent to organizational communication by several investigators (Bastien, McPhee, & Bolton, 1995; Moran & Volkwein, 1992), while organizational culture has been classified as an outcome of communication (Deal & Kennedy, 1982; Glaser, Zamanou, & Hacker, 1987; Sackmann, 1990, 1992). Leadership research has suggested that the motivational impact of a leader's communication skills on employee performance correlates to the leader's opportunities for career advancement (Conger, 1991; Fairhurst & Chandler, 1989). Yet none of these studies has led to a unifying understanding of organizational communication.

To affirm the importance of communication in today's organizations, the American Society for Training and Development (ASTD) notes that the average worker spends 8.4 percent of his or her communication time writing, 13.3 percent reading, 23 percent speaking, and 55 percent communicating either virtually or in person with others (Carnevale, Gainer, & Meltzer, 1991). ASTD's annual benchmark report on training confirms that of the more than 750 organizations reporting, employer-provided training in the United States is on the rise (Bassi &

VanBuren, 2001). The report also indicates that leading companies train about 86 percent of their employees every year and spend more than $4 million per firm.

Corporate universities have quadrupled since the 1980s, and are expected to exceed the number of traditional universities by the year 2010 (Meister, 1998). These semi-autonomous facilities offer numerous communication-based courses designed to empower the worker and turn bottom-line supervisors into coaches and mentors. As of 1997, the number of working adults participating in some form of organizational training equaled the number of students at 125 universities with an average enrollment of 36,000 (Meister, 1998).

The advent of global work teams adds important communication dynamics (i.e., interdependence, feedback, and equifinality) to organizations as managers now handle projects that span time zones, organizational boundaries and national borders (McMillan & Northern, 1995). These situations create a "dynamic tension between global imperatives and local differences that must be managed if project teams in multiple sites continue to serve a company's needs" (Sokuvitz, 2002, p. 57). Tension often stems from people with diverse cognitive styles and preferences, in addition to different values and ethics (Leonard & Straus, 1997). Culturally embedded ideas, beliefs, values, perceptions, and ways of processing information can cause untold friction as organizations span beyond traditional boundaries (Eisenberg & Phillips, 1991).

Acknowledgment, respect, and accommodation of different modes of thinking and communicating among cognitively diverse workers are prerequisites

for innovation (Leonard & Straus, 1997). This is especially true in an era where communication styles are profoundly affected by gender, culture, and ethnicity. To be successful in the global arena, organizations must manage communication and diversity of thought in ways that "both promote *creative abrasion* and maintain respect for the individual contributor" (Leonard & Straus, 1997, p. 112). So, how can organizations identify and balance the various ways people think and communicate?

Thinking, Communicating & Herrmann Brain Dominance Instrument

For communication scholars, social reality is constructed through interaction. In other words, interaction is the unifying activity that creates communication. Classifying organizational interaction via thinking types (i.e., categories of distinct brain functions, which have been identified as housing instinctive approaches to thought), and communication preferences opens a new door in researching and identifying those communication practices that may lead to patterned behaviors and habitual outcomes (Halone, 1998; Poole, Putnam, & Seibold, 1997). As Mumby notes (1988, p. 14), "Communication—as an institutional form— articulates meaning formulations which, when habitualized over time, provide the background of common experience that gives organization members a context for their organizing behavior." If thinking types can be shown to be consistent across socially situated communication, then classifying organizational interaction via thinking types would have predictive validity.

There are several ways to classify thinking types and communication preferences. The burgeoning field of psychometric testing offers numerous instruments that profile thinking styles, including the Myers-Briggs Type Indicator (MBTI) (Briggs-Myers & Myers, 1980; Hergenhahn, 1990; Hirsh, 1985; Isachsen & Berens, 1988; Myers & McCaulley, 1985); Structure of Intellect model (SOI) (Gross, 1992; Guilford, 1967), 16 Personality Factor Questionnaire (16PFQ) (Cattell, 1989; Cattell, Cattell, & Cattell, 1993); the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway & McKinley, 1967); the California Psychological Inventory (CPI) (Gough, 1996; Gough & Heilbrun, 1983); Learning Orientation Questionnaire (LOQ) (Martinez, 2000; Martinez & Bunderson, 1999); McCarthy's 4-MAT System (Felder, 1993; McCarthy, 1987), and the Herrmann Brain Dominance Instrument (HBDI) (1989a, 1989b). Although not a complete list, the variety of instruments, both psychometric and physiological in nature, demonstrate the diversity of personal preference profile instruments currently available (Bentley, 2000).

Psychometric testing offers a reliable way to categorize cognitive and communicative abilities. In particular, the Herrmann Brain Dominance Instrument (HBDI), which espouses the concept of "Whole Brain Technology," offers communication scholars a chance to investigate the predisposition of brain dominance on cognitive, communicative, and learning preferences by measurable and definable quadrants of the brain.

Unlike other psychometric tools, many of which are based in psychology, HBDI is a physiological inventory analysis that measures one aspect of personality—preferences in thinking styles. HBDI is a diagnostic tool that helps people to understand their preferred habits of thought, which influence their learning styles and communication skills (Herrmann, 1995). According to the HBDI model, preferences for thinking and communicating emerge early in a person's development, and the strongly held ones tend to remain stable through the years (Herrmann, 1995, 1996). Thus, a brain is said to be "hardwired" for certain thinking and communicating preferences, which are habituated by brain dominance. HBDI was designed to measure dominant mental preferences, or thinking styles to predict behavior (Bentley, 2000). While the original focus was on learning styles, brain dominance's influence on communication preference and behavior is an area ripe for study.

Statement of Purpose

The purpose of this study is to examine the extent to which a person's brain dominance predicts his or her communication and relationship preferences in situated organizational interactions. Using communication research methodology, this study focuses on the social construction of reality through interaction based on brain dominance. The importance of this research is that it seeks to establish an unexplored line of inquiry by investigating how brain dominance influences organizational communication patterns and habits. Organizations are complex communication processes and should be analyzed

from a communication perspective (Deetz, 1994). By following the "duality of structure" approach to communication as espoused by Structuration Theory (Giddens, 1979, 1984), meaning is created and recreated during each interaction. This study focuses on brain dominance as constitutive of communication interaction, and seeks to add to the body of knowledge in the field of human communication by developing a more clearly communication-based perspective of how brain dominance creates and constrains communication in organizations (Eisenberg & Phillips, 1991).

Structuration Theory

Structuration Theory (ST) as conceived by British sociologist Anthony Giddens (1979, 1984), is a comprehensive meta-theory that incorporates, yet transcends a multitude of humanistic and social science theories and ontologies, including functionalist, interpretive and critical perspectives, Marxism, Freudian and Ericksonian psychology, social geography, and structural linguistics (Giddens, 1984, McPhee, 1989). ST attempts to provide an explanation for the relationship of social agency to social structure that holds both to be of intrinsic importance to social outcomes (Cohen, 1989; Conrad, 1993). Giddens (1979, 1984) posits that *systems*, which are the observable patterns (habits) of interaction in groups, are constructed and constrained by *structures* which are the rules and resources active agents (members) use to organize interactions in social systems. Rules, as indicated by Giddens, are techniques and procedures that can be formulaic for producing action in an organization, much as the rules of language

are "formulas for producing social discourse" (Boggs, 1998, p. 21). Language, for the most part, is a constant pattern, habitual and reproductive with the familiar arrangement of grammar, vocabulary and syntax, but can easily be modified depending on how individuals, their interaction and interpretations are socially situated (Violanti, 1995).

Resources are those capabilities, both material and influence, that establish the basis of an agent's social power (Banks & Riley, 1993). As understood by sociologists and organizational theorists, "structure" is a "conceptual tool for explaining the regularities of relationships and behavioral practices found among organizational members," (Boggs, 1998, p. 21), and is the irreducible relationship between systems and structures that span time and space in the formation of social systems (Giddens, 1984; Yoo, 1997).

The central assumptions of structuration are predicated on the concepts of "agency and reflexivity," and "duality of structure." Agency is the ability of an empowered individual to act with purpose, knowledge and awareness of the consequences (Dillard & Yuthas, 2002). In other words, individuals are assumed to know "a great deal about the conditions and consequences of what they do in their day-to-day lives," (Giddens, 1984, p. 281) and engage in actions of their own choosing. Reflexivity is the idea that an individual actor cannot stand outside of the social construction of the organization. To participate and be understood within the confines of the organization, an individual agent must follow the rules

and norms, and use the resources known within the organization (Sherblom, Keränen & Withers, 2002).

Duality of structure incorporates the idea that social structures are both cause and effect of social interaction and practice (Cohen, 1987; Giddens, 1984). Structure exists only as a part of human interaction, and is formed and sustained through the ongoing enactment of rules and resources chosen by active agents (Conrad, 1993; Corman, 1997; Gouran, 1990). Without interaction there can be no structure. However, the influence of the interaction as manifested through rules and resources reaches well beyond the present tense by influencing an actor's future choices. Structuration, as defined by Giddens, is more than the sum of structure and system. It is the construction and reconstruction of social relations across time and space that become habituated and reproductive practices (Boggs, 1998; Dillard & Yuthas, 2002; Jary, 1991). The agent learns that "certain situations support certain courses of action while at the same time discouraging others" (Boggs, 1998, p. 22). Therefore, as noted by Cohen (1987), Connell (1987), and Giddens (1984), the analytic constructs of agency and structure cannot be separated because they explain different, but simultaneously occurring, aspects of the same social reality.

Agents implement action based on rules and resources, and these rules and resources constitute the structure of an organization (Cohen, 1987; Giddens, 1984). Thus, social reality is both the cause and the outcome of the interaction

between actors and institutional properties, which, in effect, constitutes organizational society (Yoo, 1997).

Giddens' view of structure makes structuration theory a compelling framework for communication research. Employing the concept of the organizational member as an agent who can self-report communication preferences permits the researcher to focus on the potential correlations between communication modality preferences and brain dominance, and communication satisfaction and brain dominance.

With a wide range of applications, Giddens' work is sometimes seen as a worldview (Kilminster, 1991). Structuration has become a workable framework for numerous communication studies due to the adaptive nature of its theoretical tenets. Noted as a "commonsense" approach to social science research, structuration theory addresses the most fundamental problems in the social sciences, but does so in a way that alters one's perspective of the problems, and solutions, as well. In other words, Giddens challenges established theoretical premises and traditions with a distinctive meta-theory that allows for theoretical equifinality to comfortably exist under ST (Cohen, 1989).

As mentioned earlier, Giddens offers communication scholars a framework that supercedes schools of thought, (i.e., functionalist, interpretive, critical, constructivist) by "conceiving the generic qualities of social life prior to the point where epistemological assumptions regarding acceptable forms of knowledge are made" (Cohen, 1989, p.1). The researcher is thus released from

ontological assumptions that influence her epistemological and methodological decisions, making it feasible to study the brain dominance perspective of communication as it is socially constituted. Giddens (1984) conceived of structuration as a framework for thinking about research problems and having a way to interpret research results. By implicating structure as one of the primary features of organizations, structuration offers a framework in which the influence of brain dominance on communication preferences can be understood—processes which are not codified or recognized as structure—but which, nonetheless, may have inordinate effects on the interactions within organizational life.

The tenets of ST have been used to study deeply-layered organizations (Conrad, 1981; Manning, 1982; Ranson, Hinings, & Greenwood, 1980); technology transfer (Orlikowski, 1992; DeSanctis & Poole, 1994); organizational and small group communication (Allen, Gotcher, & Seibert, 1993; Banks & Riley, 1993; Jablin, 1987; Seibold, Meyers, & Sunwolf, 1996); strategic management (Sarason, 1995); the structure of group decision-making processes (Poole, Seibold, & McPhee, 1985, 1996); formalization of organizational structure (McPhee, 1985); attachment/identification in organizations (Scott, Corman, & Cheney, 1998); ethical auditing decisions (Dillard & Yuthas, 2002); work tasks as a source of structure (McGrath, 1984; Poole, Seibold & McPhee, 1985); public relations (Kuhn, 1997); organizational climate (Bastien, McPhee & Bolton, 1995; Poole & McPhee, 1983); persuasive arguments theory (Myers & Seibold, 1990); technology planning and innovation adoption in a mature

organization (Jones, Edwards, & Beckinsale, 2000); tension within organizational change (Sherblom, Keränen, & Withers, 2002); vertical communication in organizations (McPhee, 1989); the structuration of communication networks (Contractor & Eisenberg, 1990; Corman & Scott, 1994); the role of communication in the development and utilization of power in organizations (Mumby, 1988); and organizational culture (Riley, 1983; Witmer, 1997). Overall, ST offers us a variety of methodological and contextual options.

Herrmann Brain Dominance Instrument (HBDI)

The Herrmann Brain Dominance Instrument (HBDI) is an assessment tool that quantifies relative preference for thinking modes based on the hypothesized task-specialized functioning of the physical brain (Maree & Steyn, 2001). As such, it is different from many of the personality instruments used in organizational profiling. HBDI is grounded in the physiology (rather than psychology) of a person's brain and presented metaphorically, yet it correlates strongly with the Myers-Briggs Type Indicator (MBTI) and the Learning Orientation Questionnaire (LOQ) (Bentley, 2000; DeWald, 1989; Herrmann, 1995). Thinking styles, or preferred modes of knowing, affect human cognition and behaviors, including information processing, judgment, problem solving, communication and interaction with others (Blodgett, 1989).

Several researchers have demonstrated that left-brain skills are related to analytical, logical, linear, sequential processing of information, while right-brain skills make sense of the world through visual imagery, arts, spatial orientation,

intuition, and holistic, simultaneous processing of information (Goldstein, 1985; Herrmann, 1982; Lynch, 1986; Mintzberg, 1976; Sperry, 1975, 1976).

Herrmann developed his four-quadrant model based on the theoretical constructs of left and right brain specialization (Sperry, 1975, 1977) and the triune brain construct developed by Paul MacLean (1978, 1986, & 1990); (Rosenfeld & MacLean, 1976). He labeled the quadrants A, B, C, D. The most recognizable difference in cognitive approaches is between the left and right brain. Those who approach problems in an analytical, logical, and sequential manner are said to be left-brained thinkers. Those who approach problems from a values-based, intuitive, nonlinear manner are said to be right brained. However, individuals perceive the world and process information about the world according to patterns characteristic of the functions and strategies of not only left-brain or right-brain, but also the left and right portions of the limbic system (Amen, 1999; Franco & MacLean, 1976; Herrmann, 1995). The cerebral quadrants (top, A & D) are the centers for vision, hearing, body sensation, intentional motor control, reasoning, decision-making, purposeful behavior, language, and non-verbal ideation. The limbic quadrants (bottom, B & C) regulate body functions such as blood pressure and heart rate, and also are the center for emotional energy, memory processing, and information transfer from short-term to long-term memory (Amen, 1999; Herrmann, 1995).

Based on the four-quadrant model of the brain, there are four specific cognitive approaches to perceiving and assimilating data, making decisions,

solving problems, and relating to other people (Herrmann, 1980, 1982, & 1996). Herrmann conceptualized his theory of brain dominance as a continuum of left to right dominance, allowing a person's cognitive needs to fluctuate along the continuum depending on the situation (Cicchetti, 1997). As such, the whole brain can simultaneously be creative as the situation dictates, or fall back on habituated and replicated modes of thinking (Kimura, 1973). The four specialized parts, or modes, correspond to the mental functions associated with the left and right cerebral and limbic cortices of the human brain (Franco & Sperry, 1977; Sperry, 1975, 1977).

In a construct validation study in which the dimensionality of HBDI was tested, two bipolar second order factors and one bipolar third order factor were shown to support the HBDI. This was interpreted as "confirmation of the presence of four different constructs and was consistent with the dimensional structure of Herrmann's four-quadrant theory" (Ho, 1988, p. 1). Herrmann (1995, p. 367) notes that these confirmatory results describe "generalized preferences for complex, interrelated, and intercommunicating processes of thought and action mediated in the human brain."

The Herrmann Brain Dominance Instrument metaphorically maps the brain's cognitive functions accordingly (see Figure 1.1). "The circular display represents the whole thinking brain, which then divides into four conscious modes of knowing, each with its own behaviors demonstrably associated with it" (Herrmann, 1995, p. 63).

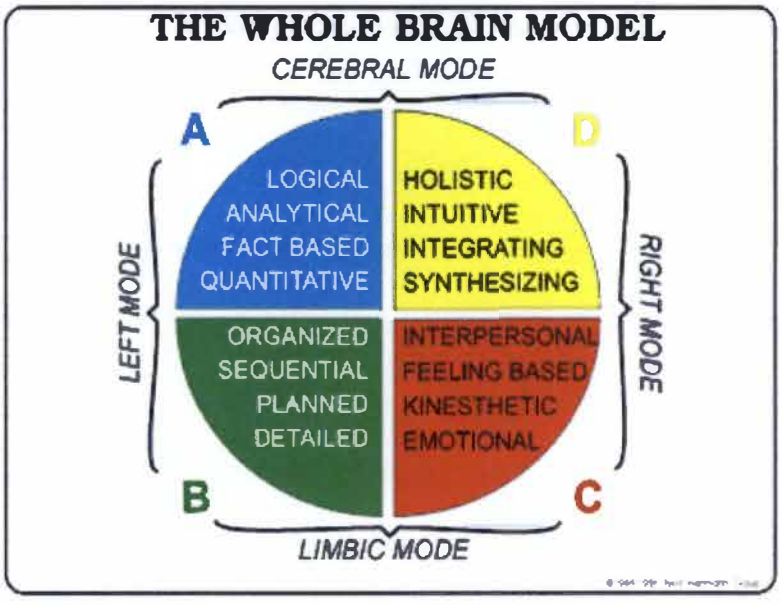

Figure 1.1: The Whole Brain Model

Individuals with measurable preference in the upper left-hand A quadrant (Blue) naturally analyze situations and apply logic to solve problems. These individuals are excellent at framing rational arguments and use highly developed critical thinking skills to separate extraneous issues from salient facts. This can make dominant Blues appear cold, aloof, and more interested in issues than interpersonal relationships. A person with a dominant preference for the Blue quadrant relies on logic that builds on tested assumptions, combined with an ability to perceive, verbalize, and express things precisely. This person honors argument above personal experience, and favors facts above intuition.

Individuals with measurable preference in the lower left-hand B quadrant (Green) are also verbal, efficient, and take a linear approach to life. These individuals prefer to tackle tasks in planned, organized, detailed, and sequential

ways. Individuals with measurable preference for Green quadrant thinking are comfortable with organizational procedures and traditions, and prefer to stick to routines that have worked for years. They are action oriented and seek to control their environment and themselves. Similar to individuals with strong preferences of quadrant A dominance, they distrust emotion and eschew ambiguity (Blodgett, 1989).

Individuals with measurable preference in the lower right-hand C quadrant (Red) tend to have natural intuition about people. Individuals who are dominant Reds are concerned with the reality of emotional currents and are immediately aware whenever the mood of a group or an individual changes. Individuals with primary preferences in this quadrant are people-oriented, empathic, and receptive to nonverbal cues and attitudes. Dominant Reds are experiential learners who prefer group work to individual pursuits.

Individuals with measurable preference in the upper right-hand D quadrant (Yellow) easily make connections between disparate concepts. Cerebral-oriented, these individuals tend to be holistic, intuitive about coming events and trends, and focused on the "big picture." These individuals tend to understand things in a gestalt-manner, with thoughts, ideas, and concepts coming to them in whole form, rather than in a logical or systematic way. They rely on inspiration more than facts. They tend to be visionaries who can be impersonal to associates. They thrive on new ideas and resist structure, deadlines, details, and procedures. They

rely on metaphors to explain their ideas. Dominant Yellows tend to be early adopters and innovators. They seek out the latest information.

Results of HBDI are presented as quantified degrees of preference in each of the four quadrants. Dominance is indicated as "1" in quadrants receiving 67 points or more; "2" indicates a secondary dominance ranging from 34 to 66 points; "3" is noted by scores between 0 and 33. In an original study of 15,000 profiles, data indicated that of the 100 percent who took the HBDI, 6 percent registered as single dominance thinkers, 60 percent were double dominant, 30 percent were triple dominant, and only 3 percent were quadruple dominant (Herrmann, 1995). As of 2003, the number of HBDI profiles completed exceeds 1 million (Herrmann International website, www.hbdi.com). Two-thirds of males register as left-brain (A& B) dominant, and two-thirds of females register as right-brain (C & D) dominant. Natural communication dyads occur among individuals who have the same quadrant preference. This is followed by a preference for communicating with individuals who are in the same left or right-brained hemisphere. Communication between actors who share preferences in either the cerebral or limbic quadrants is preferable to communicating with individuals whose brain dominance is in an opposing hemisphere, diagonally opposite from one's preferred quadrant (Herrmann, 1995, 1996).

Dominance, as interpreted by Herrmann (1998) occurs between two parts of a physically living whole. The human body is made up of several asymmetrical paired parts, including hands, arms, legs, lungs, kidneys, feet, and eyes. Likewise,

the paired brain structures (left v. right, cerebral v. limbic) are asymmetrical as a result of being specialized to think in different ways and to do different things. The brain is essentially whole and undeveloped at birth. However, as a child grows, the brain begins to develop an evolving coalition of preferences for thinking, solving problems and communicating.

HBDI and Structuration Theory

Structuration assumes that the rules and resources learned by individuals do not limit their capacity for new interaction (Giddens, 1979). In the same regard, HBDI indicates preference for thinking and communicating based on brain dominance, but does not imply that dominance serves as a barrier to alternate structures and forms of communication, nor does brain dominance indicate competence (Herrmann, 1996).

Structuration holds that structures, i.e., rules and resources, both enable and liberate communication among members, and constrain and inhibit communication because of interactive rules established in prior engagements (Griffin, 2000). HBDI acknowledges that in a group environment, the interplay of different dominances can stimulate creative abrasion and innovation, or it can inhibit and stymie contributions by allowing members who "tribalize" through habitual communication and thinking patterns to dominate the group (Herrmann, 1996). Communication, which is defined through rules and resources, may itself be transformed as a result of interactions based on brain dominance, or it may be imprisoned by the perpetuation of the structure it has created for and about itself.

The following is an explanatory list of dimensions investigated that leads directly into the hypotheses for this study.

Modalities/Communication Channels

Rice and Gattiker (2001, p. 545) note that "our understanding of organizational communication, structure, and media are all influenced by preexisting media and structures, and in turn, influence the development of new structures and media." Their contention is that organizational structures can constrain or facilitate the development and adoption of new channels of communication. Additionally, research has shown that the use of informal channels and the accuracy of formal channels are significant predictors of attitudes toward change (Vielhaber, 1983). Based on brain dominance and quadrant preferences, it is hypothesized that certain quadrants are expected to prefer and be more receptive to using certain modalities/channels than others.

Hypothesis 1: Persons whose dominant quadrant is blue score need or prefer communication channels that emphasize technology or non-personal communiqués. Examples include: E-mail, bulletin boards, corporate newsletters, video conferencing.

Hypothesis 2: Persons whose dominant quadrant is green need or prefer traditional organizational communication channels. Examples include: Written memos, letters and notices, corporate newsletters, procedural manuals, communication updates, team updates, meetings with supervisor, and staff meetings.

Hypothesis 3: Persons whose dominant quadrant is red need or prefer interpersonal communication. Examples include: Face-to-face interaction with coworkers in their department or other departments; team updates; meetings with supervisor, mid-level managers, and senior managers; department staff meetings; brainstorming; and the "grapevine."

Hypothesis 4: Persons whose dominant quadrant is yellow need or prefer communication channels that provide up-to-the minute information. Examples include: E-mail; brainstorming; video conferencing; meetings with supervisor; face-to-face; team updates; mid-level managers and senior managers; and the grapevine.

Preferences by Sex

As noted earlier, HBDI research indicates a measurable difference between males and females in terms of brain dominance and quadrant preference. This is demonstrated on the blue-red axis (See Figure 1.2).

Based on a sample of 165,427 participants, Figure 1.2 shows that men are more likely to be left-brain dominant, particularly in the blue (cerebral, left brain) quadrant (as indicated by the dotted line). Conversely, women are more likely to be right-brain dominant, particularly in the red (limbic, right brain) quadrant (as indicated by the solid line). Herrmann (1995, p. 135) notes that, on average, women are "more whole-brain oriented, more intuitive, and less fact-based, more open to new ideas than to status quo, more people-oriented than thing-oriented.

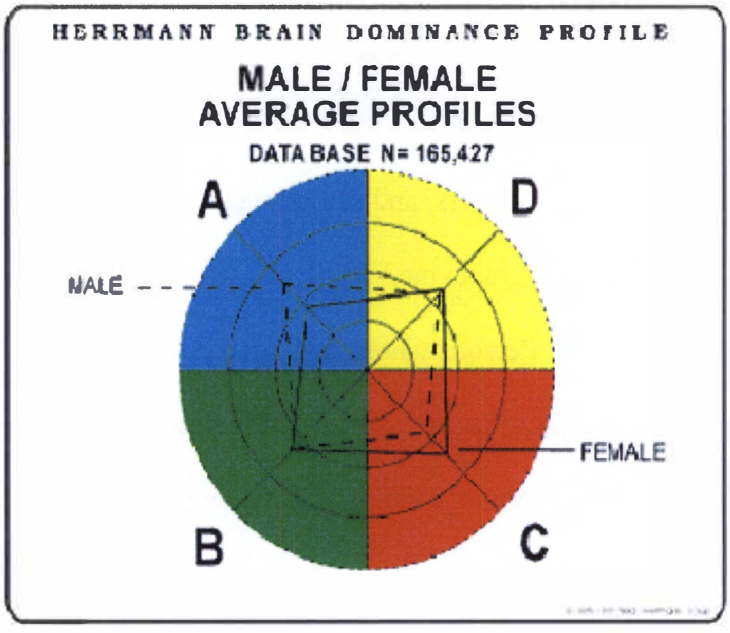

Figure 1.2: Male/Female Average Profiles

Therefore, they perceive their surroundings more sensitively, manage the innovative process more comfortably, and respond more rapidly to changing environmental circumstances." Part of this is based in the physiological differences between women and men. Women bring an enhanced capability and dimension to the work environment that "results from their larger, faster, and earlier maturing corpus callosums, brain chemistry and enculturation differences" (Herrmann, 1995, p. 136). Research question 5 deals directly with the question of sex and communication.

Hypothesis 5: Females prefer right-brain communication modalities that emphasize personal interaction more than males.

Hypothesis 6: Males prefer left-brain communication modalities that emphasize impersonal and transactional communication more than females.

Feedback Preferences

Feedback is a key management tool that, in the gestalt, enhances learning, self-knowledge and provides constructive motivation for behavioral modification or behavioral reinforcement. The sheer number of studies on feedback in the organizational communication literature is testament to its relevance and importance in the discipline (Geddes & Linnehan, 1996). The implicit (and explicit) expectation within organizations is that feedback can and should lead to improved performance (Baumann, 2000). London (1997) indicates that feedback can serve different purposes depending on the stage of the individual's career. Studies purport that the primary purposes of feedback are to "direct behavior toward established goals, facilitate learning by providing information about the effectiveness of behavior relative to established goals or objectives, and to motivate an individual by identifying behaviors that lead to successful performance" (Baumann, 2000, p. 36). Assumptions abound that positive behavior change will occur through the process of enhancing self-awareness of performance (Church & Bracken, 1997). However, research indicates that much feedback is lost because organizational members fail to interpret information and diagnose corrective strategies required for self-learning and do not accept their feedback (Dechant, 1990; Facteau, 1995; Kudisch, 1996). The agent providing feedback should not assume that the recipient would know what to do with the feedback (London, 1997). Understanding and predicting recipients' responses to feedback is not an exact science (Adams, 1999). One reason for the complexity is

the inability of researchers to predict the message valence of whether the information was perceived as positive or negative (Cusella, 1987; Ilgen, Fisher & Taylor, 1979; Landy & Farr, 1983).

Currently, brain research indicates feedback that is perceived as negative in tone, or alludes to the deficiency of the recipient is not useful because it never reaches the part of the brain where learning occurs—in the neocortex, or cerebral hemispheres. The neocortex, or cerebral hemispheres, accounts for approximately 80 percent of total brain matter including thinking and gray matter (Restack, 1984). Vision, hearing, body sensation, reasoning, thinking, decision-making, purposeful behavior, language, and non-verbal ideation are processes centered in the cerebral hemispheres. The limbic system is located between the brain stem and the cerebral hemispheres and influences brain activity that occurs above and below it. The limbic system is smaller than the cerebral hemispheres, but is the master regulator for eating, drinking, sleeping, waking, body temperature, blood sugar, heart rate, blood pressure, hormones, sex, and emotions, as well as the cognitive transfer station for moving short-term memory to long-term storage. Under the category of emotions, the limbic system is where the feelings of pleasure, punishment, hunger, thirst, aggression, and rage are stimulated. When caution is thrown to the wind and rational behavior is abandoned for the spontaneous moment, the limbic system has overwhelmed the rational mind with emotional energy (Herrmann, 1995).

Negative feedback elicits a fear response in the brain, motivating an individual to seek survival or to dismiss the feedback as erroneously conceived. In a feedback study conducted by Brett & Atwater (2001), results indicated that negative feedback was related to beliefs that feedback was less accurate and less useful. Instead of receiving the information in the neocortex, the feedback, understood as being dangerous to the survival of the individual, is processed in the limbic system (McManus, 2001). Paradigmatically shifting the focus of feedback from multiple sources of psychological or communicative receptivity to brain dominance preference provides a unique framework for investigation. Therefore, the following hypotheses are posited.

Hypothesis 7: Persons whose blue score is dominant need or prefer factual feedback that specifically relates to technological changes; how job related problems are being handled; and specific problems faced by management.

Hypothesis 8: Persons whose green score is dominant need or prefer feedback about job duties; organizational policies; mistakes and failures of the organization; how they are being judged; how technology affects their jobs; how job related problems are handled; and how organizational decisions, which affect their jobs, are made.

Hypothesis 9: Persons whose red score is dominant need or prefer feedback about how well they are doing their job; how they are being judged; opportunities for promotions; and pay and benefits.

Hypothesis 10: Persons whose yellow score is dominant need or prefer feedback about important new products, service or program developments in the organization; how their job relates to the total operation of the organization; specific problems faced by management; how organizational decisions are made that affect their jobs; and how well they are doing on the job.

Communication Satisfaction

Communication satisfaction is an important indicator of overall job satisfaction (Jablin, 1979).The items used in this section are designed to elicit responses as to the efficacy of an organization's communication. Is the organization's communication stimulating and does the organization create a positive environment for all communication? Jablin and Krone (1994, p. 650) studied work relationships in organizations, and concluded, "The great majority of studies that have explored interpersonal communication relationships in work organizations have failed to consider adequately the (positive and negative) constraints that the *embeddedness* of these relationships within a larger organizational system have upon communication processes." Sigman (1995) also pondered how it is possible for communication to have the consequences it does. This simple question goes directly to the heart of the proposition that brain dominance affects communication both at the micro (individual) level and at the macro (organizational) level and has the ability to affect job satisfaction. Micro constraints are related to the physiological "hardwiring" of the way individuals think. At the macro level "group think" or "tribalization" can create institutional

constraints, reinforced by the communication climate that becomes acculturated and accepted as the norm. Individuals who have a unitary dominance in one quadrant may have a narrow ability to relate to diversity of thought.

Hypothesis 11: Persons who are multi-dominant (3 or more dominant quadrants) are more satisfied with communication than persons who are single or double dominant.

Rationale

Work and organizations are central themes in society. Tretheway (1997) notes that active agents identify with and derive meanings from their organizational environments, sometimes in place of family, community, church, and state. From an anthropological perspective, organizations of the 21st century are as rich in cultural symbolism and behavior as the aborigine tribes were to Margaret Mead nearly 100 years ago. Organizations are constantly creating and recreating social systems every time members interact and apply generative rules and resources (Poole, Seibold, & McPhee, 1986). HBDI is appropriate for understanding and predicting how different profiles might affect interpersonal and organizational communication (Herrmann, 1995). Organizations, which attempt to redefine their interactions based on the "Whole Brain Technology" of HBDI, may create a new paradigm for communication based on the quadrant preferences of organizational members. "Whole brain" communication can facilitate an individual's ability (micro) to adapt to organizational change and relationships. Conversely, recognition of an organization's (macro) preferred way of

communicating can have important consequences for organizational behavior and communication climate. As explained by Ned Herrmann:

> "A manager who is aware of his or her own mental processes is in a much better position to manage those processes to his or her advantage. The degree to which the manager is aware of and understands the unique brain of other people in the organization is a tremendous advantage in working effectively with them. The ability to assemble a composite whole brain staff, which then has the capability of synergy within the organization, is available only to the person who understand the brain dominance concept" (Gorovitz, 1982, p. 82).

Communication scholarship leads one to understand that an organization is more than bricks and mortar, but is, "a construction made out of conversation" (Taylor, 1995, p. 22). Once the habituated pattern of communication has been established in an organization, it becomes resistant to change, and cannot be easily reprogrammed. What this means for an organization with embedded speech and communication preferences is that certain organizational members may be relegated to "second class" citizens because they do not think or communicate in the dominant mode, and their contributions are thereby minimized or negated.

In sum, this is an appropriate and groundbreaking study in which to examine the possible root causes of habituated communication patterns in organizations. The hypotheses, based on extant literature and research, provide a contextual environment for exploration of this cross-disciplinary study.

Chapter 2
Literature Review

This study set out to examine the relationship between brain dominance and organizational communication by testing for correlations between communication variables (communication satisfaction, feedback, and channel/modalities) and brain quadrant preferences. The purpose of this section is to synthesize the extant literature on organizational communication and brain dominance as posited by various perspectives in organizational communication literature and other disciplines. This review examines how the various communication perspectives have informed the organizational communication research agenda and how changing the paradigmatic approach might infuse new energy and direction into organizational research. This chapter is divided into the following sections: Structuration Theory, Brain Dominance, Communication Variables, and Implications. The Implications section makes the case for a multi-disciplinary perspective that privileges results over process.

Background

From its nascent beginnings, the disciplines of industrial psychology, social psychology, organizational behavior, and administrative science have dominated the research agenda of organizational studies. Organizational communication theorists have traditionally approached research from three speech communication areas: public address, persuasion, and interpersonal/small group/and mass communication (Putnam & Cheney, 1985). The communication

path draws its legitimacy from the truism that "our very survival as individuals, families, and communities depends upon the extent to which we can effectively negotiate and persuade one another within culturally diverse and complex organizational settings" (Albrecht & Bach, 1997, p. v). In their organizational research, Krone, Jablin, & Putnam (1987) report that solely within organizational communication studies, there are four distinctive perspectives: mechanistic, psychological, interpretive-symbolic, and systems-interaction. The mechanistic perspective focuses on topics dealing with communication channels and message transmission, the psychological perspective concentrates on the conceptual filters that affect how individuals respond to their information environments, the interpretive-symbolic approach holds that shared meanings are created among communicators through role-taking processes, and the systems-interaction perspective suggests that patterns are created through contiguous communication acts (Jablin, 1987). From the myriad choices, it becomes clear that the questions organizational communication researchers choose to pursue are direct consequences of the perspectives with which they have aligned themselves concerning the general process of human communication (Jablin, 1987). This exclusivity of approach can only result in limited explanations of a dynamic and evolving discipline.

Communication researchers have pursued specific research formats, such as empirical-analytical, historical-hermeneutic, or critical orientation, in which to frame and address organizational communication. Each perspective of

investigation has its advantages and shortcomings. One thing is certain—by choosing one approach over another, the researcher has limited his or her ability to plum the depths of understanding. And where has this left communication research? The narrowly focused communication perspectives have produced less than effective explanations of causality in communication. Instead of moving toward understanding, communication research has splintered into numerous paradigmatic shards of limited meta-theoretical positions, such as humanists, scientists, realists, relativists, modernists, postmodernists, functionalists, and interpretivists (Scherer, 1998). This has undoubtedly fragmented, rather than unified the discipline. In part, the fragmentation and lack of a coherent overarching organizational perspective can be traced to the work of a few prominent researchers (Burrell & Morgan, 1979; Jackson & Carter, 1991, 1993) who contend that individual paradigms cannot be combined for interpretation because they are "incommensurable."

Incommensurability has three requirements: 1) The systems of orientation have to be radically different; 2) The systems must be in competition for definitions and language, making problem solutions incompatible with other perspectives; and 3) No consensus on objective measurement can be reached (Sherer, 1998). Different systems of orientation are therefore, by definition, closed systems that must eventually ignore (legitimate) concepts and issues that do not neatly fit into the particular paradigm. Ultimately, by choosing one approach over another, the researcher has privileged that approach to the

exclusivity of other approaches (Deetz, 1996). However, in social science, research cannot be reduced to an either/or set of binary answers (Mumby, 2000). The multitude of interactions, outside influences, and ancillary motivations make categorization impossible and single perspectives irrelevant. There are too many voices and meanings embedded within any particular text, symbol, or social situation to assume they can be understood from one perspective (Bahktin, 1981). To overcome the inherent bias in single-perspective research, this study employs Anthony Giddens' (1984) Structuration Theory (ST), which provides a holistic and practical framework to identify and deconstruct organizational issues for better understanding.

Structuration Theory

Structuration Theory (ST) defines a social system as a "structured totality" wherein the combined effect of top-down and bottom-up social interaction creates a duality of structure (Giddens, 1984). Conceptually, ST posits that social systems are habituated and patterned interactions and not functional relationships between parts of a whole. Giddens (1979, p. 65) states:

> "Structures do not exist in time-space, except in the moments of constitution of social systems. But we can analyze how 'deeply-layered' structures are in the historical duration of the practices they recursively organize, and the spatial 'breadth' of those interactions. The most deeply-layered practices constitutive of social systems in each of these senses are 'institutions.'"

ST helps identify the rules and resources used in the general socialization process without minimizing the very formulations of the problem encountered by

managers and workers (Cheney, 2000). By studying a social system through the application of generative rules and resources, and in the context of how intended and unintended outcomes are produced and reproduced through daily communication interaction, ST provides a useful approach to understanding and interpreting the complex institutional patterns that arise from the contradictions and tensions of daily interaction, which over time and space constitute institutions (Riley, 1983). As a theory that supercedes perspectives and paradigmatic schemas, ST nullifies the "assumption that any organization is really monolithic" (Cheney, 2000, p. 23) in terms of how the organizational manifestations of communication can be studied.

Rather than focusing on one aspect of organizational interaction as many communication-based studies do (see a variety of perspectives in Shockley-Zalabak, 1999), ST recognizes how complex and irreducible relationships create and restrain communication within an organization, and how structurational patterns within that organization involuntarily create underlying tensions (Giddens, 1990, 1991). More than the sum of structure and system, structuration is the construction and reconstruction of social relations across time and space that become habituated through self-fulfilling practices (Boggs, 1998; Dillard & Yuthas, 2002; Jary, 1991). The concept of organization is ultimately inseparable from interaction. As such, organizational communication can only be deconstructed for examination, but not for explanation.

ST holds that human agents are both enabled and constrained by social structures. The key to structuration is the dual nature of creation and constraint within each interaction—a reflexive process that is a function of desired action and the power and influence to make the action happen (Sarason, 1995). Structure, in effect, mediates action. Differences between ST and other theories of social science emerge from the basic domain of study. "The theory of structuration is not the experience of any form of social totality, but social practices ordered across space and time," (Giddens, 1984, p. 2). In other words, structure is "both medium and outcome of the conduct it recursively organizes—a medium because through its use social conduct is produced, and an outcome because it is through the production of this conduct that rules and resources are reproduced in time and space" (Mouzelis, 1989, p. 615). As such, ST provides the unique opportunity to accept and accommodate social constructionist viewpoints, post-positivist objectivity, and critical critiques of power and control that constitute structures (Miller, 2000). At the individual level of analysis, structuration can be seen as a phenomenological approach as it focuses on the ability of the individual actor to create her own reality. At the institutional level, ST transcends the radical humanist and radical structuralism perspectives through the emphasis on the shifting organizational structures in institutional analysis (Riley, 1983). However, ST is not aligned with either radical paradigm. There is less focus on the exploitation of individuals, as in Radical Humanism, and more belief in actors' control and knowledge over their actions. Furthermore, the

concrete reality of the radical structuralists is the ontological opposite of structuration's symbolically created reality" (Riley, 1983, p. 416).

The unique aspect of ST is the interconnectedness of its components that cognitively snap together like pieces in a puzzle. Separately, the parts do not mean much, but once assembled the totality of ST is more than the sum of its parts, and provides researchers with a universal format for explaining phenomena, contradictions, and tension in organizations, without limiting or privileging perspectives. Herewith is a summation of Gidden's structurational components.

An *agent* is an individual who can act with purpose and knowledge, and who understands the consequences of one's decisions (Dillard & Yuthas, 2002). The word "agent" implies that an individual has power and purpose in an organizational setting. Agents use a combination of knowledge and awareness of social rules to create and recreate the structure of their everyday encounters (Giddens, 1984). Knowledge is not always conscious. Giddens describes three levels of consciousness: unconscious, practical consciousness, and discursive consciousness (Dear & Moos, 1994). Reflexivity is understood to be a key aspect of knowledge as it represents the basic understanding an agent has regarding the context, constraints and consequences of taking an action (Sarason, 1995). Agents who have lost the power to intervene or influence organizational conduct are no longer considered agents (Sherblom, Keränen, & Withers, 2002).

Rules are techniques and procedures that are like formulas for producing action in an organization, much like the rules of language are "formulas for

producing social discourse" (Boggs, 1998, p. 21). *Resources* are those sources—material and influential—that are used to wield organizational change. While organizational agents use resources and rules in habituated ways to achieve certain outcomes, they also have the choice to deviate from the patterned and expected behavior of the community.

Structures are "recursively organized rules and resources that individuals draw on and reconstitute in their day-to-day activities" (Giddens, 1979, p. 64). Structure, as it is constituted in day-to-day activities, is therefore, both cause and effect of social practice (Cohen, 1987; Giddens, 1984). Structure is created, changed, and recreated when agents who have the power and influence alter the routine and resources in an organization. Change only occurs when empowered agents influence routines and resources through interaction. Conversely, structure is maintained through the ongoing enactment (or enforcement) of rules and resources chosen by active agents (Conrad, 1993; Corman, 1997). Without interaction there can be no structure. Viewing structure as a dynamic aspect of organizational life allows the researcher to stop seeking static categories of identity, culture, networks, or communication (Pettigrew, 1992).

Social integration is the process of exchange that occurs naturally and reciprocally between and among actors across time and space (McPhee, 1989a). According to Giddens (1993), all social action expresses power, and active agents have some resources by which to influence organizational powers.

Institutional reproduction is the habituated practices developed and reproduced by actors within organizational conditions (Sherblom, Keränen, & Withers, 2002). These practices become embedded over space and time through the repetitive nature of social interaction (Poole, Seibold, & McPhee, 1985).

Time-Space Distanciation explains the influence of interactions as manifested through rules and resources that reach beyond the present tense by influencing an actor's future choices (Giddens, 1984).

Modalities define those channels agents knowledgeably use in the reconstitution of structural properties (Sarason, 1995).

Structuration theory has been advanced in a variety of technology communication studies (Contractor & Eisenberg, 1990; DeSanctis & Poole, 1994; Orklikowski & Yates, 1994; Poole & DeSanctis, 1990, 1992; Yates & Orlikowski, 1992). DeSanctis and Poole (1994) use *adaptive* structuration as one approach for studying the role of advanced information technologies in organizational change. Adaptive structuration examines the emerging structures that are created through the implementation and use of new technologies of communication by organizational members (DeSanctis & Poole, 1994). DeSanctis and Poole posit that emerging technologies (i.e., computer-mediated communication) trigger adaptive structurational processes, which in turn lead to changes in rules and resources an organization uses in social interaction. However, these adaptive structurational processes are neither uniform, nor

predictable. In essence, the adoption of new forms of communication technology is less a function of the technology itself than it is of the user's preference.

The effect of new and improved technologies that are touted as solutions to communication problems in organizations frequently differ from their intended impacts (Kiesler, 1986; Markus & Robey, 1988). This is partly because human interaction is both enabled and constrained by the structure created by previous actions of agents. Indeed, ST holds that the stated goals for the implementation of new communication technologies in an organization frequently differ from the outcomes because actors are also creators of social systems (Sarason, 1995). The theory of brain dominance may hold a key to understanding why people adopt certain communication modalities and systems to their particular work needs and reject or avoid others.

Technology activities, as defined by Orlikowski, Yates, Okamura, & Fujimoto, (1995, p. 424), are "deliberate, ongoing, and organizationally-sanctioned interventions within the context of use that helps to adapt a new communication technology to that context, modifies the context as appropriate to accommodate use of the technology and facilitates the ongoing effectiveness of the technology over time." Thus, structuration action also affects meaning construction as communication technologies "are both a cause and consequence of structure. This dual role of technology occurs because structuring is an ongoing process that shapes the meaning of artifacts through scripts, interaction, and tradition, and is itself shaped by those meanings" (Weick, 1990, p. 22-23). While

new technologies alter structurational processes, the contention of this study is that cognitive processes, as demonstrated by HBDI, need to be studied as antecedents to new technology adaptation and usage. The key determinant of usage—when the user has a choice—is based on the user's brain dominance preference and situated contexts. As noted by DeSanctis and Poole (1994, p. 142) communication technology advancements have not made remarkable improvements in organizational effectiveness, and "fresh theoretical approaches are needed to shed new light on these old questions."

Orlikowski and Yates (1995) confirm the supposition that users manipulate technology to accomplish work, but they make no connection to brain dominance preference as a plausible cause. Instead, Orlikowski and Yates provide a structuring perspective that posits a communicative genre approach to understanding the adoption and usage of communication in organizations. For example, Yates and Orlikowski (1994) define genres of organizational communication as a distinctive type of communication action that is formatted and recognized as a common delivery system understood by members of a community. Lab reports, staff meeting updates, grant proposals, and tax forms are examples of structurized genres of codified knowledge produced for specialized communities (Berkenkotter & Huckin, 1993). Miller (1984) states that genre is not determined by one person's motive for communicating. Instead, it is the norm for how communication should be delivered within the organization. The genre approach examines the genre set of a community, thereby allowing the researcher

to investigate the community's situations, its recurring activities and relationships (Devitt, 1991). The genre approach espoused by Yates and Orlikowski provides a legitimate approach to studying organizational communication, but it does not provide answers to how or why a particular genre is started and if the genre is the preference of community members.

Organizational researchers have developed many theories to explain the social construction component of technology (Contractor & Eisenberg, 1990; Fulk, Schmitz, & Steinfield, 1990; Poole & DeSanctis, 1990). These theories hold that the attitudes toward uses of technologies are structured by social agents, who in turn, stimulate a convergence within the social system of the organization (Rice & Aydin, 1991; Rice, Grant, Schmitz, & Torobin, 1990; Schmitz & Fulk, 1991). The power of brain dominance is the effect it has on structuring organizational communication, which compliments the social constructivist approach toward thinking about technologies. Individual communication preferences, especially those of influential managers, have a "strong, obligating quality to them" (Riley, 1983, p. 420). These communication preferences become unintentionally codified and members must deal with them, regardless of whether they like them. Thus, a duality of structure in communication preferences creates tension within the organization as the dominant actors assert control of the communicative processes.

Brain Dominance

Brain dominance, also described as hemispheric dominance, which includes left brain/right brain dominance, and cerebral/limbic dominance, is used to describe how an individual processes information through a preferred mode of thinking. An abundance of evidence supports the contention that the two hemispheres perform different cognitive functions that are specialized, but not necessarily discrete, different, or better (Springer & Duetsch, 1981). The construct of brain dominance developed from the neurophysiologic research of Nobel prize-winning researcher Roger Sperry (1964), physicist Ned Herrmann (1982, 1995, & 1996) and brain scientist Robert Ornstein (1978, 1997), to name just a few. These researchers demonstrated that an independent stream of consciousness resides in each hemisphere with each side managing different types of mental activity. Thirty years of brain research has led investigators to conclude that individuals demonstrate a preference for perceiving and problem solving that is characterized by the specialized functions of one hemisphere of the brain over the other (Amen, 1999; Bunderson, et al, 1980, 1981, 1982; Herrmann, 1995; Ho, 1988; Mintzberg, 1976; Nugent, 1982; Sonnier, 1982; Springer, 1981). The left hemisphere specializes in quantitative, rational, analytic and logical modes of thinking, while the right hemisphere is intuitive, imaginative, visuo-spatial, random, relational, and global. The two separate sides of the brain communicate back and forth through a complex network of nerve fibers known as the corpus callosum.

Research indicates that the left and right hemispheres of the brain interpret stimuli differently. For example, Ornstein's (1997) research notes that the left hemisphere processes stimuli serially and sequentially, and is involved in analytic brain functions, including language, reasoning, logic, and mathematics. The right hemisphere interprets stimuli as a gestalt (a whole thought) and is involved in creative, artistic, musical, emotional, and non-verbal tasks (Clayton, 1990). Herrmann (1995), a pioneer in brain dominance research, began his research using the electroencephalogram (EEG) to measure brain activity, but found it impractical for assessing brain dominance. His research led him to develop a self-report, paper and pencil instrument (which has since become an online profile). Early results clearly showed the hemiphericities of the brain, but Herrmann also found that scores clustered at four points along the left-right continuum, indicating that there were sub-categories not accounted for in his statistical analysis. As a result, Herrmann created a quadripartite model that refines hemisphericity preferences into four quadrant preferences—two cerebral and two limbic quadrants: A) Cerebral Left: the analytical, logical, problem-solving person; B) Limbic Left: the reliable, organized, controlling, conservative person; c) Limbic Right: the interpersonal, emotional, sensitive, intuitive person; and D) Cerebral Right: the creative, conceptual, synthesizing person.

The Herrmann Brain Dominance Instrument (HBDI) is used to assess "preferences for mental activity" (Herrmann, 1989b, p. 44), but not competence for the mental activity. Since communication is so closely linked to thought

processes, it stands to reason that brain dominance for thinking preferences would parallel brain dominance for communication preferences, both as sender and receiver.

The literature on brain dominance is scattered through several disciplines, including psychology, physiology, technology, music, nursing, education, accounting, and business, but very little, if anything, has been done with organizational communication. One reason for the lack of research in the communication area may be due to the difficulties and limitations of measuring communication in organizations. Another reason may be that multi-dominant thinkers (people with strong preferences in more than two quadrants) tend to develop a more generalized thinking style, which can make it more difficult to measure communication preference because interaction and meaning are situationally constructed (Herrmann, 1995; 1996). In one study, research was conducted to ascertain the influence of brain dominance on self-actualization (Bernhoft, 1985). Data analysis revealed that the self-actualizing personality is primarily right brain dominant, both right limbic and right cerebral, with selected input from the left limbic quadrant. Left-brain cerebral dominance was shown to have a negative effect on self-actualization (Bernhoft, 1985).

In organizations, left-brain skills are encouraged and rewarded with money and power as these skills reinforce the dominant hegemonic structure (Deetz, 1994). As supporting evidence, research has shown that management education privileges the left-brain approach in teaching and learning (Goldstein,

Scholthauer, & Kleiner, 1985; McKenny & Keen, 1974; Mintzberg, 1976; Nugent, 1981). Left-brain hegemony in management education has continued unabated since the days of Frederick Taylor (1913) and the formation of Classical Organizational Theory. The objectivist approach privileged scientific management by creating rigorous standards, and implementing task analysis, and one-way communication to ensure efficient production. Rewards and punishments were used to motivate workers toward completing their tasks. Early curriculum theorists, like Bobbitt (1918) and Tyler (1949) argued that schools needed to be more like businesses in their approach to education and accountability. Management writers have evaluated the historical and current management education curriculum and agree that courses supporting right-brain skill development are underrepresented (Agor, 1984, 1986; Coulson & Strickland, 1985).

In a correlation study of brain dominance and graduate record examination scores of adult learners, a significant negative relationship was found between right hemispheric brain dominance and GRE quantitative scores (Blaine, 1989). Would it not be logical to assume that if an organization is inundated with left-brain thinkers that the communication channels and modalities, and benchmarks for communication satisfaction would favor left-brain preferences? Would it also not be logical to assume that right brain thinkers who try to succeed in left-brain dominated environments would have difficulties acclimating to the communication climate and organizational culture? From a feminist, critical

perspective, the structuration of organizational culture and climate are tools that management uses to maintain the status quo (Cheney, 1995; Deetz, 1992; Tretheway, 2000). According to Wonder and Donovan (1984) Blacks, Hispanics, and women generally have right-brain preferences, which may be one reason that these groups, in particular, have met resistance with ascension to the highest offices in organizations. To become successful in a traditional hierarchy, minorities must master left-brain skills of analytical competence and financial management, in addition to overcoming discriminating biases. Additionally, when an organization wants to implement change, mutual understanding and action must occur before the change can be undertaken successfully (Brown, 1995). This requires collaborative sense making that involves reflective questioning and reasoning with assumptions becoming explicit (Kellett, 1999; Putnam, 1996). If communication is tribalized by left-brain dominant managers, the likelihood of diverse perspectives being expressed and deep issues addressed, is minimized. The dialogue that ensues does not necessarily transform the organization; rather it indoctrinates the right-brain thinkers into the dominant perspective (Bennett & Brown, 1995).

Studies of cognitive dominance, personality type and leadership traits have been cited in both the business and academic communities (Bennis, 1983; Kouzes & Posner, 1987; Sashkin, 1986), yet there is a paucity of research on brain dominance as it relates to organizational communication. An early qualitative study by Mintzberg (1976: 57) followed the decision-making process of five chief

executives, and although his study was limited and non-replicable, Mintzberg found that CEOs engaged in high-level decision-making "rely to a considerable extent on the faculties identified with the brain's right hemisphere."

Many researchers since Mintzberg have looked for the brain connection between management science and training. Knisbacher (1999) investigated how brain dominance affects the relationship between two independent variables—learning style and thinking style. She found a relationship between learning and thinking styles as they apply to instructional presentation preferences. Another study investigated the impact of cerebral dominance and training, and concluded that teachers should investigate prior to instruction whether their students are left brain dominant or right brain dominant to create teaching methods conducive to the brain dominance preference of the learner (Ray, 1999). Brain dominance preference has been studied in business faculty at an institution of higher learning (Wilber, 1995). Results indicated that business faculty are overwhelmingly limbic in brain dominance preferences, and use the methods they learned in college, specifically, lectures and discussion. In addition, Wilbur (1995) found evidence to suggest that the longer an individual teaches business, the stronger the limbic quadrant preference becomes. Additionally, Wilbur found a high level of satisfaction for teaching, which matches the descriptors for individuals whose dominance is limbic-based.

Research has also shown a relationship between brain dominance and levels of management. Herrmann (1989) reported that lower level manager

profiles clearly exhibit a strong preference for left-brain thinking while nine percent of CEOs are quadruple dominant, the highest percentage for an occupational group. Buergin (1998) compared the HBDIs of a group of Swiss entrepreneurs and managers to determine if brain dominance played a role in level of achievement and locus of control. The findings revealed significant differences in brain dominance preferences between entrepreneurs and managers. Delving further into the results showed that Swiss managers have a decided preference for left-brain thinking, while entrepreneurs demonstrate more whole brain thinking. In a similar research study, Clayton (1990) found that experienced auditing managers were more likely to engage in whole brain thinking and analysis before rendering a decision, while young auditors were more predisposed to making left-brain decisions. Finally, Herrmann (1996) suggested up to 80 percent of low to mid-level managers' work is left-brain, whereas top managers' work is both strategic and detailed.

Brain dominance can be expressed in terms of how individuals prefer to learn, understand, and express themselves. Since brain dominance is correlated with learning styles (Herrmann, 1995), it is possible that cognitive preferences, or preferred modes of knowing, can also predict communication modality preferences. Brain dominance may show how communication preferences lead to habituated ways of accessing information.

Brain dominance research has also explored the connection between hemisphericity and occupations. In a comparison study of accounting students and

art students, Schkade and Potvin (1981) found that accounting majors were overwhelmingly left brain dominant, while art students were more likely to be right brain dominant. In a HBDI comparison study of school superintendents and corporate chief executive officers, Coulson and Strickland (1985) found school superintendents preferred left brain analytic information processing, while CEOs tended toward more right brain creative processing of information. Herrmann International, which processes all HBDIs, has a databank of more than one million individuals who have taken the HBDI. The databank has allowed Herrmann to develop occupational norms for certain profiles. Multi-dominance (preference in more than one quadrant) is the norm in occupations that demand the use of more than one mode of thinking or interpreting information (Smith, 1993). Certain occupations have shown consistency and reliability in dominance preference. For example, individuals whose occupations are in finance and manufacturing have double dominance profiles, while people who excel at nursing, social work, and training are more likely to be triple dominant, and CEOs, personnel executives, politicians, and administrative assistants, quadruple dominant (Smith, 1993).

Individuals with similar profiles tend to prefer similar mental activities and tend to process information in similar ways (Agor, 1984; Herrmann, 1982, 1995, 1996; Springer & Duetsch, 1989). If individuals on a management team process information in similar ways, chances are that they will also process communication in similar ways.

Communication Variables

Three communication variables were chosen for this study: satisfaction, feedback, and channels.

Communication Satisfaction

The study of communication and job satisfaction is a robust area of inquiry. Wheeless, Wheeless, and Howard (1984) found that communication variables (communication satisfaction with supervisor, perceived supervisor receptivity to information and ideas, employee participation in decision-making) accounted for a substantial amount of variance (76%) in employees' job satisfaction. Pincus (1986) completed a field study of 327 nurses and found significant positive relationships between communication satisfaction and job satisfaction and performance. Strategies and supervisor communication of affinity were found to correlate with subordinate satisfaction (Richmond, McCroskey, and Davis, 1986). If brain dominance is shown to play an active part in communication, then individuals with multi-dominant profiles will be more satisfied with organizational communication than individuals who have only one or two dominant quadrants. Multi-dominance is defined as primary cognitive preference in three or four quadrants.

The multi-dimensional construct of communication satisfaction consists of information flow and relationship variables (Downs & Hazen, 1977). Numerous definitions are used to describe communication satisfaction, such as expectation fulfillment (Ilgen, 1971) and equivocality reduction (Weick, 1979). Hecht (1978)

defined organizational satisfaction as the linkage of environmental reinforcement with expectation fulfillment. Neely (1973) explained satisfaction as the driving force in needs gratification theory. Many researchers and professionals ascribe to the idea that a positively perceived communication environment enhances organizational effectiveness (Taylor, 1997). The outcomes of organizational socialization affect members' perceptions of their new environment and have been linked to employee satisfaction (Allison & Cawyer, 1997; Jablin & Krone, 1987; Staton & Hunt, 1992). Messages used to socialize employees are recognized as key building blocks on which relationships and roles are built (Cawyer & Friedrich, 1998; Graen, Orris, & Johnson, 1973).

Leader-member-exchange theory (LMX) has also investigated communication satisfaction from the leader-member relationship perspective (Dienesch & Liden, 1986; Graen & Scandura, 1987). The communication dimensions of leader-member-exchange theory (i.e., trust building, delegation-performance, and high quality interaction) play a significant role in organizational outcomes such as subordinate turnover (Graen Liden, & Hoel, 1982) and subordinate satisfaction (Graen, Novak, & Sommerkamp, 1982; Scandura & Graen, 1984).

Several models have been created that explain communication satisfaction to be a significant predictor of organizational satisfaction, commitment, and job satisfaction (Downs & Hazen, 1977; Gorden & Infante, 1991; Koike, Gudykunst, Stewart, Ting-Toomey, & Nishida, 1988; Lamude,

Daniels, & Graham, 1988; Pincus & Rayfield, 1989; Roberts & O'Reilly, 1974; Wheeless, Wheeless, & Howard, 1984). Pincus (1986) investigated the relationship between perceived satisfaction with organizational communication, and job satisfaction and performance to discover that communication climate, personal feedback and supervisor communication were strongly related to job satisfaction and performance. Richmond and McCroskey (2000) studied affinity-seeking strategies in communication satisfaction and reported that subordinates' perceptions of supervisors were enhanced and motivation and job satisfaction increased when supervisors demonstrated immediacy behaviors.

According to Herrmann (1995), immediacy is achieved naturally when a supervisor and subordinate share similar preferences for thinking and communicating. Wheeless, Wheeless and Howard (1984) examined the relationship of communication-related variables to employee job satisfaction and found that supervisor receptivity was a more reliable predictor of job satisfaction than decision participation variables. A substantial amount of variance (76%) was attributable to communication-related variables. Trombetta and Rogers (1988) investigated the effects of communicative strategies on employee loyalty to the organization. Results indicated that management communicative strategies influence commitment and job satisfaction, but commitment is not a precursor to satisfaction.

Infante and Gorden (1982) studied the similarities and differences in the communicative styles of superiors and subordinates to determine if similar

communication preferences affect the working relationship. They found that subordinates' satisfaction was related to being similar to superiors on communication style and flare, which anecdotally supports the supposition that individuals with similar dominance profiles are "hardwired" to think and communicate in mutually satisfying ways. Fulk (1993) found empirical evidence for patterns of meaning and action among a group of scientists and engineers whose social influences were structured and defined by their common attitudes and behaviors related to technology. Bauer & Green (1996) studied the development of leader-member exchange (LMX) relationships and found support for relationships between the quality of leader-member exchange and positive affectivity similarity. Vielhaber (1983) studied the interface between organizational communication and organizational change and found that the best predictor of attitude toward work-related change was the organizational relations among coworkers, superiors and subordinates. The better the primary organizational relationship, the more positive the attitude toward change is. Similar research has shown that job satisfaction is mediated by relational and organizational communication factors (Jablin, 1979, 1982; Kramer, 1995; Morrison, 1995; Spiker & Daniels, 1981; Teboul, 1995).

Gorden and Infante (1991), Koike, et al. (1988), and Roberts and O'Reilly (1974) found strong relationships between organizational communication and job satisfaction, which supports the assumption "that an environment of open, supportive, active, accurate, free-flowing communication" (Taylor, 1997, p. 301)

is the foundation for organizational satisfaction. Conversely, research suggests that a lack of understanding of one's own thinking preferences and the preferences of others leads to miscommunication and operational problems within organizations (Ellis, 1983; Mintzberg, 1976; Nugent, 1982; Piatt, 1983; Robey & Taggart, 1981).

Not all studies show that open communication leads to greater satisfaction. The Finnish scholar Wiio (cited in Goldhaber, 1983) found that open communication was associated with greater dissatisfaction with the job. This has led Eisenberg and Witten (1987, p. 419) to conclude that "the relationship between open communication and employee attitudes is not as simple as is sometimes presumed." Instead, communication must be practiced from a contingency perspective as open communication is "relative for all practical purposes, not absolute" (McGregor, 1967, p. 162-163). In other words, perceptions toward openness cannot always be presumed to be positive particularly when the nature of the information is negative or politically charged. Research indicates that subordinates' preferences for open communication depend to a great deal upon the personal characteristics and communication style of the superiors (McGregor, 1967). Subordinates are less at ease in communicating with superiors when those managers are perceived as having a political agenda (Jablin, 1981). Without knowledge or perception of one's own communication preference or style, managers create an inherent vulnerability in the communication process, exacerbating the duality of structure (Giddens, 1984).

Gudykunst (1995) determined that effective communication is based, in part, on the ability to reduce uncertainty and manage anxiety. Communication climate is less than nurturing when fact-based information is distributed and doled out on an as needed basis by managers who structure communication according to their own preferences without regard to its impact on members. Where uncertainty remains high, persons are less likely to experience communication satisfaction (Neuliep & Grohskopf, 2000). In an era when information sharing is paramount to success, withholding information from organizational members or reframing information in constitutively ineffective language can have detrimental consequences for productivity and morale.

Communication Feedback

Feedback in organizations is an active area of research (Bernardin & Beatty, 1987; Ilgen, et al, 1979; Jablin, 1979; Kluger & DeNisi, 1996; Pearce & Porter, 1986; Reilly, Smither & Vasilopoulos, 1996). In particular, technology-driven 360-degree feedback has made deep in-roads into organizational processes (Antonioni, 1996; Baldwin & Padgett, 1994; London & Beatty, 1993; London & Smither, 1995; McCauley, 1997). Yet there is a paucity of data related to brain dominance and feedback. McManus (2001) indicates that negative feedback never reaches the neocortex, the part of the brain that can make logical and rational sense of the information. Instead, negative feedback is perceived as threatening and is rerouted to the limbic system for processing and safekeeping. Additionally, brain dominance research indicates that when a person prefers one

mode, s/he may actually reject another (Herrmann, 1995). Thus, one who strongly prefers to function from one quadrant or two may be incapable of processing feedback if it is presented in a style reflective of the other quadrants. Implications from this line of questioning may provide insight into how feedback is perceived and processed by the four quadrant model and how it can be utilized as effective management rather than as a "deadly management disease" (Carson, Cardy & Dobbins, 1991, p. 143).

The literature on communication feedback is robust and well-developed (see Ilgen, Fisher, & Taylor, 1979 for a review). Research has shown that feedback can have positive effects on the performance of individuals (Florin-Thuma & Boudreau, 1987; Guzzo, Jette, & Katzell, 1985; Ilgen, Fisher, & Taylor, 1979; Landy, Farr, & Jacobs, 1982). There is much debate regarding the impact of feedback. Researchers have tried to make a causal relationship between frequency of feedback and organizational effectiveness with less than conclusive results (Ilgen, Fisher, & Taylor, 1979; Shenson, 1970). This has led some researchers to conclude, "Feedback does not uniformly improve performance" (Balcazar, Hopkins, & Suarez, 1985, p. 65). Kluger and DeNisi (1996) argue there is a widely shared assumption that feedback consistently improves performance, which is not scientifically based. They report that in some conditions feedback improves performance, in other conditions, feedback has no apparent effect on performance, and in yet other examples, feedback reduces performance (see U.S. Congress, Office of Technology Assessment, 1987).

Another meta-analysis of feedback reveals that more than one-third of feedback interventions are found to decrease subordinates' work performance, with verbal feedback being perceived as being ego threatening (Kluger & DeNisi, 1996). As noted by Lizzio, Wilson, Gilchrist, & Gallois (2003, p. 342) "Clearly, not enough is known about the 'verbal technologies' of feedback to ensure consistently successful outcomes." Behaviorists define feedback as behavior regulation, while communication theorists see feedback as the key function of the communication loop between sender and receiver (Larson, 1989). In either case, researchers believe that employees are motivated to seek out information from their work environment. Active members learn by processing information that validates or negates their behavior. This process, in its most basic form, is feedback (Ashford & Cummings, 1983; Ilgen, Fisher, & Taylor, 1979; Powers, 1973). Yet feedback is a unique and complicated form of communication that is not easily understood (Higgins, Hartley, & Skelton (2001). Feedback theory has often focused on message features, such as the degree to which messages are constructive, timely, and considerate (Barron, 1988; Ilgen, Fisher, & Taylor, 1979; Maniero & Tromley, 1993). However, these variables have led to mixed results, raising the question of whether these variables account for much variance (Larson, Glynn, Fleenor, & Scontrino, 1986). This study perceives feedback differently from previous studies.

A body of research called, "perceptual congruence" deals with the subordinate's perceptions of the relationship with his/her supervisor and the

subsequent effects on outcome variables for organizations (White, Crino, & Hatfield, 1985). In a parallel construct (similar to the effects of brain dominance congruence between superiors and subordinates), studies have shown a positive relationship between congruence and (1) supervisors' evaluations of subordinates (Wexley, Alexander, Greenwalt, & Couch, 1980); (2) subordinates' satisfaction and morale (Green, 1972, Wexley et al., 1980); (3) quality of relationships between supervisors and subordinates (Graen & Schieman, 1978); and (4) subordinates' satisfaction with communication (Hatfield & Huseman, 1982).

Feedback is a relational dimension for organizational members as they actively seek to interpret and organize their interactions (Jones, 1983; Van Maanen, 1976). An active agent assimilates feedback by recognizing situational cues in his environment (Giddens, 1984). Feedback is critical for adaptation in an organization. New members make sense of their environment by tailoring their behaviors to fit the demands and norms of an organization (Ashford, 1986). The importance of feedback has grown as the nature of work has become more complex, especially in managerial jobs (Baumann, 2000). In a study conducted by Longenecker & Fink (2001), the most important practices identified by managers as improving their performance are focus, feedback and learning (e.g. problem solving, new communication and leadership). Thus, feedback is no longer simply discovering "when to ask questions, give advice, take a vacation, quit early or push for a pay raise" (Katz, 1980, p. 93).

The speed at which organizations operate today ensures the importance of feedback as a critical component for success. To compete in the global marketplace, organizations must be fast. Speed is the driving force that pushes organizations to break old habits and develop new behaviors and processes that make them more efficient (Senge, 1990). To do this, feedback must be a fluid and creatively iterative process that supports agency and reflexivity (Giddens, 1979, 1984). Individuals inherently try to adapt to their organizational environment by tailoring their behavior, but tailoring is based on information that helps the individual develop (Ashford, 1986). For many organizations, the greatest challenge they face is the rapid and effective development of managers (Drucker, 1999). Management studies indicate that organizations that do not integrate feedback into their management development programs tend to experience lower than expected performance improvements and higher dissatisfaction turnover of their managers (Longenecker & Fink, 2001).

Feedback has been studied as reciprocal determinism through communication exchanges between a supervisor and subordinate (Watson, 1982a, 1982b). The model for the basic unit of analysis is the paired exchange of two messages—one given by the supervisor and the response of the subordinate. This approach focuses on the linguistic form of interaction, specifically how a supervisor creates and restrains his language to maximize control. For example, Gioia and Sims (1986) found that a supervisor's verbal behavior toward poor and good performers was conveyed through verbal behavior and cues. One consistent

theme in feedback research is supervisors are reluctant to give negative feedback, partly because it is an unpleasant experience for both the employee and the supervisor, and because it might cause long term interpersonal repercussions (Larson, 1984). Empirical evidence has shown that supervisors avoid giving negative feedback as long as they can, and when they do deliver it, the feedback is presented less negatively than the performance might warrant (Fisher, 1979; Ilgen & Knowlton, 1980; Larson, 1986; Yong & Miller, 1990). This has resulted in feedback processes being inconsistent in helping to improve performance (Kluger & DeNisi, 1996). Conway (1999) found that supervisors pay more attention to task performance (left-brain dominance) than to interpersonal facilitation (right-brain dominance).

HBDI contends that communication is easiest between interactants who have the same quadrant dominance, followed by interactants who are either both left brain or right brain. Following same quadrant and same hemisphere congruence is cerebral or limbic congruence. The most difficult communication is between quadrant A (left-brain cerebrals) and quadrant C (right-brain limbics). Feedback based on brain dominance has never been investigated as a source of causality in supervisor-subordinate interaction even though research has shown the influence of liking in feedback interactions. For example, a review of 24 studies showed that supervisors' positive regard for subordinates frequently resulted in "more lenient appraisal ratings, greater halo effects, reduced accuracy, less inclination to punish performance and better interpersonal relationships"

(Fletcher, 2001, p. 479). Congruency of brain dominance and its effect on feedback is an important construct that is conspicuously missing from research. If communication is easier and more fluid between interactants who have the same quadrant or hemisphere preference, then understanding one's brain dominance and the dominance of a subordinate should be a logical approach for giving feedback. As noted by Ilgen et al., (1979) and Stone and Stone (1984; 1985), for feedback to be used as a developmental tool it must be accepted.

Male/Female Characteristics

There is a plethora of anecdotal evidence that men and women think and communicate differently. Linguistic scholar Deborah Tannen (2001) calls the difference between the way men and women communicate as "Report Talk v. Rapport Talk." Family therapist John Gray (1994) notes, men are more interested in "objects" and "things" rather than in people and feelings. Brain research indicates that the differences between men and women may be more physiologically based than previously thought. The corpus callosum is the part of the brain which connects the two cerebral hemispheres. A great band of commissural fibers unite the hemispheres, with a second, smaller band of hippocampal commissures connecting the two halves of the limbic system. These four interconnected structures represent the thinking parts of the brain. In a white paper written by Herrmann (1994), the physicist notes:

> "The fact that there are physiological differences makes an impact on the degree to which information is passed back and forth between these two specialized parts of the brain. In women, autopsies clearly show that the corpus callosum is larger on the average than it is for men. Since each person's brain is

unique and the size of the corpus callosum would vary between individuals as well as between sexes, it is only possible to think in terms of generalized averages. On this basis, it is clear that the average female has 5 to 6 percent more connections between the two hemispheres than does the average male."

If male brains are different from female brains, it stands to reason that the differences in brain size, chemistries, and hormones would also indicate a difference in thinking preferences, communication preferences, feedback preferences and channel preferences. Herrmann (1994) was one of the first to surmise that one aspect of brain physiology contributes substantially toward differences in mental preferences. For example, studies show that women measure business success differently than men (Larwood & Gattiker, 1989). Men prefer jobs that offer higher income, while women prefer jobs that offer opportunities for professional growth and challenge (Bigoness, 1988; Brenner & Tomkiewicz, 1979). Female managers generally use "soft" approaches, such as personal stories and affiliative tactics to resolve conflict and give feedback, while men report greater use of "hard" tactics, such as coercion and pressure (Carothers & Allen, 1999; Gruber & White, 1988; Offerman & Schrier, 1985; Pruitt, 1998). Since the business environment has fundamentally changed in the past two decades with more women and minorities entering the ranks of professional managers, several communication researchers have called for changes in the way organizations are studied (Deetz, 1995a; Deetz, Cohen, & Edley, 1997; Gergen, 1992, 1995; Marsden, 1993). Leading researchers have called for a shift toward a "stakeholder" model of organizations, which privileges participatory style and multiple-ownership over autocratic decision-making by management (Grunig &

Hunt, 1984; Osigweh, 1994). From a brain dominance perspective, the stakeholder model, which enables widespread participation and inclusion, will favor the female brain dominance preferences.

Results of how male managers and female managers handle interpersonally difficult situations suggest that male managers tend to use formal authority to deal with difficult issues, while female managers use interpersonally complex and facilitative modes of intervention. The female strategy generally endorses relationship maintenance and participative processes. (Wilson, Lizzio, Zauner & Gallois, 2001; Lizzo, et al., 2003). In one study, female managers were able to identify the most effective feedback strategy to use in a variety of difficult situations, while the male managers were only able to recognize the best strategy when it was presented to them (Lizzo, et al., 2003). These results corroborate earlier studies that suggest there is a consistent pattern regarding women's greater interpersonal competence (Noller & Fitzpatrick, 1988; Smythe & Wine, 1980; Wagner & Berger, 1997).

Herrmann (1994) also notes that mental transactions between the two hemispheres of the brain occur up to 15 percent faster in women than in men—regardless of whether the woman is left or right brain dominant. This may be one reason why female managers instinctively go beyond "report talk" to "rapport talk." There may be a "hardwired" ability for women to naturally interact at a deeper level with a subordinate, rather than simply interact at a superficial level through a direct, person-specific discussion of performance issues. For women

managers, initiating strategy is indirect at the outset, but progresses to a specific discussion of the issue. Women, in general, use face-to-face communication to enact participative and evidential processes for the building of subordinate's ownership and commitment (Eagly & Johnson, 1996; Lizzo, et al., 2003; Sagrestano, 1992; Wilkins & Anderson, 1991).

Channels/Modalities

While structuration theory has been used to study elements of communication technology (Barley, 1986; Orlikowski & Robey, 1991; Poole & DeSanctis, 1990; Yoo, 1997), technology itself is not defined as an objective determining feature of structuration, per se (Bastien, McPhee, & Bolton, 1995). Instead, technology is viewed as a resource used by individual interactants as a way of structuring interaction. Communication channels, as interpreted through structuration theory, assume that the electronic communication channel is a social technology that possesses objective features, but whose meaning is recreated through social interactions among people who use it (Yoo, 1997). Brain dominance research suggests that the choice of communication technology, channel and media selection is structured by quadrant preference and situational factors, which are often outside the control of the communicator (Herrmann, 1996). Much has been written about channel selection. The following is a review of the prominent research on the topic.

Daft and Lengel's (1984, 1986) Media Richness Model (MRM) suggests that the content of a communicated message drives media choice. They argue that

in organizational settings, managers choose media to match the equivocality of the message. Equivocal messages are open to interpretation because of the presence of multiple and conflicting meanings. Interactants must overcome equivocality to reach agreement or solve a problem (Weick, 1979). Technologies are equivocal because they can be interpreted in various conflicting ways (Fulk, 1993; Weick, 1990). Daft and Lengel also identify uncertainty as an important and contributing factor in media selection. Uncertainty refers to the gap between information that is needed/wanted and information that is available (Trevino, Lengel, Bodensteiner, Gerloff & Muir, 1990). MRM is represented as a hierarchy from rich to lean media. Face-to-face contact is considered to be the richest medium because of the additional cues provided. This is followed by telephone contact, voice mail, and e-mail. The leanest media are written documents and numbers. In matching message to equivocality, Daft, Lengel and Trevino (1987) demonstrated that managers who matched the medium with the message were rated as better performers overall. Rice and Shook's (1990) meta-analysis supports the hypothesis that managers who work in equivocal situations tend to use rich media (see also Rice, 1992; Russ, Daft, & Lengel, 1990; Trevino, et al., 1987; Trevino, et al., 1990).

Christensen and Bailey (1997) conducted an experiment to test MRM and found a significant interaction between task routine and source accessibility. Subjects in the non-routine condition selected a significantly richer medium than those in the routine condition, as predicted by MRM. However, when access to

source information (e.g. a manager) was denied, subjects preferred a richer medium, even for routine tasks. For routine tasks without restriction to source information, the subjects chose a leaner media. The results of this experiment, while not generalizable, suggests that there is more to media selection and media satisfaction than message content.

Other researchers have found familiarity and proximity affect communication. Thomason (1966) concluded that variables, such as density of people in work area, differentiation of jobs, and interpersonal proximity have significant influence on communication. From these interpersonal communication factors, the concept of the social influence model was developed by Fulk, Schmitz, and Steinfield (1990). The social influence model explains how social forces, such as work group norms and supervisor attitudes affect media behavior. Fulk and Boyd (1991) used behavior-modeling processes conceptualized by Bandura (1986) and positive reinforcement identified by Salancik and Pfeffer (1978), to demonstrate how social influences impact acceptance of new media (e.g., e-mail and voice mail) among associates. They contend that social influences, such as the attitudes and behaviors of superiors and peers can positively or negatively influence an individual's media choices and uses (Conger, 1992; Fulk & Boyd, 1991; Igbaria & Chakrabarti, 1990).

In addition to proximity, social influences, and geographical distance, time pressure and critical mass have been implicated as creating powerful limitations on the ability of individuals to exercise personal preferences (Markus, 1986;

Steinfield & Fulk, 1986). In other words, a manager might prefer to conduct face-to-face meetings with her staff, but because of the number of people involved (critical mass), the urgency of the message (time pressure), and the distances between offices (geographical distance), the manager must settle for expediency (lean media) over interpersonal thoroughness (rich media). According to Trevino, et al., 1990, leaner media are not capable of reducing ambiguity and resolving multiple interpretations. However, when the message concerns are routine, predictable, and known, leaner media are more efficient and expedient.

The media richness model is a compelling formula for channel selection, but it has limitations. Research from objective (Rice & Love, 1987) and perceptual (Walther & Burgoon, 1992) measures yield contradictory results to what MRM proposes. In fact, Lee (1994) found that lean media could accommodate relational interaction (e.g., rich media), especially if it occurs over time. Lean media also found to be appropriate for managing equivocality between individuals who are familiar with each other. Conversely, Yoo (1997) found that when interactants do not know each other well, the chance of unstable channel patterns increases, diminishing the effectiveness of rich media, and performance suffers. The key variable is time. Time increases the chances of perceived richness of electronic mail (Burke, Aytes, & Chidambaram, 2001; Carlson, 1995).

How organizational agents choose media and communication channels can be found in the economic, psychological, and communication literature (e.g. Arrow, 1973; Axley, 1984; Hogarth, 1987; Petty & Cacioppo, 1986; Reinsch &

Beswick, 1990). Trevino, Lengel, and Daft (1987) found that interaction through the electronic communication channel reinforces the structuration process as active agents create rich meanings through the selection of a mediated communication with specific symbolism. For example, a written, formal reprimand is a lean form of communication which carries serious implications for job viability, while a face-to-face verbal warning is a rich communication that may lead to better understanding between interactants, and away from dismissal. By actively picking a specific communication channel, a manager symbolically determines the meaning of the interaction.

Overall, relationships have been found primarily among three factors: (1) media choice; (2) message content; and (3) context (i.e., symbolism, critical mass, geographical distance, and time pressure) (Trevino, et al., 1990). To this list of communication-based dimensions, this study proposes that the influence of brain dominance be added. Staw, Bell, and Clausen (1986) argue for a similar inclusion when they suggest that theory and research focus too heavily on situational determinism without considering the value of dispositional prediction, cognitive style.

A few researchers have looked at the implications of cognitive style and individual characteristics on the impact of media selection (Huber, 1983; Rice & Case, 1983). Early research focused on the cognitive style of the manager and the use of management information systems (Trevino, et al., 1990). Huber (1983)

found the cognitive style literature lacking in theory development, measurement accountability, and appropriate research design.

Around the same time, communication scholars were also studying channel preference (Conrath, 1973; Porter & Roberts, 1973; Thomason, 1966). Monge, Edwards, & Kriste (1978) reviewed the interdisciplinary literature on determinants of communication and structure, and found a majority of studies were flawed statistically, or relied heavily on cross-sectional rather than longitudinal data. Burke, et al., (2001) report that research on channel selection has generally focused on the "bandwidth" concept, which suggests the amount and effectiveness of communication is restricted by the capacity of the media. Therefore, task-oriented interaction is facilitated by lean media, and relational-oriented interaction is facilitated by rich media. Several studies have concluded that capacity, in particular lean media, may be less restrictive of relational interaction than previously thought (Chidambaram & Jones, 1993; Kinney & Dennis, 1994; Walther & Burgoon, 1992).

Huber concluded that research should stick to task identification, since most studies conclude the demands of the task are the significant predictors for channel selection. Nonetheless, task demands cannot account for all of the variance explained, nor does it account for the potential importance of individual and contextual differences for predicting channel choice under certain circumstances (Trevino, et al., 1990). Weiss and Adler (1984) and Daly (1986) concur. These researchers suggest that the only reason cognitive style has not

been implicated in media and channel selection is because researchers have not figured out how to measure the influence of cognitive style—not because the influence is not there.

Media richness says that managers choose rich media in equivocal situations and lean media in non-equivocal situations, but adding individual cognitive preferences, such as those defined by the HBDI, changes and complicates the equation. To get at this idea, Trevino and colleagues (1990) investigated how individual cognitive styles influence media choice behavior using the Myers-Briggs Type Indicator (MBTI). The results suggested that when equivocality is low, the perceptive individual as measured by MBTI (the right brain/limbic dominated individual as measured by HBDI) will prefer rich media, while the judging individual as measured by MBTI (the left brain/cerebral dominated individual as measured by HBDI) will prefer lean media. However, situated factors may require more "richness" capacity than a communicator can provide—and this is one area in which there is a dearth of research. As brain dominance research suggests, a manager with a strong preference for thinking and communicating from the "Blue" quadrant (e.g., factual, critical, logical, technical, bottom-line oriented, direct and to the point) may have difficulty connecting with a subordinate whose preferences are strongly anchored in the "Red" quadrant (e.g., tactile, intuitive, feeling-based, emotional)—even when the manager uses a richer media. More than media, it is the cognitive connection that determines the outcome of the interaction. It is not unusual to hear an individual complain that

her boss does not like or understand her. In fact, it may not be a question of liking, but a question of brain dominance alignment. Herrmann (1996) has noted that individuals with the same quadrant dominance or same hemisphere dominance have an easier time communicating and understanding each other than individuals whose quadrant dominances are at opposing angles.

Implications

In summary, hundreds of researchers guided by a multitude of perspectives have examined organizational communication through communication satisfaction, feedback, sex, and media (channel). None has developed a *grande idée*—an ideological platform that can accommodate entire systems of analysis (Banks & Riley, 1993). Structuration Theory comes closest to becoming communication studies' universal platform. ST's critical theory roots are reminiscent of the Frankfurt School of scholars who pursued a line of inquiry that sought to expose the constraints of human consciousness, thus making it possible for enlightenment (Hancox, 1997). Structuration's theoretical constructs are designed to reflexively analyze the unconscious habits of social interaction that constitute organizations. Ultimately, ST provides social science with a framework in which to understand human behavior in social systems (Hancox, 1997).

The role of brain dominance in organizational structuration is an area ready for examination. Brain dominance can manifest as ideology in organizations. Giddens (1979, p. 193) holds that ideology functions through the

"representation of sectional interests as universal ones." The dominant tier of managers, who frequently have the same or similar beliefs, backgrounds, and brain dominance preferences, define the interests of the organization under the banner of "strategic planning" or "organizational alignment" and make their interests appear "universally valid" (Mumby, 1988, p. 86). When the dominant group in an organization has similar quadrant preferences, thinking can become reified. Giddens (1979) suggests that reification is the unconscious desire of the dominant group to preserve the status quo. Herrmann (1995) calls this phenomena "tribalization" where like-minded thinking is held up to be the righteous path to the corner office. In this scenario, communication and ideology become objectified (Lukács, 1971) and appear as a natural way of doing, seeing, and understanding. Reification has the potential to "limit the possibility of conceiving of alternative social realities or, if such alternatives are articulated in some way, they are usually derided as unworkable, too radical, or against the best interests of the organization" Mumby (1988, p. 87). Conceptually, brain dominance reification could manifest as organizational climate or culture with the dominant group subliminally controlling language and behavior under the rubric of "the way we do things around here." But reification is found only in shared meanings that shape actions to fit the idea (Daniels, Spiker, & Papa, 1997).

One of the main contributions that brain dominance can make to organizational communication research is the identification and incorporation of language that defines and quantifies quadrant preferences as they relate to

communication habits and assumptions. Understanding brain dominance allows people to discuss communication and ideology issues that would normally be too amorphous to articulate. For example, one participant in the study shared his feelings when she stated, "I was ready to quit this job before I took the HBDI. I thought nobody liked me, but now I know I just think differently than others on my team. Now they know it too, and instead of getting weird looks at staff meetings for my unconventional ideas, I'm getting nods." Understanding brain dominance has a way of leveling the playing field in organizations.

This study looks at the role of brain dominance as a significant determinant in organizational communication—with all that implies. In other words, it is the contention of this study that brain dominance significantly informs and explains important fundamental dimensions of organizations (i.e., communication satisfaction, feedback, sex, and channel choice) that other perspectives cannot. Brain dominance, like structuration theory, is a meta-theoretical proposition that does not privilege one approach or perspective over another, but helps define, explain, and inform heretofore unexplained areas of organizational communication. Thus, the partnership of structuration theory and brain dominance creates a strong framework for analysis.

Chapter 3
Methodology

This chapter discusses the methods and approaches used in the study. Brain dominance, which influences thinking styles, or preferred modes of knowing, affects human cognition and behavior, including information processing, problem solving, communication and relationships with others (Blodgett, 1989). Understanding the thinking styles that permeate and dominate organizations provides researchers with an important way to look at how dominance-driven communication influences interaction and climate within organizations. Gidden's framework of structuration makes it possible to interpret structure and action as mutually constituted through transformative and replicative effects of social activity. The results of this study were obtained by using data from completed HBDIs in a correlational study with data collected in a survey using items from the International Communication Audit (ICA) (Downs, 1988) and the Communication Satisfaction Questionnaire (CSQ) (Downs & Hazen, 1977).

Participants for the Study

Two hundred and ten questionnaires were collected and analyzed for this study. Participants were volunteers who had previously taken the HBDI and are currently working at various organizations part-and full-time. Of the 210 participants, 108 are male and 102 are female. Financial considerations made it necessary to request the assistance of individuals who had already completed the

HBDI. Administering new HBDIs to a control group would have been cost prohibitive for an unfunded dissertation study. Participants come from four strata of workers (senior management, middle management, technical, and support staff) and from four different organizations. One organization is a medium-size manufacturing concern. The three other organizations are smaller (fewer than 50 full-time employees). HBDIs were drawn from a non-profit group, a semi-governmental organization, and a county government staff. All participants were over the age of 21. Education level ranges from high school graduate to post doctoral degrees (See Table 3.1). Years employed range from less than one year to 38 years with a mean of 7.8 years. Hours worked per week range from 7 to 80 hours with a mean of 46 hours per week.

As noted in Chapter 1, results of HBDI are presented as quantified degrees of preference in each of the four quadrants. In an original study of 15,000 profiles, data indicated that 6 percent registered as single dominant, 60 percent were

Table 3.1
Education Level of Participants

		Frequency	Percent	Cumulative Percent
Valid	Some H.S.	2	1.0	1.0
	HS Diploma/GED	23	11.0	11.9
	Some College	29	13.8	25.7
	Trade School	8	3.8	29.5
	4-yr. College degree	71	33.8	63.3
	Some graduate work	29	13.8	77.1
	Advanced degree	48	22.9	100.0
	Total	210	100.0	100.0

double dominant, 30 percent were triple dominant and 3 percent were quadruple dominant. For this study, dominant quadrants were summed per participant. Table 3.2 results indicate that the reliability of the sample population of 210 matches the original study. For this study, 9 percent were single dominant, 56 percent were double dominant, 32 percent were triple dominant and 3 percent were quadruple dominant.

Categorization of Quadrants

Using the HBDI scale, the dominant score for each quadrant was categorized as 67 points or higher. Table 3.3 indicates the number of participants who had dominance in each quadrant. For example, in the Blue quadrant, there were 128 participants whose scores registered at or above 67. The Blue group's responses answered hypotheses 1 and 7. In the Green quadrant, there were 149 participants whose scores registered at or above 67. The Green group's responses answered hypotheses 2 and 8. In the Red quadrant, there were 109 participants whose scores registered at or above 67. The Red group's responses answered hypotheses 3 and 9. In the Yellow quadrant, there were 94 participants whose scores registered at or above 67. The Yellow group's responses answered hypotheses 4 and 10.

Instruments

The questionnaire used for this study was a compendium of items from the International Communication Association (ICA) audit, sections A (Receiving

Table 3.2
Quadrant Dominance of Participants

	Frequency	Percent
Single	19	9.0
Double	118	56.2
Triple	67	31.9
Quadruple	6	2.9
Total	210	100.0

Table 3.3
Dominance/Non-dominance By Quadrant

	Non-dominant		Dominant	
	Count	%	Count	%
Blue	82	(39.0%)	128	(61.0%)
Green	61	(29.0%)	149	(71.0%)
Red	101	(48.1%)	109	(51.9%)
Yellow	116	(55.2%)	94	(44.8%)

information from others) and H (Channels of communication), and items from the Communication Satisfaction Questionnaire (CSQ), Section B. These items ask respondents to rate how satisfied they are with the communication in their organizations. Additional items were added to the survey to reflect the more prominent role and influence of certain modalities in today's society, including e-mail, video conferencing, and brainstorming. Section D, Sources of Information (ICA) was incorporated into the rate section. Respondents were asked to rank their preferred mode of communication and provide demographic information.

The final section of the survey asked participants to share any additional information that might be helpful to understanding communication in the respondent's organization (see Appendix A). However, fewer than 5 percent responded and the open-ended portion was deleted from the final results.

The ICA Audit employs a 5-point Likert scale. For this study, the response section was expanded to a 7-point Likert scale to account for a greater amount of variability. The two ICA scales employed (A & D) measure an employee's need for feedback and preferred information channels by subtracting the amount of communication currently sent or received from the amount desired (DeWine, 1994). These scales were chosen as strong indicators that people choose communication modalities/channels, and amount and quality of feedback based on their needs and preferences as determined by their dominant brain quadrant. A meta-analysis of 180 journal articles conducted by DeWine and Pearson (1985) revealed that the ICA audit was one of the five most frequently used self-report

instruments during a five-year period. Coefficient alphas for the total instrument are .97 (DeWine & James, 1988). Individual alphas for feedback and channel modalities were not collapsed, and therefore, not tested.

The CSQ already employed a 7-point Likert scale and did not need to be augmented. The CSQ was designed to discover the relationship between communication and job satisfaction. Items chosen from the CSQ deal with communication satisfaction as measured by channels and climate. Communication climate is an important indicator, especially when measuring brain dominance preference. Organizations can have a distinct preference for how communication is disseminated, which is satisfying to those whose preferences are the same or similar, but can be dissatisfying, confusing, or seemingly duplicitous to those whose preferences are different from the dominant sources. CSQ factors have been found to be highly correlated with job satisfaction (Downs & Hazen, 1977). Job satisfaction reliability was tested and found to be .92. This was the only set of items that was collapsed into one scale.

Four dependent variables were chosen for the final study: (1) Modalities/channels; (2) Communication differences between male and female respondents; (3) Feedback; and (4) Communication Satisfaction. The independent variables are the four distinct quadrants of the brain: Left Cerebral, A = Blue Quadrant; Left Limbic, B = Green Quadrant; Right Limbic, C = Red; and Right Cerebral, D = Yellow. The four quadrants were categorized by ranking

preference. Any quadrant which received 67 points or higher was considered to be a dominant quadrant regardless of what scores were tallied in the other quadrants.

The Herrmann Brain Dominance Instrument (HBDI)

The Herrmann Brain Dominance Instrument (HBDI) is an online self-directed assessment containing 120 items that measure brain dominance and preferences for thinking and communicating. To eliminate bias, the HBDI uses a variety of blind questions, the motives of which are unclear. For example, according to Herrmann (1995, p. 68), "Few people would guess that a relationship exists between what time of day the person experiences the most mental productivity and which brain quadrant he or she prefers." Likewise, it is not well known that individuals who experience motion sickness usually have a strong dominance in one specific quadrant. These blind questions make the HBDI less susceptible to participant bias.

Bunderson, Olsen, and Herrmann (1980, 1981, and 1982) performed a series of studies of internal and external validity on the HBDI. The internal constructs measured the HBDI with extroversion/introversion, left brain/right brain, and cerebral/limbic modes. The internal validation studies showed that four kinds of mental processes clustered together as hypothesized by the "Whole Brain" model (Herrmann, 1995). The external construct validity studies assessed the validity of the four-construct theory of brain processing by "comparing the measures of the constructs internal to the HBDI to measures of constructs external to the HBDI" (Herrmann, 1995, p. 346). Since the constructs underlying the four-

quadrant theory are very general, they can be taken as a normative theory where actions and decisions can be observed in situations. The four quadrant profile of preferred modes of thinking allows for quantification of items as they relate to communication preferences.

Bunderson, et al. (1980, 1981, and 1982) converted the scoring into a numerical system and validated the four-quadrant model. The results were factor-analyzed against established psychological indicators, such as the Myers-Briggs Type Indicator, and were significantly correlated. In his summary, Bunderson stated that his validity studies showed good evidence that:

(1) Four stable, discrete clusters of preference exist.

(2) These four clusters are compatible with the Herrmann model.

(3) The scores are valid indicators of the four clusters.

(4) The scores permit valid inferences about a person's preferences and avoidances for each of these clusters of mental activity.

(5) Predictive validity studies would produce significant results (Herrmann, 1995, p. 337, 342).

While the main independent constructs are the four quadrants plus Introversion/ Extroversion, Herrmann derived nine scores from the HBDI (Herrmann, 1995). Empirical data on test-retest stability has not been undertaken systematically. Ho (1988) found 78 repeated measures of the same individuals (Table 3.4) in a large data set, and calculated the test-retest reliabilities of the nine main scores derived from the HBDI.

Table 3.4
Test-Retest Reliabilities for 78 Repeated Measures on 9 Scores

Score	Reliability
Left	.96
Right	.96
A Quadrant	.86
B Quadrant	.93
C Quadrant	.94
D Quadrant	.97
Cerebral	.93
Limbic	.91
Intro/Extroversion	.73

Results from more than 20 years of research have given Herrmann (1989, p. iii) the data to state that the quadrants of the brain produce "A metaphoric model of preferred modes of thinking, with a highly validated statistical and visual display of brain dominance."

Procedures

A pilot test was conducted to confirm the existence of the four major dimensions: modality preference, feedback preference, communication relationships and communication satisfaction. Thirty volunteers, who had previously taken the HBDI profile and are employed full-time, agreed to complete the survey. After data collection, a reliability test was run to confirm the addition of channel items (e-mail and brain storming) to the augmented survey. The data for e-mail and brain storming revealed evidentiary support for the items. However, it was determined that several items were too abstract and general to elicit empirical indicators. By clarifying operationalized variables, it was presumed that responses would improve and yield useful data. Thus, part of the

original survey was maintained, while part of the survey was changed. Questions 1 – 29 come directly from the ICA and are reliable and validated indicators of feedback and channel/modality satisfaction. Questions 30 – 50 are drawn from the CSQ and were designed to elicit responses related to communication satisfaction (Downs, 1994). Demographic indicators allowed the researcher to discern differences between male and female communication preferences based on brain dominance.

Surveys were distributed via internal company mail by human resources managers at the larger organization. The three smaller organizations passed out surveys in person at staff and board meetings. Each survey included a cover letter explaining the purpose of the study and expressing confidentiality for the responses. At the bottom of the cover letter, each participant was required to sign his or her name. Any returned surveys without the name at the bottom of the page were thrown out. The required signature fulfilled two obligations--it gave the researcher permission in writing to use the information from the survey and the HBDI, and made it possible to connect each survey with the correct HBDI profile. As part of the negotiations, each organization is to be provided a summary report of aggregate findings only. Each survey was placed in an unmarked manila envelope for distribution and collection. Upon completion, respondents returned the surveys to a centrally located box for pick-up by the researcher. Surveys were collected over a four-month period of time. Based on the number of employees at each organization, a greater than 75 percent rate of return was garnered, with one

organization providing 100 percent participation. Less than full participation was achieved due to attrition from retirements, voluntary and involuntary separations and personal reasons. Data were entered into SPSS for scoring.

Data Analysis

For Hypotheses 1, 2, 3, and 4, a repeated measures ANOVA was run for only those participants whose quadrant scores exceeded 67 points, thus indicating dominance in that particular quadrant. Pairwise comparisons were run to determine how the channel preferences differ. For Hypotheses 5-6, repeated measures were run to see if there were significant differences in preference of the 16 channels as determined by sex. Repeated measures and pairwise comparisons were also run for Hypotheses 7-10 to determine how feedback preferences differ.

For Hypothesis 11, single and double-dominant participants were grouped together, and triple and quadruple-dominated participants were grouped together. An independent sample *t*-test was run to determine if job satisfaction is higher for multi-dominants as opposed to single or double-dominant subjects.

In summary, hypotheses 1- 4 are intended to predict the communication channel preference based on brain dominance; hypotheses 5 and 6, are predicted to demonstrate the differences between how males and females differ in their preferences for receiving communication; hypotheses 7 through 10 are intended to predict feedback preferences based on quadrant dominance, and hypothesis 11 is predicted to demonstrate the differences in organizational communication satisfaction between single/double-dominant respondents and multi-dominant

respondents. The next chapter will discuss the results of the data collection and analyses.

Chapter 4
Results of Analysis

The purpose of this study was to ascertain if brain dominance, as measured by the Herrmann Brain Dominance Instrument (HBDI), correlates with the organizational variables of feedback, channel modality, and job satisfaction, and if sex is a determining factor in brain dominance. Using communication research methodology and scales provided by the International Communication Association (ICA) and the Communication Satisfaction Questionnaire (Downs & Hazen, 1977), this study examined if and how brain dominance influences communication within organizations. Subjects were gainfully-employed and had already taken the HBDI as part of their job duties.

Results of Hypothesis 1

Hypothesis 1 focused on communication channel needs of Blues as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as blue dominant. The purpose of this test was to compare the 16 channel needs to each other to see which channels were needed more.

The results of the ANOVA, $F(15, 113) = 14.3$, $p < .001$, indicates significant differences in channel needs for blues. To determine how channel needs differ, pairwise comparisons were run. Questions 14 through 29 were related to channel needs. These numbers were recoded to 1 – 16 to reflect the number of channels considered. The ANOVA contains the channel means in descending order with multiple comparison results.

Table 4.1 indicates that channels which share a letter are not significantly different. While the mean is tight for dominant blues with a low of 3.03 and a high of 4.49, there is significant difference between the top three choices—meeting with supervisor, face-to-face, and e-mail—and the bottom three choices—grapevine, bulletin boards and video conferencing. Results were mixed for Hypothesis 1, which predicted that persons whose dominant quadrant is blue need or prefer communication channels that emphasize technology or non-personal communiqués, such as e-mail, bulletin boards, corporate newsletters, and video conferencing.

Table 4.1
Channel Needs/Preferences in Descending Order:
DOMINANT BLUE

Channel	Mean	Groupings						
Mtgs. with supervisor	4.49	A						
Face-to-face	4.43	A						
E-Mail	4.41	A						
Team Updates	4.31	A	B					
Written memos, letters	4.30	A	B	C				
Staff meetings	4.13		B	C	D			
Brainstorming	4.11		B	C	D	E		
Inter-departmental meetings	4.05			C	D	E		
Mtg. w/ mid-level mgrs.	3.91				D	E	F	
Mtg. w/ senior mgmt.	3.87					E	F	
Procedural manuals	3.86					E	F	G
Communication updates	3.69						F	G
Corporate newsletter	3.59							G
The "grapevine"	3.09							H
Bulletin Boards	3.05							H
Video conferencing	3.03							H

Of the hypothesized modalities, only e-mail (4.41) showed up as a preferred channel. Contrary to what was predicted, meetings with supervisor (4.49) and face-to-face interaction (4.43), were ranked as the most preferred channels for communication.

Results of Hypothesis 2

Hypothesis 2 focused on communication channel needs of Greens as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as green dominant. The purpose of this test was to compare the 16 channel needs to each other to see which channels were needed more. The results of the ANOVA, $F(15, 134) = 17.81$, $p < .001$ indicates significant differences in channel needs for greens. To determine how channel needs differ, pairwise comparisons were run. Questions 14 through 29 were related to channel needs. These numbers were recoded to 1 – 16 to reflect the number of channels considered. Table 4.2 contains the channel means in descending order with multiple comparison results.

Table 4.2 indicates that channels which share a letter are not significantly different. The mean for greens range from a high of 4.52 (meeting with supervisor) to a low of 2.84 (video conferencing). There is significant difference between the top three choices—meeting with supervisor, face-to-face, and e-mail—and the bottom three choices—grapevine, bulletin boards, and video conferencing. Results were mixed for hypothesis 2, which predicted that persons whose dominant quadrant is green need or prefer traditional organizational

Table 4.2
Channel Needs/Preferences in Descending Order
DOMINANT GREEN

Channel	Mean	Groupings						
Mtgs. with supervisor	4.51	A						
Face-to-face	4.45	A	B					
E-Mail	4.41	A	B					
Team Updates	4.26		B	C				
Written memos, letters	4.17			C	D			
Inter-departmental meetings	4.13			C	D	E		
Brainstorming	4.12			C	D	E		
Staff meetings	4.06			C	D	E	F	
Mtg. w/ mid-level mgs.	3.95				D	E	F	G
Procedural manuals	3.91					E	F	G
Mtgs. w/ senior mgmt.	3.85						F	G
Communication updates	3.78							G
Corporate newsletter	3.74							G
The "grapevine"	3.07							H
Bulletin Boards	3.01							H
Video conferencing	2.83							H

communication channels, such as written memos, letters and notices, corporate newsletters, procedural manuals, team updates, communication updates, meetings with supervisor, and staff meetings. Of the 16 modalities, only meeting with supervisor (4.51) showed up as a hypothesized channel preference. Contrary to what was predicted, face-to-face interaction (4.45) and e-mail (4.41) were ranked higher than written memos, letters, and notices (4.17), corporate newsletters (3.74), procedural manuals (3.91), communication updates (3.78), team updates (4.26) and staff meetings (4.06).

Results of Hypothesis 3

Hypothesis 3 focused on communication channel needs of Reds as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as red dominant. The purpose of this test was to compare the 16 channel needs to each other to see which channels were needed more. The results of the ANOVA, $F(15, 94) = 14.38$, $p < .001$ indicates significant differences in channel needs for reds. To determine how channel needs differ, pairwise comparisons were run. Questions 14 through 29 were related to channel needs. These numbers were recoded to 1 – 16 to reflect the number of channels considered. Table 4.3 contains the channel means in descending order with multiple comparison results. Results were mixed for hypothesis 3, which predicted that persons whose dominant quadrant is red need or prefer interpersonal communication. Examples include: Face-to-face interaction with coworkers in their department or other departments; communication committee minutes; meetings with supervisor, mid-level managers, and senior managers; department staff meetings; brainstorming; and the "grapevine."

Table 4.3 indicates that channels which share a letter are not significantly different. There is significant difference between the top three choices (meeting with supervisor, face-to-face, and e-mail), and the bottom three choices—grapevine, bulletin boards, and video conferencing. However, except for e-mail and the "grapevine," the communication preferences of Reds manifested as

Table 4.3
Channel Needs/Preferences in Descending Order:
DOMINANT RED

Channel	Mean	Groupings							
Face-to-face	4.63	A							
Meetings with supervisor	4.58	A							
E-Mail	4.38	A	B						
Team Updates	4.30		B	C					
Brainstorming	4.22		B	C	D				
Inter-departmental mtgs.	4.16		B	C	D				
Staff meetings	4.11		B	C	D	E			
Mtg. w/ mid-level managers	4.05			C	D	E	F		
Written memos, letters	3.96				D	E	F	G	
Mtg. w/ senior management	3.90					E	F	G	
Communication updates	3.78					E	F	G	
Procedural manuals	3.72							G	H
Corporate newsletter	3.56								H
The "grapevine"	3.15								I
Bulletin Boards	2.67								I
Video conferencing	2.59								I

expected. There are several plausible reasons for the discrepancies, which will be discussed in Chapter 5.

Results of Hypothesis 4

Hypothesis 4 focused on communication channel needs of Yellows as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as yellow dominant. The purpose of this test was to compare the 16 channel needs to each other to see which channels were needed more. The results of the ANOVA, $F(15, 79) = 12.04$, $p < .001$ indicates significant differences in channel needs for yellows. To determine how channel needs differ, pairwise comparisons were run. Questions 14 through 29 were related to channel

needs. These numbers were recoded to 1 – 16 to reflect the number of channels considered. Table 4.4 contains the channel means in descending order with multiple comparison results.

Table 4.4 indicates that channels which share a letter are not significantly different. There is significant difference between the top three choices—meeting with supervisor, face-to-face, and team updates—and the bottom three choices—grapevine, video conferencing, and bulletin boards. The means of the top 7 responses are tight and include 5 of the 7 predicted preference channels (face-to-face [4.63], meeting with supervisor [4.58], e-mail [4.38], team updates [4.30], and brainstorming [4.22]). Thus, results are strong for Hypothesis 4, which predicted that persons whose dominant quadrant is yellow need or prefer communication channels that provide up-to-the minute information. Examples include: E-mail; face-to-face; brainstorming; video conferencing; meetings with supervisor, mid-level managers and senior managers; team updates, and the grapevine. Video conferencing and "the grapevine" appear to have been misplaced as channel preferences for yellows. There are several possible reasons for this, which will be discussed in Chapter 5.

All four quadrants rated face-to-face interaction and meeting with supervisor as the top two preferred channel modalities. Only Yellows rated team updates higher than e-mail, but there is no significant difference in the rankings. All four quadrants rated the "grapevine," bulletin boards, and video conferencing

Table 4.4
Channel Needs/Preferences in Descending Order:
DOMINANT YELLOW

Channel	Mean	Groupings							
Meeting with supervisor	4.79	A							
Face-to-face	4.72	A	B						
Team Updates	4.54	A	B	C					
E-Mail	4.47		B	C	D				
Brainstorming	4.37			C	D	E			
Mtg. w/ senior management	4.31			C	D	E			
Inter-departmental meetings	4.30			C	D	E			
Mtg. w/ mid-level managers	4.17				D	E	F		
Staff meetings	4.13					E	F		
Communication updates	3.93						F		
Written memos, letters	3.93						F	G	
Procedural manuals	3.57							G	H
Corporate newsletter	3.48								H
The "grapevine"	3.21								H
Video conferencing	3.03								H I
Bulletin Boards	2.63								I

as their least preferred channels of communication. The results suggest meetings with supervisors benefit everyone, which supports communication study results (Jablin, 1979).

Results of Hypotheses 5 & 6

Hypotheses 5 & 6 focused on the effect of sex on brain dominance preference. Based on a sample of 165,427 participants in an HBDI study, men are more likely to be left-brain dominant, particularly in the blue (cerebral, left brain) quadrant. Conversely, women are more likely to be right-brain dominant, particularly in the red (limbic, right brain) quadrant. The purpose of hypotheses 5 & 6 was to determine if sex significantly impacts channel modality preferences.

In other words, do women prefer or need certain communication channels more than men, and vice versa. To compare hypotheses 5 & 6, a repeated measures ANOVA was run comparing the 16 channels with the sex of each respondent. There was no significant channel-sex interaction, $F(15, 194) = 1.50$, $p = .108$. Therefore, both hypotheses are rejected.

Upon further study, there may be an ancillary reason for the lack of significance in hypotheses 5 & 6. Are the hypotheses wrong or is the sample population wrong for this particular line of inquiry? For example, the sample population of 210 was based on participants who are gainfully employed. According to Ned Herrmann (1996) there is a tendency in American business to pull everyone toward left-brain thinking and communicating. To investigate the sample, a one-way chi square was run ($\chi^2_1 = 2.44$, $p = 118$). Of the males, 75.8% registered as left-brain dominant, and 24.2% as right-brain dominant. In the general population, men are 67% left-brain and 33% right-brain. There were no significant differences between the general population and the sample population; therefore, the males in this study represent the general population. However, in this study, women are 47.1% left-brain and 52.9% right-brain. The general population, women are 67% right-brain and 33% left-brain. The chi square results indicate that the sample population significantly differs from the general population ($\chi^2_1 = 5.80$, $p = .016$) in that there are more left-brain women in this study than would be expected to be found in the general population.

Results of Hypothesis 7

Hypothesis 7 focused on the feedback needs of Blues as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as blue dominant. The purpose of this test was to compare the 13 feedback needs to each other to see what kind of feedback is needed more. The results of the ANOVA, $F(12, 116) = 2.13$, $p = .020$ indicates significant difference in feedback needs for Blues. Hypothesis 7 stated that persons whose dominant quadrant is blue have feedback needs or prefer feedback information that specifically relates to technological changes, how job related problems are handled, and problems faced by management

To determine how feedback needs differ, pairwise comparisons were run. Questions 1 through 13 were related to feedback needs. Table 4.5 contains the feedback needs means in descending order with multiple comparison results. The means for all feedback items range from a low of 4.37 to a high of 4.73—a difference of only .36. The small range may indicate that, depending on the organizational circumstances, Blues need and want feedback any way they can get it.

Table 4.5 indicates that the feedback needs which share a letter are not significantly different. Although Number 7—How I am being judged—is statistically different, the difference is too small for this to be of real practical significance. Table 4.6 compares the differences between the predicted feedback needs and the actual feedback needs indicated in the survey.

Table 4.5
Feedback Needs/Preferences in Descending Order:
DOMINANT BLUE

Feedback	Mean	Groupings		
How I am being judged	4.73	A		
How org. decisions affect my job	4.65	A	B	
How my job relates to the total org	4.66	A	B	
How well I'm doing on my job	4.58		B	C
How job related problems are handled	4.53		B	C
How tech. changes affect my job	4.51		B	C
My job duties	4.51		B	C
Organizational policies	4.48		B	C
Problems faced by management	4.44			C
Mistakes & failures of my org.	4.43			C
Important new products/services	4.40			C
Pay & Benefits	4.38			C
Promotion & advancement opportunities	4.37			C

Table 4.6
Predicted Feedback Needs/Preferences by Quadrant Dominance:
BLUES

Predicted Blue Feedback Needs	Actual Blue Feedback Needs
How technology changes affect my job (4.51)	How I am being judged (4.73)
How job related problems are handled (4.53)	How organizational decisions are made that affect my job (4.65)
Problems faced by management (4.44)	How my job relates to the total organization (4.66)
	How well I am doing on my job (4.58)

Results of Hypothesis 8

Hypothesis 8 focused on the feedback needs of Greens as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as green dominant. The purpose of this test was to compare the 13 feedback needs to each other to see what kind of feedback is needed more. The results of the ANOVA, $F(12, 137) = 3.44$, $p < .001$ indicates significant difference needs in feedback for Greens. Hypothesis 8 stated that persons whose green score is dominant need or prefer feedback about job duties; organizational policies; mistakes and failures of the organization; how they are being judged; how technology affects their jobs; how job related problems are handled; and how organizational decision, which affect their jobs, are made. Pairwise comparisons were run to determine how feedback needs differ. Questions 1 through 13 were related to feedback needs. Table 4.7 contains the feedback needs means in descending order with multiple comparison results. Table 4.8 compares the differences between the predicted feedback needs and the actual feedback needs indicated in the survey. Feedback needs which share a letter are not significantly different. Results are strong for Hypothesis 8 as 4 of the 7 items predicted registered at the top of the list. The means for all feedback items range from a low of 4.25 to a high of 4.73—a difference of only .48. The small range may indicate that, depending on the organizational circumstances, Greens need and want feedback any way they can get it.

Table 4.7
Feedback Needs/Preferences in Descending Order:
DOMINANT GREEN

Feedback	Mean	Groupings				
How org. decisions affect my job	4.73	A				
How I am being judged	4.54	A				
How my job relates to the total org	4.72	A	B			
How well I'm doing on my job	4.50	A	B	C		
My job duties	4.44	A	B	C		
Organizational policies	4.48	A	B	C	D	
How job related problems are handled	4.33		B	C	D	E
How tech. changes affect my job	4.34			C	D	E
Promotion & advancement opportunities	4.58			C	D	E
Pay & Benefits	4.29			C	D	E
Mistakes & failures of my org.	4.29			C	D	E
Important new products/services	4.25				D	E
Problems faced by management	4.25					E

Table 4.8
Predicted Feedback Needs/Preferences by Quadrant Dominance:
GREENS

Predicted Green Feedback Needs	Actual Green Feedback Needs
How organizational decisions made affect my job (4.73)	How organizational decisions made affect my job (4.73)
How I am being judged (4.54)	How I am being judged (4.54)
Mistakes and failures of my organization (4.29)	How my job relates to the total organization (4.72)
Organizational policies (4.48)	Organizational policies (4.48)
My job duties (4.44)	My job duties (4.44)
How job related problems are handled (4.33)	How job related problems are handled (4.33)

Results of Hypothesis 9

Hypothesis 9 focused on the feedback needs of Reds as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as red dominant. The purpose of this test was to compare the 13 feedback needs to each other to see what kind of feedback is needed more. The results of the ANOVA, $F(12, 97) = 4.23$, $p < .001$ indicates significant difference needs in feedback for Reds. Hypothesis 9 stated that persons whose red score is dominant need or prefer feedback about human resources issues, such as, how well they are doing their job; how they are being judged; opportunities for promotions; and pay and benefits. Pairwise comparisons were run to determine how feedback needs differ. Questions 1 through 13 were related to feedback needs. Table 4.9 contains the feedback needs means in descending order with multiple comparison results. The table indicates that feedback needs which share a letter are not significantly different. Table 4.10 compares the differences between the predicted feedback needs and the actual feedback needs indicated in the survey. Three of the 4 hypotheses are in grouping A and therefore, are not significantly different. Only pay and benefits registered in Group B. Results are strong for Hypothesis 9 as 3 of the 47 items predicted registered at the top of the list. The means for all feedback items range from a low of 4.23 to a high of 4.73—a difference of only .50. The small range indicates thatthe need to orient oneself within the system requires following as many organizational cues as possible.

Table 4.9
Feedback Needs/Preferences in Descending Order:
DOMINANT RED

Feedback	Mean	Groupings			
How org. decisions affect my job	4.73	A			
How my job relates to the total org	4.72	A			
Promotion & advancement opportunities	4.57	A	B		
How I am being judged	4.54	A	B		
How well I'm doing on my job	4.49	A	B	C	
Organizational policies	4.49		B	C	
My job duties	4.44		B	C	D
Pay & Benefits	4.43		B	C	D
Important new products/services	4.37		B	C	D
Problems faced by management	4.37		B	C	D
How job related problems are handled	4.33			C	D
Mistakes & failures of my org.	4.30			C	D
How tech. changes affect my job	4.23				D

Table 4.10
Predicted Feedback Needs/Preferences by Quadrant Dominance:
REDS

Predicted Red Feedback Needs	Actual Red Feedback Needs
How well I am doing my job (4.49)	How organizational decisions are made that affect my job (4.73)
How I am being judged (4.54)	How my job relates to the total organization (4.72)
Opportunities for promotion (4.57)	Opportunities for promotion (4.57)
Pay and benefits (4.43)	How I am being judged (4.54)

Results of Hypothesis 10

Hypothesis 10 focused on the feedback needs of Yellows as determined by brain dominance. A repeated measures ANOVA was run for only those categorized as yellow dominant. The purpose of this test was to compare the 13 feedback needs to each other to see what kind of feedback is needed more. The results of the ANOVA, $F(12, 82) = 2.23$, $p = .017$ indicates differences in feedback needs for Yellows.

Hypothesis 10 stated that persons whose yellow score is dominant need or prefer feedback about trends and future-oriented issues, such as, feedback about new products, service and program developments in the organization; how their job relates to the total operation of the organization; specific problems faced by management; how organizational decisions are made that affect their jobs; and how well they are doing in their job. Pairwise comparisons were run to determine how feedback needs differ. Questions 1 through 13 were related to feedback needs. Table 4.11 contains the feedback needs means in descending order with multiple comparison results. Table 4.12 compares the differences between the predicted feedback needs and the actual feedback needs indicated in the survey.

Table 4.11 indicates that feedback needs which share a letter are not significantly different. Of the original hypotheses for Dominant Yellow, three items are in grouping A—How my job relates to the total operation (4.89); how organizational decisions are made that affect my job (4.74), and how well I am doing on my job (4.73).

Table 4.11
Feedback Needs/Preferences in Descending Order:
DOMINANT YELLOW

Feedback	Mean	Groupings				
How my job relates to the total org	4.89	A				
How I am being judged	4.78	A	B			
How org. decisions affect my job	4.74	A	B	C		
How well I'm doing on my job	4.73	A	B	C		
How job related problems are handled	4.67	A	B	C	D	
Problems faced by management	4.61		B	C	D	E
Organizational policies	4.57		B	C	D	E
My job duties	4.53		B	C	D	E
Important new products/services	4.50		B	C	D	E
Promotion & advancement opportunities	4.48		B	C	D	E
Mistakes & failures of my org.	4.52			C	D	E
Pay & Benefits	4.41				D	E
How tech. changes affect my job	4.33					E

Table 4.12
Predicted Feedback Needs/Preferences by Quadrant Dominance:
YELLOWS

Predicted Yellow Feedback Needs	Actual Yellow Feedback Needs
New products and services (4.50)	How my job relates to the total organization (4.89)
How my job relates to the total organization (4.72)	How I am being judged (4.78)
How organizational decisions made affect my job (4.74)	How organizational decisions made affect my job (4.74)
How well I am doing on my job (4.73)	How well I am doing on my job (4.73)
Problems faced by management (4.61)	How job related problems are handled (4.67)

These hypotheses are not significantly different. However, the other two hypotheses—new products, services or program developments (4.50) and specific problems faced by management—are also in the top range Therefore, results are strong for Hypothesis 10 as all five of the items predicted registered at the top of the list. The means for all feedback items range from a low of 4.33 to a high of 4.89—a difference of only .56. As with the results of hypotheses 7 through 9, the means for Dominant Yellows also cluster around a tight mean. The suggestion here is that organizational cues stand independently; therefore, it is incumbent upon the actor to reorient himself within the system through any and all cues available.

Results of hypotheses 7 – 10 demonstrate the need for feedback in all its forms. All four quadrants registered above 4 for every item in the feedback list. The ranges were smaller for feedback needs and preferences than the ranges for channel needs and preferences. Statistically, it is unnecessary to rank order the feedback needs and preferences for the quadrants as the differences may be statistically significant, but not practically significant.

Results of Hypothesis 11

Hypothesis 11 stated that persons who are multi-dominant (3 or more dominant quadrants) are more satisfied with communication than persons who are single or double dominant. Single and Double dominant profiles were combined in one group and Triple and Quadruple dominant profiles were combined into

another group. An independent sample *t*-test was run to determine if job satisfaction is higher for Triple and Quadruple dominant profiles than for Single and Double dominant profiles.

The means for the single/double dominant profiles is 4.47. The means for the triple/quadruple dominant profiles is 4.44. Results of the *t*-test indicate there is no significant difference in the perception of job satisfaction between single/double dominant profiles and triple/quadruple dominant profiles (t_{208} = .263, p =.793).

Summary

In summary, the purpose of this chapter was to present the quantitative results of the questionnaire, and to offer analyses of those results. Overall, the 11 hypotheses produced mixed, but positive results for the line of inquiry. The lack of conclusive evidence is not the fault of the communication suppositions and HBDI, but rather, the nature and structure of the analytical pursuit. In Chapter 5, results are discussed, limitations of the study are enumerated, and lessons learned for future studies are shared.

Chapter 5
Discussion and Conclusions

Brain dominance and the power it wields over behavior, learning, thinking, and communicating is a provocative line of research that provides a missing link for communication theorists. In the 1960s, psychologists, educators, and brain researchers began to make the connection between hemisphericity of the brain and behavior. Researchers, such as Bever (1975), Bogen (1969), Levy (1974), Ornstein (1972, 1978), and Segalowitz (1983) found that left-brain dominant persons tend to process logically, while right-brain persons more often than not, process holistically. Research also showed a marked difference in learning aptitude between left-brain and right-brain dominant individuals. Left-brain learners prefer lectures and linear styles of learning while right-brain learners do best with experiential scenarios and visual/spatial concepts (Bogan, 1969; Gassaniga, 1977; Hunter, 1976; Sperry, 1974). Dabbs (1980) found that when left-brain dominant thinkers were given an analytical question to solve, blood flow increased to that side of the brain, but did not for right-brain thinkers. Piatt (1979) discovered that nearly 80 percent of high school students who were assigned to "alternative" schools (because of behavior problems in their regular schools) were right-brain dominant (Bernhoft, 1985). Bunderson, Olsen, & Herrmann (1982) validated four separate quadrants that influence brain dominance. The work of Gray (1994), Goleman (1978), Nebes (1977), and

Tannen (2001) also suggests that the sexes process information and communicate differently.

As has been noted by Herrmann (1996) there is a natural hydraulic in organizations, which pushes people toward left-brain dominance activities. Individuals are rewarded for "bottom-line" results, which are based on facts, analysis, accounting, accountability, performance measurements, and forecasting—all left-brain activities. The natural hydraulic of which Herrmann writes is also a cornerstone of Anthony Giddens' Structuration Theory (1979, 1984).

Structuration Theory posits thatgroups quickly develop observable patterns and habits. Once established, these patterns become rules, which then limit and constrain the interaction of the group. The more resources a person has, in terms of materials and influence, the more opportunity that person has to control the rules within an organization. Since left-brain thinking dominates organizations, it stands to reason that communication is structured and constrained by left-brain rules. Upon joining a typical company, a strongly dominant right-brain thinker may have a hard time adjusting to the rules and regulations of a predominantly left-brain organization. Since studies suggest that right-brain processing is more creative (Torrance, 1980, 1982), a right-brain dominant individual must learn to speak and think more like a left-brain person to be successful. In other words, the right brain dominant individual is effectively constrained by the dominant coalition's structuration. For right-brained

individuals, success in a left-brain organization is jeopardized unless they accept the hydraulic influence and adopt more left-brain attributes. Therefore, it is not surprising that this study revealed a statistically significant number of women were left-brain dominant (47%), more than would be seen in the general population (the average is 33%). Similarly, a greater number of men (although not significantly different) in this study were also strongly marked as left-brain dominant (75%), rather than the 66% for the general population, as noted by Herrmann (1982, 1994).

New Questions

Would the results have turned out differently if the sample had been more balanced between right-and left-brain thinkers? Does structuration force people to act more left-brain in organizations or do organizations simply attract more left-brain dominant individuals? Are organizations losing the "creative juice" they need for innovation because the structure of organizations stifles creativity? Do institutional constraints and bureaucratic cultures value predictability and conformity over innovation and flexibility? These are only some of the questions still to ponder for future research.

Recapitulation

The purpose of this study was to determine if brain dominance can be used to predict individual preferences and needs in communication channels, feedback, and job satisfaction. More specifically, it argued organizational communication preferences and needs are predicated, in part, on the "hardwired" predisposition of

a person's brain dominance. The study classified organizational interaction via thinking types (i.e. categories of distinct brain functions) as noted by Herrmann, (1982, 1994). To determine the relationship between brain dominance and organizational communication preferences and needs, survey methodology was employed. A questionnaire was administered in four organizations. Two hundred ten respondents who had already completed the Herrmann Brain Dominance Instrument (HBDI) as part of their job duties returned the completed questionnaires. The data collected were matched to the raw scores of the HBDI and evaluated using pairwise comparisons and independent *t*-tests. This chapter discusses the findings of these analyses, the contributions and limitations of the study, and questions for future research. The conclusion and discussion are grouped in six subsections:

1. Variables and Hypotheses
2. Implications
3. Comparisons to other studies
4. Unexpected Findings
5. Limitations
6. Future Direction for Research
7. Conclusion

1. Variables and Hypotheses

Channel Needs and Preferences

Based on the suppositions of the Herrmann Brain Dominance Instrument, hypotheses 1-4 proposed that a person's dominant quadrant would lead a person

to prefer or need communication channels that reinforce their natural preferences for thinking and communicating. For example, it was hypothesized that Blues, who favor analytical, logical, rational, and factual thinking, would prefer communication that emphasizes one-way transmission of information, high technology, or non-personal communiqués. Examples included e-mail, bulletin boards, corporate newsletters, and video conferencing. Only one of the predicted variables—e-mail—made the top five choices of communication channels for dominant Blues.

It was hypothesized that Greens, who favor sequential, traditional, status quo thinking, would prefer communication that emphasizes traditional modes of corporate communication, such as written memos and letters, staff meetings, procedural manuals, bulletin boards, meeting with supervisor, and corporate newsletter. Of the 16 channels, meeting with supervisor, and written memos and letters made the top five choices of communication channels for dominant Greens.

It was hypothesized that Reds, who are highly intuitive and tend to "read" people, would prefer communication that emphasizes interpersonal communication, such as face-to-face interaction with coworkers in their department or other departments, communication committee minutes, meetings with supervisor, mid-level managers, and senior managers; staff meetings; brainstorming; and the "grapevine." Three of the predicted variables—face-to-face, meetings with supervisor and team updates—made the top five, but a non

personal communication channel—e-mail—ranked third in preference and need for Dominant Reds, while the "grapevine" ranked in the bottom three.

It was hypothesized that Yellows, who are intuitive about coming trends, and tend to be "big picture" conceptualizers and collaborators, would prefer communication that emphasizes the latest way to get up-to-the minute information. Channels of preference were hypothesized to be e-mail; brainstorming; video conferencing; meetings with supervisors, mid-level managers and senior managers; team updates; and the "grapevine." Four of the five items made the top list of preferences for Yellows.

The right brain quadrants (Red and Yellow) came closer to predicting the preferred channels of communication than the left brain quadrants (Blue and Green). However, the startling result is that all four quadrants picked four of the five same top communication channels (See Table 5.1), and the exact three bottom (lowest) communication channels (See Table 5.2). Only one channel differed between left-brain and right brain. The Blues and Greens chose written memos as their fifth top choice; the Reds and Yellows chose brainstorming as their fifth top choice.

The possible reasons for this result are discussed in Section 4, Unexpected Findings. Psychological research holds that the differences inherent in individuals can only emerge as predictors of behavior in situations where "task demands are weak or ambiguous and the *situational press* is relatively mild" (Trevino, et al., 1990, p. 181).

Table 5.1
Top Five Channel Needs/Preferences by Quadrant Dominance

Blue	Green	Red	Yellow
Mtg. with Supervisor (4.49)	Mtg. with Supervisor (4.51)	F-2-F (4.63)	Mtg. with Supervisor (4.79)
F-2-F (4.43)	F-2-F (4.45)	Mtg. with Supervisor (4.58)	F-2-F (4.72)
E-mail (4.41)	E-mail (4.41)	E-mail (4.38)	Team updates (4.54)
Team Updates (4.31)	Team Updates (4.26)	Team updates (4.30)	E-mail (4.47)
Written memos (4.30)	Written memos (4.17)	Brainstorming (4.22)	Brainstorming (4.37)

Table 5.2
Bottom Three Channel Needs/Preferences by Quadrant Dominance

Blue	Green	Red	Yellow
Grapevine (3.09)	Grapevine (3.07)	Grapevine (3.15)	Grapevine (3.21)
Bulletin Board (3.05)	Bulletin Board (3.01)	Bulletin Board (2.67)	Video (3.03) Conferencing
Video (3.03) conferencing	Video (2.83) conferencing	Video (2.59) conferencing	Bulletin Board (2.67)

Only when the individual, acting as an empowered actor, is free to make choices based on natural preferences and perceptions can the predictive dimension of brain dominance be readily measured. Conversely, when situated, external factors reduce individual choice, dominance preferences become secondary to expected and programmed organizational behaviors (Mischel, 1973; Mischel, Ebbesen, & Zeis, 1973; Monson, Hesley & Chernick, 1982). Therefore, structure, rules, and context trump brain dominance preferences by placing powerful limitations on the ability of the individual to exercise personal preferences (Trevino, et al., 1990). This is amply demonstrated by the results in Table 5.2, in which all four quadrants ranked the same three variables dead last. Dominant Blues and Yellows are attracted to new technology. Blues want the facts; Yellows want the latest technology. Video conferencing, with its evolving technology, is a cost-effective way to hold important meetings. So why did the dominant Blues and Yellows rate video conferencing so low? Again, structuration holds the key to understanding this result. The organizations that participated in this study are local and regional firms who do not have much need for scheduling long-distance meetings. The leadership of these locally-based organizations does not perceive video conferencing to be an important addition to the communication mix. Therefore, video conferencing is not a structured and codified part of the organization.

Bulletin boards also ranked low on the channel preference scale. One possible reason is that in the organizations where the surveys were conducted, no

bulletin boards were visible to visitors. Bulletin boards may be considered passé or junky in today's organizations. Structuration theory holds that active and knowledgeable actors in an organization are continuously monitoring the social structure and rules of the organization. These actors apply knowledge in the production and reproduction of everyday encounters (Giddens, 1984). If there are no bulletin boards anywhere, then it is possible that the dominant coalition in the organization has effectively structured the preferences of actors into believing that bulletin boards are not needed.

All four quadrants ranked the "grapevine" third from the bottom on channel preferences. This is surprising, and then again, not. It is surprising because many hours of field work were conducted in these organizations before a survey instrument was constructed. A large percentage of actors in these organizations noted the powerful presence of the "grapevine" in their communications. Then again, it is not surprising because organizations frown on the "grapevine." In the organizations surveyed, the "grapevine" was considered a negative form of communication, one that needed to be eradicated from the inner workings of the organization. Under these circumstances, it is plausible that respondents who are structured by the conditions and consequences of what they do in their day-to-day lives would rank the "grapevine" low—even though for many it is a powerful source of information.

Preferences by Sex

Hypotheses 5 and 6 focused on the effect of sex on brain dominance preference. Specifically, does sex impact communication channel preferences? Hypothesis 5 predicted that the females in this study would prefer right-brain communication channels that emphasize interpersonal interaction. Hypothesis 6 predicted that the males in this study would prefer left-brain communication channels that emphasize impersonal delivery systems and transactional communication. Both hypotheses were rejected. Upon further study, there may be ancillary reasons for lack of significance in hypotheses 5 & 6. Socialization research suggests that when an individual enters an organization as a new employee, he or she is quickly indoctrinated or socialized into a hegemonic system that is weighted heavily in favor of the dominant coalition. Thus the process of socialization allows for the existence of the individual, but privileges the organization (Cheney, 1987; Clair, 1996). In essence, males and females are not given choices regarding communication channels. Often, they are initiated in an orientation session designed to deconstruct personal preferences and reinforce the primary communication modalities of the organization.

It is also important to consider whether the hypotheses are inappropriate or if the sample population is wrong for this particular line of inquiry. For example, the sample population of 210 was based predominantly on participants who are gainfully employed in white collar office work. According to Ned Herrmann (1996) there is tendency in American business to pull everyone toward

left-brain thinking and communicating, especially in older organizations where left-brain skills of administration, forecasting, and embedded management control dominate.

Herrmann International has processed more than one million HBDIs and results conclusively indicate that men are more likely to be left-brain dominant (67%), particularly in the blue quadrant, and women are more likely to be right-brain dominant (67%), particularly in the red quadrant. The results of a one-way chi square showed that 75.8% of the males (108) registered as left-brain dominant, which is more, but not significantly different from the general population. However, the women (102) in this study are 47.1% left-brain dominant and 52.9% right-brain dominant, which is significantly different than the general population ($p = .016$). There are more left-brain dominant women in this study than would be expected to be found in the general population, which supports Herrmann's observations of the nature of work. Therefore, the hypothesis is appropriate, but the sample is not. Herrmann's observations match the tenets of structuration, which hold that the structured nature of organizations are both the medium and the outcome of the situated practices that make up its social system (Sarason, 1995).

Additionally, technology is viewed to be a powerful resource that is often appropriated for the purpose of structuring interaction (Bastien, McPhee, & Bolton, 1995; Poole & DeSanctis, 1990). Therefore, it stands to reason that

technology-based communication ranks evenly across all four quadrants and between sexes.

Feedback

The result of the feedback hypotheses are all over the place, and are best explained by structuration theory. Feedback is an integral component of communication in organizations. Unlike communication channels, which are structured as downward rules and resources, feedback is an upward process of reflexive monitoring. Reflexivity is Gidden's notion that actors routinely observe themselves and others in the process of everyday interaction, and actively apply their knowledge and awareness of social rules in the production and reproduction of everyday encounters (Giddens, 1984). In this way, feedback is recursive with each interaction, which explains why all four quadrants registered above 4 in predicted feedback needs. In other words, feedback cannot be separated from interaction. It is atomistic to the proposition of structuration theory.

Based on the suppositions of the Herrmann Brain Dominance Instrument, hypotheses 7- 10 proposed that a person's dominant quadrant would lead a person to prefer or need certain kinds of feedback, which would satisfy his or her natural preferences for thinking and communicating. For example, hypothesis 7 assumed that Blues, who favor analytical, logical, rational, and factual thinking, would prefer organizational feedback that is related to technological changes; how job related problems are being handled, and specific problems faced by management.

Hypothesis 8 predicted Greens would favor traditional, safekeeping,

administrative-based information related to specific job duties and organizational policies. Dominant Greens were predicted to prefer/need feedback regarding the failures of the organization; how they are being judged, and how organizational decision, which affect their jobs, are made.

Hypothesis 9 predicted Reds would favor interpersonal feedback related to pay and benefits, performance, and promotion opportunities. Hypothesis 10 predicted Yellows would favor feedback related to the overall performance of the organization, future direction, problems faced by management, and information about new products and services.

In a similar fashion to the communication channel hypotheses, the feedback results showed consistency across the four quadrants. Listed in Table 5.3 are the five top feedback needs/preferences for each of the quadrants. How I am being judged, how organizational decisions made affect my job, and how well I am doing on the job—are in the top five feedback needs of all four quadrants. The consistency of responses across brain dominance supports the tenets of structuration theory. However, unlike communication channels, which can be seen as top-down driven, feedback needs emanate from the individual upward and outward in daily interactions. The results—while not the ones expected for this study—are consistent with communication theory related to feedback (Jablin, 1979; Van Maanen, 1976, 1991). According to Giddens (1984) organizational members actively seek to interpret and refine their interactions through situational cues in the environment. To do this, individuals are constantly assimilating

Table 5.3
Top Five Feedback Needs/Preferences by Quadrant Dominance

Blue	Green	Red	Yellow
How I am being judged (4.73)	How org. decisions made affect my job (4.73)	How org. decisions made affect my job (4.73)	How my job relates to the total org. (4.89)
How org. decisions made affect my job (4.65)	How I am being judged (4.54)	How my job relates to the total org. (4.72)	How I am being judged (4.78)
How my job relates to the total org. (4.66)	How my job relates to the total org. (4.72)	Promotion & advancement opportunities (4.57)	How org. decisions made affect my job (4.74)
How well I am doing on the job (4.58)	How well I am doing on the job (4.50)	How I am being judged (4.54)	How well I am doing on the job (4.73)
How job related problems are handled (4.53)	My job duties (4.44)	How well I am doing on the job (4.49)	How job related problems are handled (4.67)

feedback from multiple and varied sources. This is one explanation of why the top five needs and preferences for feedback are so similar across the four quadrants. In essence, the need for accurate and timely feedback is paramount to assimilation and survival in an organization and therefore, supercedes the preferences of dominant quadrants (Ashford, 1986).

Satisfaction

Hypothesis 11 stated that persons who are multi-dominant (3 or more dominant quadrants) are more satisfied with communication than persons who are single or double dominant. The independent *t*-test indicated no significant difference in the perception of communication satisfaction between single/double dominant profiles and triple/quadruple dominant profiles. To perform the independent *t*-test, 20 items were collapsed into one analysis. The data was collapsed because the means for the two variables was greater than 4, which indicated high levels of satisfaction throughout the items. The means for the single/dominant profiles was 4.47 and the means for the triple/quadruple dominant profiles was 4.44. Unfortunately, these results only reflect the means and not the individual responses, and the hypothesis must be rejected outright.

2. Implications for Organizations

For the most part, the 11 hypotheses proposed in this study are rejected because they did not conclusively meet the specifications as stated in the hypotheses. However, one of the unintended consequences of this study is that a range clearly emerged—a middle road of channels and feedback styles—that

appear to accommodate a significant majority of organizational members. For example, this study produced results indicating that all four quadrants ranked face-to-face communication, regular meetings with supervisors, e-mails, and team updates, as their most preferred channels of communication. This same study also produced results indicating that all four quadrants' lowest preferences for channels of communication are video conferencing, the "grapevine", and bulletin boards.

These unexpected results, which indicate consensus among 210 respondents from four different organizations, suggest that organizations may have similar structurizing circumstances. This is not unusual when one considers the educational indoctrination, cultural backgrounds and behavioral expectations of most organizations. This is true especially for this study, which was conducted in four organizations located in the same city in the mid- Southeast region of the United States. Could it be that structuration has a uniform effect on organizational agents, much like Herbert Simon's (1945, 1987) concept of *bounded rationality*? The premise of bounded rationality is that agents behave in a way that is bounded or limited by their own experiences. In other words, agents are limited in their rational decision making by their cognitive abilities, desires, habituated behaviors, experiences, and organizational rules. The implication is thatthe structurizing nature of organizations inhibit agents with mental "property boundaries" beyond which those agents generally do not go if they want to continue to be a part of the organization. For organizational leaders whose mission is to push past the

boundaries of conventional thinking in order to be more innovative, bounded thinking is the antithesis of what is needed to succeed.

Understanding how brain dominance affects and constrains communication may provide the first step in changing the structurized paradigm in organizations. Marcia Stern (2002), a clinical psychologist and author, has discovered through her work that words are not enough to change behavior. She says that the challenge of therapy is to get clients from intention to action. "Helping people understand their own brains and the unique way they process information can help bridge that gap and make change stick" (Wylie & Simon, 2003). The same concept can work for organizational communication. By understanding communication preferences, managers become aware of how their own personal style constrain and inhibit the creativity of other members in the organization. At a macro level, cognitive awareness of tribalized communication preferences and the power resources behind them, can initiate a deconstruction process to a more balanced, whole-brain style of communication, which is crucial to organizational health in all functional areas (Blodgett, 1989). The ideas of brain dominance and communication preferences have important practical implications.

The impact of brain dominance on organizational communication has yet to be fully explored. The role of brain dominance could aid human resource specialists in placing workers in the most appropriate positions and working conditions for that particular member. Understanding the influence of brain

dominance may help managers assemble teams that are balanced and capable of creative problem solving and influence how organizational communicators structure their communication to more effectively reach their constituents, internally and externally. Understanding the influence of brain dominance could inform the boundary spanning role of managers when they seek information for decision making (Lee & Heath, 1999), improve the feedback process in organizations, identify cultural influences based on the leadership's brain dominance characteristics, reduce the inherent distrust between management and labor, help improve safety awareness and performance, foster breakthrough creativity and innovation, and promote an increase in business efficiency (Bernhoft, 1985). Ultimately, understanding the influence of brain dominance on organizational communication will provide better understanding of media choices, which would then contribute to the design of future communication and information systems and how those choices would inform communication effectiveness (Webster & Trevino, 1995).

3. Comparisons to Other Studies

A careful review of the literature indicates that there are no other studies that directly address brain dominance and organizational communication supported by Structuration Theory. There are a variety of studies that focus on brain dominance, but none that concentrate on how organizational rules and resources constrain communication and interaction, thereby diminishing the choices of communication modalities and feedback. There are a few studies,

however, that used similar methodologies. The results of these studies are both illuminating to and compatible with this study.

M.T. Cicchetti (1991) studied the thinking styles and training preferences of educational and corporate leaders and discovered that the only quadrant in which both education and corporate male/female groups had significant differences was in the C (Right-brain, Limbic) quadrant. The corporate and education male leaders were expectedly and decidedly left-brain, while the corporate and education female leaders were significantly different to each other and to the male leaders. Cicchetti found the corporate female leaders to be more strongly marked as left-brain dominant (but not as much as male leaders), while the education female leaders were significantly more right-brain dominant. Cicchetti's findings match the results of this study in that they show the female population in organizations to be more left-brain dominant than the general population of females as stated by Herrmann (1994, 1995). Cicchetti (1991, p. 144-145) concludes, "Since the total corporate group had preferences for the left hemisphere, the females within this group would have more of a tendency for the left hemisphere than education females, who are generally encouraged and reinforced in their teaching careers with qualities associated with the C quadrant." His interpretation is that the corporate world attracts females who are more inclined toward left-brain dominance or have learned to "conform to and function within a left-brain corporate leadership style" (p. 145).

Blodgett (1989) examined the thinking styles of entrepreneurs and their management teams. She assessed John Kao's (1989) proposition that an organization started by an entrepreneur (Right-brain, Cerebral) will develop a culture that balances intuition and emotion (right-brain processing) with rationality and systematic thinking (left-brain processing.) Blodgett looked at the correlations among management thinking styles, team effectiveness, and the organizational growth of 52 company presidents, 39 company founders, and 84 executive team members. Her findings suggest that organizational growth is related to the "whole brain" balance in thinking style preferences of entrepreneurial presidents and their executive team members, and to the age of the organization.

In her study, Blodgett (1989, p. 87) observed that left-brain modes increasingly dominate organizations as they age. "Mature organizations need A & B dominant people to conduct activities such as solving problems, reporting facts, measuring performance, monitoring structural systems and uniform procedures." This is type-casting for left-brain thinking. Blodgett's findings help explain the preponderance of left-brain preferences in this study, as none of the four organizations sampled were entrepreneurial in nature, and three of the four organizations have been in business for a considerable amount of time. One of the organizations surveyed in this study is 100 years old. Blodgett's conclusions mirror the conclusions of this study, "It is possible for individuals to understand their own thinking preferences and how they differ from others'. An appreciation

and understanding of divergent thinking styles could lead to the awareness and development of communication skills" (p. 89).

Other studies are only tangentially similar to this study. For example, Mintzberg's (1976) qualitative study only provides anecdotal support for the idea that CEOs engaged in high-level decision making depend on a right-brain process—gut instinct. Another study compared the Graduate Record Examination (GRE) test scores of adult learners and brain dominance. A significant negative relationship was found between right hemispheric brain dominance and GRE quantitative scores (Blaine, 1989). The study concludes that left-brain dominant individuals tend to do better on standardized tests than right-brain dominant individuals, but it stopped short of indicting the educational system's hegemonic preference for left-brain skills over right-brain thinking. Ultimately, Blaine recommends that admissions offices, professors, and various department chairpersons consider more than GRE scores and grade point averages when determining whether to accept adult graduate learners.

Several research studies have looked at the physiological placement of speech and communication in the brain. Charles Hampden Turner's (1981) research on brain dominance shows that electrical charges are activated on a particular side of the brain when a participant is asked to perform a task. Turner's empirical evidence confirms that when an individual is asked to perform a spatial-visual problem, the right side of the brain starts to fire. When asked to complete a verbal or mathematical problem, the left hemisphere comes alive with neural

activity. Sir John Eccles' (1989) research analyzes symmetry in the human brain and has confirmed the location of speech recognition and production to be in the left hemisphere. He also noted that consciousness, language and linguistic thought are activated through the left hemisphere, surmising that the right hemisphere has little functional relationship to speech processes. Yet, it is the right-brain that expresses human emotion through singing, crying, swearing and praying (Zdenek, 1988). It is also the right side of the brain thatmanages gestalt functionality—the ability to create and synthesize various elements into a system and to recognize patterns in the formation of images (Loye, 1988).

In a study, which compared brain dominance characteristics of technical male workers to work task elements, Schlling (1999) predicted that the alignment of brain dominance preference and task would show increased productivity and satisfaction. The tasks were divided into left-brain and right-brain-oriented tasks. The findings for brain dominance and preference for certain work tasks confirmed a positive correlation between left-brain dominance and left-brain work tasks and a negative correlation between left-brain dominance and right-brain work tasks. The same holds true for right-brain dominance and left-brain tasks. Schilling's work takes a strong step toward confirming how the dimensions of work correlate to brain dominance, but it does not suggest how communication impacts productivity or satisfaction. Schilling's goal was to develop a template for integrating task assignment with brain dominance to increase productivity and self-actualization on the individual level in organizations.

These studies highlight the growing convergence of the importance of brain dominance on all aspects of organizational functioning. As noted by Blodgett (1989, p. 91), "The company that dominates its market is more financially impeccable (A quadrant), efficient and reliable (B quadrant), interpersonally sensitive (C quadrant), and consistently forward-thinking (D quadrant) than its competitors.

4. Unexpected Findings

There were several unexpected findings in this study. For example, it was predicted that individuals whose dominant quadrant is Red (Right-brain, limbic) would prefer face-to-face communication channels to written or technological modes of communication (i.e. e-mail, video conferencing, memos, etc.) For the most part, the hypothesis was validated, excepted for e-mail. E-mail ranked as the third highest preferred mode of communication for Dominant Reds. This result is surprising until one remembers that the tenets of structuration theory influence the process in which interaction and discourse are constrained by the organizational rules, particularly those of communication. In other words, e-mail has become the ubiquitous choice of communication transfer in the organizations studied. Individual preference for communication channels is a non-issue because the mode of communication has already been codified by the dominant coalition.

Additionally, while the right brain quadrants (Red and Yellow) came closer to predicting the preferred channels of communication than the left brain quadrants (Blue and Green), the striking result is that all four quadrants picked

four of the five same top communication channels and the exact three bottom (lowest) communication channels. Only one channel differed between left-brain and right brain. Again, the unexpected results suggest the influence of structuration in organizations. As the reciprocal interaction of human actors and organizational structures, structuration both enables and constrains action (Sarason, 1995). Since actors create their social system within organizations, and then are constrained by the rules they have created, it is plausible to conceive a system in which individual brain dominance is subordinated to the preferences of the organization. In other words, organizational members start to believe that the communication channels they are offered by the organization are the communication channels they need and want because the organization says so.

There is another possible reason that the hypotheses for channel preferences produced more uniform responses than expected. Research on the Media Richness Theory (Daft & Lengel, 1984) has shown that in complex situations employees prefer richer media, such as face-to-face interaction for information gathering (McKinnon & Bruns, 1992; Mintzberg, 1973). This is because "richer media provide multiple cues and opportunities to ask and answer questions related to the information" (McKinnon & Bruns, 1992, p. 79). When situations are not as complex and equivocality is not an issue the leaner communication channel of e-mail is often the sanctioned and most expedient organizational mode of communication. However, according to Chang & Johnson (2001, p. 350) a "convergence of perceptions among groups of media users must

be established before the medium, whether traditional or new, can be used appropriately and effectively." The assumptions of the Media Richness model call for a shared frame of reference that is created and maintained by individuals who occupy structurally equivalent roles (Chang & Johnson, 2001). Again, in terms of structuration, a critical mass is easily acquired when the organization structures the rules.

5. Limitations

As no research is perfect and complete unto itself, the author wishes to acknowledge several shortcomings in this study. First, because of cost factors, sampling size was limited. Research was confined to those organizations that had purchased HBDI profiles for their employees. HBDI raw scores of organizational participants provided the basis for the study. No generalizations related to the influence of brain dominance on communication should be made from the results of this study. Operationalization of procedures and outcomes would most likely improve with a larger sample size from a variety of professions, not just organizations.

Second, using sections of validated instruments rather than creating a specific instrument for this particular study sacrificed precision sacrificed on the altar of expediency. Future research will include the expansion of a communication instrument that provides a broader spectrum for construct analysis. Many researchers have attempted to correlate the antecedents of turnover, which include demographic and personal characteristics, job

satisfaction, organizational and work environments, job content, organizational commitment, ease of movement, job costs, and intrinsic motivation (Scott, Connaughton, Diaz-Sanz, Maguire, R amirez, Richardson, Shaw, & Morgan, 1999). Could it be possible that turnover is significantly related to brain dominance? Turnover and its antecedents may provide a portal into understanding how the relational substructure of speech and codified communication practices constrain the free expression and creativity of members, thereby inducing turnover among employees who cannot align themselves with the communication culture and ideology of the organization. Another opportunity is to examine how brain dominance influences structuration at the macro and micro-levels of society. As noted by Blau (1974, 1977) society is clustered into groups based on nominal parameters, such as race, religion, and gender, and graduated parameters, such as wealth and education. The natural clustering at the micro-level in the workplace occurs among individuals who share similar characteristics and demonstrate ingroup interaction patterns supported by socioeconomic, ethnic, and culture similarities (Wittig & Schmitz, 1996). Could the natural clustering at the micro-level be significantly influenced by brain dominance? Herrmann (1996) indicates that people who share the same quadrant preferences for thinking, have an easier time communicating and understanding each other. Ultimately, communication-based research of brain dominance could provide insight into group interaction, socialization within organization, and how and why certain individuals get promoted over others.

Third, studying communication in an organizational context is extremely challenging on several levels. For example, organizational research must take into account the emergent and local nature of relationships, the spoken and unspoken rules, the dialogic experience of interactants, and various other extraneous factors that are created and recreated, much the way artificial intelligence replicates itself in computer programs. Language, for example, is not fixed, but metaphorical. Thus, meaning is contextual, situational, subject to interpretation and misunderstanding. To deconstruct organization into bounded concepts of satisfaction, modality, feedback, and sex diminishes the holistic nature and constitutive power of communication. Organizational communication is indivisible from its atomistic elements and the interrelationship between symbolic action and social/organizational structures (Conrad & Haynes, 2001).

Organizational communication needs the various research traditions that have accumulated over the past five decades, many of which possess partial explanatory power. To privilege one research construct over another reduces the explanatory power of organizational research. However, in a simple research project of this nature, it is not feasible to incorporate and synthesize the numerous research traditions into a coherent study. As they say in the movie business, much of the good stuff was left on the cutting room floor. An ideal situation would be to conduct a meta-analysis of organizational communication research with a comparative analysis of brain dominance.

Additionally, the thrust of inquiry assumed a control orientation that neither challenged the authority nor the goals of the participating organizations. As such, this research can be classified as normative in nature, relying on the "givens" of organizing: "centrality of codification, the search for regularity and normalization, and the implied prescriptive claims" (Deetz, 2001, p. 19).

Finally, this study was conducted using self-reports—the majority of which were obtained through one organization (which may have skewed the results)—and objective means to measure the communication preferences in organizational members. Knapp, Putnam, & Davis (1988) note that the increase in usage of self-report interviews and survey questionnaires rather than direct observation has led to a cache of literature that reveals more about instrumentation than theory. Reliance on a rational, functionalist model of communication preference can only render a partial understanding of the holistic and self-replicating process that is communication.

6. Future Research

The most exciting aspect of this study is the opportunity for future research. There are many avenues to pursue. Due to the fact that organizational communication and brain dominance is a relatively unexplored line of inquiry, the opportunities for research are nearly limitless. For example, a study might focus on non-corporate types, such as entrepreneurs, artists, and educators, who might be more representative of the general population in order to determine if a balanced left-brain/right-brain sample might affect the communication channel

choices. Results of this dissertation study also indicate that preferences based on sex are not significant. However, with a sample that represents the natural distribution of left-and right-brain dominance based on sex, channel preferences and feedback might be significantly influenced by sex.

The construct of job satisfaction should be approached differently to determine if brain dominance can be correlated with individual items. There are several instruments that may provide a more appropriate means of measurement, such as turnover scales, intent to leave scales, and needs-met scales (Bluedorn, 1982; Carsten & Spector, 1987; Lachman & Aranya, 1986).

Research may lead to a completely new line of inquiry. For example, if speech recognition and production is activated only in the left hemisphere, does this mean that everyone—whether they are left-brain, right-brain, cerebral or limbic dominant—prefer left-brain communication modalities?

Any future study will include an integrated approach to the investigation process including interviews, observations, and possibly a situational experiment, with the focus on building a hybrid research program that spans beyond the arbitrary boundaries of communication research. Stanley Deetz (2001, p. 18) offers an insightful methodology for social science:

> "In an ideal research program, we might identify a complementary relation among research orientations with each asking different questions at different moments and each, at the appropriate moment, answering to the specific criteria of a particular orientation…One can easily see how such a rotation through orientations might be constant and productive without losing the separation and tension among them."

7. Conclusion

Individuals tend to develop their understanding of the world based on how they perceive the orientations of others around them and how they are oriented to the world (Chaffee & McLeod, 1973). HBDI offers value to researchers in demonstrating categorical evidence to how people think and communicate, but situated factors have an incalculable effect on orientation. There are always two separate things going on in interaction. One of them is the individual preferences for communication established through brain dominance; the other is the necessity to constantly orient oneself within a system. This orienting is interaction in its constitutive role, creating and recreating structure through rules and resources. Chaffee & McLeod (1973, p. 470) suggest that "a person's behavior is not based simply upon his private cognitive structure of his world; it is also a function of his perception of the orientations held by others around him and of his orientation to them." Thus, descriptive analysis of brain preference can easily be altered due to situated environmental factors that are shaped by the perceptions of the social structure. The circumstances put forth in this study indicate that brain dominance preferences have been altered and subordinated to the influence of structuration within the participating organizations. Would the influence of brain dominance be more visible in young organizations, or organizations where individual expression and innovation are celebrated rather than challenged by the rules and resources of the dominant coalition? Devising research to address and capture the changing

and accommodating prerogatives of brain dominance may be beyond the scope of social science research, but it is worth investigating the possibilities.

The results of this study also ranked video conferencing in the bottom three items for channel preferences. Will the events of 9-11 and the rise of global terrorism make video conferencing more acceptable than this study indicated?

While several limitations reduced the clarity of the outcomes of this study, a new contribution to communication theory, which has never been explored before, has been established. HBDI is unlike most psychometric tools because it is based on physiology rather than psychology. Designed to measure one aspect of personality—preferences in thinking style—HBDI offers communication researchers an opportunity to investigate the possibilities of preferences in communicating styles using the brain as the basis for preference, choice, and need. Eventually, HBDI will be used to inform researchers of communication preferences and needs based on brain dominance.

Brain dominance offers a unique way to investigate organizational communication as it allows the researcher to take a holistic perspective of the integrative processes while exploring topical divisions of the field. Rather than thinking of brain dominance as an ancillary, external concept separate and apart from organizational communication research, it is hoped that this study opens a new perspective to an unexplored avenue of research. Krone, et al. (1987) concludes, rightly so, that communication is a vital part of the myriad perspectives of organizational and managerial theories. Thus, the value of the

brain dominance perspective is in the questions it leads researchers to ask about organizational communication, and in the unique platform it provides on which current and prospective organizational communication theories can build complimentary and interdisciplinary perspectives regarding human interactions in organizational settings. While the research of this study cannot conclusively present the predictive validity of brain dominance on communication and feedback preferences and needs, and job satisfaction, it does suggest that communication activity is usefully defined in terms of Structuration Theory. In other words, communication is simultaneously micro and macro, form and function, and process and outcome (Halone, 1998). The future of organizational communication theory rests upon the ability of researchers to comprehend, blend, and synthesize different perspectives of the human experience to inform how organizing processes, including brain dominance, influence and codify communication patterns in organization.

Does brain dominance have predictive capabilities? The results of this study lead the researcher to believe that the tenets of structuration theory trump individual brain dominance preferences for communication, feedback, and satisfaction—but only in this study. Stay tuned.

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APPENDICES

APPENDIX A

Cover Letter and Survey

October 7, 2002

Dear Participant:

Herrmann Brain Dominance (HBDI) has shown that all of us have preferences for the way we give and receive information. Based on the principles of HBDI, an organization's internal communication can be more effective if employees' preferences are understood and communication is relayed through those preferred channels. Attached is a survey that will provide data for use in a dissertation study.

By filling out this voluntary questionnaire, you will be helping your organization to better serve your communication needs, and you will be helping me complete my research on brain dominance. Responses are ***strictly confidential*** and will be seen only by me. Results will be reported in aggregate form only. However, to use your data, I must have your permission in writing. By signing this page, you are giving your consent to participating.

Please take ten minutes right now to fill out this survey. Check the appropriate responses and answer all questions. When you have completed the survey, return it to the envelope provided, *seal the envelope*, and leave it in the box at the receptionist's desk. I will stop by and pick up completed surveys every few days.

Thank you for your help!! If you have any questions or comments, feel free to call me. My goal is to have all of the surveys returned no later than **October 15, 2002.**

Sincerely,

Astrid Sheil
University of Tennessee
College of Communication
865-380-9353

I understand that I have been requested to complete this survey, and that I am under no obligation to complete it.

_____ _____

Print name* Signature*

*You must sign this consent form and return it with your survey in order for me to be able to use your information.

Instructions: For the 13 topics listed mark the responses that best indicate:

(1) The amount of information you are receiving on the topic, and
(2) The amount of information you need to receive on the topic in order to do your job.

1=Very Little
2=Little
3=Some
4=Right Amount
5=More than Enough
6=Great
7=Very Great

	The amount of information I receive about...	The amount of information I need to receive about...
1. How well I am doing on my job	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
2. My job duties	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
3. Organizational policies	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
4. Pay and benefits	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
5. How technological changes affect my job	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
6. Mistakes and failures of my organization	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
7. How I am being judged	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
8. How my job related problems are being handled	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
9. How organization decisions are made that affect my job	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
10. Promotion and advancement opportunities in my organization	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
11. Important new product, service or program developments in my organization	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
12. How my job relates to the total operation of my organization	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
13. Specific problems faced by management	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7

Instructions: For the 16 channels listed, mark the responses that best indicate:

(1) The amount of information you now receive through that channel, and
(2) The amount of information you need to receive through that channel.

1=Very Little
2=Little
3=Some
4=Right Amount
5=More than Enough
6=Great
7=Very Great

	The amount of information I now receive	The amount of information I need to receive
14. Face to Face	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
15. Written memos, letters, and notices	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
16. Bulletin Boards	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
17. Corporate Newsletter	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
18. Team Updates	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
19. Procedural manual	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
20. Communication committee updates	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
21. Video conferencing	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
22. Inter-departmental meetings	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
23. Informal conversations with supervisor	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
24. Structured & regularly scheduled meetings with supervisor	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
25. Meetings with senior management	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
26. Staff meeting	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
27. Email	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
28. Telephone	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7
29. The "grapevine"	□□□□□□□ 1 2 3 4 5 6 7	□□□□□□□ 1 2 3 4 5 6 7

Instructions: Below are several kinds of information often associated with a person's job. Please indicate how satisfied you are with the amount and/or quality of each.

Not Satisfied **Very Satisfied**
1 2 3 4 5 6 7

30. Extent to which my superiors know and understand the problems faced by subordinates	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
31. Extent to which the company's communication motivates & stimulates enthusiasm for meeting its goals	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
32. Extent to which my supervisor listens and pays attention to me	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
33. Extent to which people in my organization have great ability as communicators	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
34. Extent to which my supervisor offers guidance for solving job related problems	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
35. Extent to which the organization's communication makes me identify with it or feel a vital part of it	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
36. Extent to which the organization's communications are interesting and helpful	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
37. Extent to which my supervisor trusts me	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
38. Extent to which I receive in time the information needed to do my job	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
39. Extent to which conflicts are handled appropriately	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
40. Extent to which the grapevine is active in our organization	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
41. Extent to which my supervisor is open to new ideas	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
42. Extent to which horizontal communication with other employees is accurate and free flowing	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
43. Extent to which communication practices are adaptable to emergencies	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
44. Extent to which my work group is compatible	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
45. Extent to which decisions that affect my work are made in a timely manner	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
46. Extent to which the amount of supervision given me is about right	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
47. Extent to which written directives and reports are clear and concise	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7
48. Extent to which the attitudes toward communication in the organization are basically healthy	☐☐☐☐☐☐☐ 1 2 3 4 5 6 7

49. Extent to which informal communication is active and accurate	□□□□□□□ 1 2 3 4 5 6 7
50. Extent to which the amount of communication in the organization is about right	□□□□□□□ 1 2 3 4 5 6 7

Circle the appropriate answer for each of the following questions.

1 = Blue --Factual, unemotional, rational, critical, demanding
2 = Green--Concerned with details, deadlines, following procedures, controlling
3 = Red--Personal, inclusive, face-to-face, conversational, emotional
4 = Yellow--Sporadic, spontaneous, few details, big picture, visual imagery

51. My immediate supervisor's communication style is predominantly:	1 2 3 4
52. I believe the organization's style of communicating with employees is predominantly:	1 2 3 4
53. I believe my department's style of communicating with me is predominantly:	1 2 3 4

In the following section:
Write 1 for your *most* preferred way of receiving information,
Write 2 for your *least* preferred way of receiving information.
Put a plus (+) sign by other ways you like to receive information.

54. I prefer to receive general information about the company by…

_____telephone
_____e-mail
_____fax
_____written memo
____posting on a bulletin board
____face to face
____staff meeting updates
____company newsletter or magazine

55. I prefer to receive information related to my job by…

_____telephone
_____e-mail
_____fax
_____written memo
____posting on a bulletin board
____face to face with my supervisor
____staff meeting updates
____company newsletter or magazine

56. I prefer to receive information about benefits by…

_____telephone
_____e-mail
_____fax
_____written memo
_____special meetings
____posting on a bulletin board
____face to face with human resources personnel
____staff meeting updates
____company newsletter or magazine
____brochure sent to my house

57. I prefer to hear about how the company is doing financially by…

_____telephone
_____e-mail
_____fax
_____written memo
____posting on a bulletin board
____face to face with senior management
____staff meeting updates
____company newsletter or magazine

58. Sex (circle one): Male Female

59. What is the highest level of education you have completed? (check one)

___ None
___ Grade 1-7
___ Grade 8 (grade school)
___ Some high school
___ Completed high school or GED
___ Some college
___ Professional or trade school degree
___ 4-year college degree
___ Some graduate education beyond college
___ Advanced degree (MS, PhD, MD, etc.)

60. For how many years (altogether) have you worked for your present employer? _____years

61. On average, how many hours a week do you work on your job?
_____hours/week

Please tell me anything else you can that would help me better understand how communication works around here.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you
for your participation!

APPENDIX B

The Herrmann Brain Dominance Instrument

HBDI™

Herrmann Brain Dominance Instrument

Thinking Styles Assessment

This 120-Question Survey Form results in a profile of your preferred thinking styles. By understanding your thinking style preferences you can achieve greater appreciation for how you learn, make decisions, solve problems, and communicate, and why you do these things--and others--the way you do. The survey measures preferences rather than skills. It is not a test; there are no wrong answers. You will gain the greatest understanding by answering the questions frankly and sincerely.

Herrmann International

794 Buffalo Creek Road, Lake Lure, NC 28746
Tel: 828-625-9153 • 1-800-432-HBDI • Fax: 828-625-1402
Web page: www.hbdi.com • e-mail: thinking@hbdi.com

INSTRUCTIONS

A profile of your mental preferences will be determined by your responses to the following 120 questions. Answer each question by writing in the appropriate words or numbers, or checking the boxes provided. This is not a test, and there are no right or wrong answers. You are only indicating your preferences. Please respond to questions as authentically as possible, keeping in mind your **total self, at work and at home.** When you have completed the survey form, confirm that you have answered every question. Then complete the name and address information on the back of the form, fold on the dotted line, and mail the form to the address on the back.

Tear off this sheet and refer to the glossary of terms for clarification of the terms used. Save the glossary page for reference when you receive your profile results.

GLOSSARY OF TERMS

analytic • Breaking up things or ideas into parts and examining them to see how they fit together.

artistic • Taking enjoyment from or skillful in painting, drawing, music, or sculpture. Able to coordinate color, design, and texture for pleasing effects.

conceptual • Able to conceive thoughts and ideas—to generalize abstract ideas from specific instances.

controlled • Restrained, holding back, in charge of one's emotions.

conservative • Tending toward maintaining traditional and proven views, conditions, and institutions.

creative • Having unusual ideas and innovative thoughts. Able to put things together in new and imaginative ways.

critical • Exercising or involving careful judgement or evaluation, e.g., judging the feasibility of an idea or product.

detailed • Paying attention to the small items or parts of an idea or project.

dominant • Ruling or controlling, having strong impact on others.

emotional • Having feelings that are easily stirred; displaying those feelings.

empathetic • Able to understand how another person feels, and able to communicate that feeling.

extrovert • More interested in people and things outside of self than internal thoughts and feelings. Quickly and easily exposes thoughts, reactions, feelings, etc. to others.

financial • Competent in monitoring and handling of quantitative issues related to costs, budgets, and investments.

holistic • Able to perceive and understand the "big picture" without dwelling on individual elements of an idea, concepts, or situation. Can see the forest as contrasted with the trees.

imaginative • Able to form mental images of things not immediately available to the senses or never wholly perceived in reality; able to confront and deal with a problem in a new way.

implementation • Able to carry out an activity and ensure fulfillment by concrete measures and results.

innovating • Able to introduce new or novel ideas, methods, or devices.

integration • The ability to combine pieces, parts and elements of ideas, concepts and situations into a unified whole.

intellectual • Having superior reasoning powers. Able to acquire and retain knowledge.

interpersonal • Easily able to develop and maintain meaningful and pleasant relationships with many different kinds of people.

introvert • Directed more toward inward reflection and understanding than toward people and things outside of self. Slow to expose reactions, feelings, and thoughts to others.

intuitive • Knowing something without thinking it out—having instant understanding without need for facts or proof.

logical • Able to reason deductively from what has gone before.

mathematical • Perceiving and understanding numbers and being able to manipulate them to a desired end.

metaphorical • Able to understand and make use of visual and verbal figures of speech to suggest a likeness or an analogy in place of literal descriptions, e.g., "heart of gold."

musical • Having an interest in or talent for music and/or dance.

organized • Able to arrange people, concepts, objects, elements, etc. into coherent relationships with each other.

planning • Formulating methods or means to achieve a desired end in advance of taking actions to implement.

problem solving • Able to find solutions to difficult problems by reasoning.

quantitative • Oriented toward numerical relationships, inclined to know or seek exact measures.

rational • Making choices on the basis of reason as opposed to emotion.

reader • One who reads often and enjoys it.

rigorous thinking • Having a thorough, detailed approach to problem-solving.

sequential • Dealing with things and ideas one after another or in order.

simultaneous • Able to process more than one type of mental input at a time, e.g. visual, verbal, and musical. Able to attend to more than one activity at a time.

spatial • Able to perceive, understand and manipulate the relative positions of objects in space.

spiritual • Having to do with spirit or soul as apart from the body or material things.

symbolic • Able to use and understand objects, marks, and signs as representative of facts and ideas.

synthesizer • One who unites separate ideas, elements, or concepts into something new.

technical • Able to understand and apply engineering and scientific knowledge.

teaching/training • Able to explain ideas and procedures in a way that people can understand and apply them.

verbal • Having good speaking skills. Clear and effective with words.

writer • One who communicates clearly with the written word and enjoys it."

DETACH HERE ➧

5-85

BIOGRAPHICAL INFORMATION

Please complete **every** question according to the directions given. Each response, including your answers to question 1, 2, 3 and 4 provide important data. When directions are not followed or data is incomplete we are unable to process your survey, and must return it to you. Please note additional instructions on Page 1. **Please Print:**

1. Name _____ 2. Sex: M ☐ F ☐

3. Educational Focus or Major _____

4. Occupation or Job Title _____

Describe your work (please be as specific as possible) _____

_____

HANDEDNESS

5. Which picture most closely resembles the way you hold a pencil? Mark box **A, B, C,** or **D.**

A ☐  B ☐  C ☐  D ☐ 

6. What is the strength and direction of your handedness? Mark box **A, B, C, D,** or **E.**

A ☐ primary left B ☐ primary left, some right C ☐ both hands equal D ☐ primary right, some left E ☐ primary right

SCHOOL SUBJECTS

Think back to your performance in the elementary and/or secondary school subjects identified below. **Rank order all three subjects differently,** even if the choice is difficult, by entering a **1, 2,** and **3** on the basis of how well you did: **1** = best; **2** = second best; **3** = third best.

7. _____ math 8. _____ foreign language 9. _____ native language or mother tongue

Please check that no number is duplicated: The numbers 1, 2, and 3 must be used once and only once. Correct if necessary.

WORK ELEMENTS

Rate each of the work elements below according to your strength in that activity, using the following scale: **5** = work I do best; **4** = work I do well; **3** = neutral; **2** = work I do less well; **1** = work I do least well. Enter the appropriate number next to each element. **Do not use any number more than four times.**

10. _____ analytical
11. _____ administrative
12. _____ conceptualizing
13. _____ expressing ideas
14. _____ integration
15. _____ writing
16. _____ technical aspects
17. _____ implementation
18. _____ planning
19. _____ interpersonal aspects
20. _____ problem solving
21. _____ innovating
22. _____ teaching/training
23. _____ organization
24. _____ creative aspects
25. _____ financial aspects

Please tally: Number of 5's_____ 4's_____, 3's_____, 2's_____ 1's_____. If there are more than four for any category, please redistribute.

KEY DESCRIPTORS

Select **eight adjectives** which best describe the way you see yourself. Enter a **2** next to each of your **eight** selections. Then change one **2** to a **3** for the adjective which best describes you.

26. _____ logical
27. _____ creative
28. _____ musical
29. _____ sequential
30. _____ synthesizer
31. _____ verbal
32. _____ conservative
33. _____ analytical
34. _____ detailed
35. _____ emotional
36. _____ spatial
37. _____ critical
38. _____ artistic
39. _____ spiritual
40. _____ rational
41. _____ controlled
42. _____ mathematical
43. _____ symbolic
44. _____ dominant
45. _____ holistic
46. _____ intuitive
47. _____ quantitative
48. _____ reader
49. _____ simultaneous
50. _____ factual

Please count: seven 2's and one 3? Correct if necessary.

HOBBIES

Indicate a maximum of six hobbies you are actively engaged in. Enter a 3 next to your major hobby, a 2 next to each primary hobby, and a 1 next to each secondary hobby. Enter only one 3.

51. _____ artsicrafts
52. _____ boating
53. _____ camping/hiking
54. _____ cards
55. _____ collecting
56. _____ cooking
57. _____ creative writing
58. _____ fishing
59. _____ gardening/plants
60. _____ golf
61. _____ home improvements
62. _____ music listening
63. _____ music playing
64. _____ photography
65. _____ reading
66. _____ sailing
67. _____ sewing
68. _____ spectator sports
69. _____ swimming/diving
70. _____ tennis
71. _____ travel
72. _____ woodworking
_____ other _____

Please review: Only one 3 and no more than six hobbies. Correct if necessary.

ENERGY LEVEL

73. Thinking about your energy level or "drive," select the one that best represents you. Check box **A**, **B**, or **C**.

A ☐ day person B ☐ day/night person equally C ☐ night person

MOTION SICKNESS

74. Have you ever experienced motion sickness (nausea, vomiting) in response to vehicular motion (while in a car, boat, plane, bus, train, amusement ride)? Check box **A**, **B**, **C**, or **D** to indicate the number of times.

A ☐ none B ☐ 1–2 C ☐ 3–10 D ☐ more than 10

75. Check box **A** or **B** to indicate whether you can read while traveling in a car without stomach awareness, nausea, or vomiting.

A ☐ yes B ☐ no

ADJECTIVE PAIRS

For each paired item below, check the word or phrase which is more descriptive of yourself. Check box **A** or **B** for each pair, even if the choice is a difficult one. **Do not omit any pairs.**

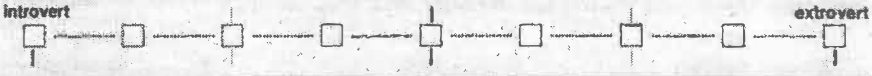
	A	B		A	B
76. conservative	☐	☐ empathetic	88. imaginative	☐	☐ sequential
77. analyst	☐	☐ synthesizer	89. original	☐	☐ reliable
78. quantitative	☐	☐ musical	90. creative	☐	☐ logical
79. problem-solver	☐	☐ planner	91. controlled	☐	☐ emotional
80. controlled	☐	☐ creative	92. musical	☐	☐ detailed
81. original	☐	☐ emotional	93. simultaneous	☐	☐ empathetic
82. feeling	☐	☐ thinking	94. communicator	☐	☐ conceptualizer
83. interpersonal	☐	☐ organizer	95. technical things	☐	☐ people-oriented
84. spiritual	☐	☐ creative	96. well-organized	☐	☐ logical
85. detailed	☐	☐ holistic	97. rigorous thinking	☐	☐ metaphorical thinking
86. originate ideas	☐	☐ test and prove ideas	98. like things planned	☐	☐ like things mathematical
87. warm, friendly	☐	☐ analytical	99. technical	☐	☐ dominant

Please review: Did you mark one and only one of each pair? Correct if necessary.

PLEASE COMPLETE NEXT PAGE ➡

INTROVERSION/EXTROVERSION

100. Check one box only to place yourself on this introvert–extrovert scale.



TWENTY QUESTIONS

Respond to each statement by checking the box in the appropriate column.

	strongly agree	agree	in between	disagree	strongly disagree
101. I feel that a step by step method is best for solving problems.	☐	☐	☐	☐	☐
102. Daydreaming has provided the impetus for the solution of many of my more important problems.	☐	☐	☐	☐	☐
103. I like people who are most sure of their conclusions.	☐	☐	☐	☐	☐
104. I would rather be known as a reliable than an imaginative person.	☐	☐	☐	☐	☐
105. I often get my best ideas when doing nothing in particular.	☐	☐	☐	☐	☐
106. I rely on hunches and the feeling of "rightness" or "wrongness" when moving toward the solution to a problem.	☐	☐	☐	☐	☐
107. I sometimes get a kick out of breaking the rules and doing things I'm not supposed to do.	☐	☐	☐	☐	☐
108. Much of what is most important in life cannot be expressed in words.	☐	☐	☐	☐	☐
109. I'm basically more competitive with others than self-competitive.	☐	☐	☐	☐	☐
110. I would enjoy spending an entire day "alone with my thoughts."	☐	☐	☐	☐	☐
111. I dislike things being uncertain and unpredictable.	☐	☐	☐	☐	☐
112. I prefer to work with others in a team effort rather than solo.	☐	☐	☐	☐	☐
113. It is important for me to have a place for everything and everything in its place.	☐	☐	☐	☐	☐
114. Unusual ideas and daring concepts interest and intrigue me.	☐	☐	☐	☐	☐
115. I prefer specific instructions to those which leave many details optional.	☐	☐	☐	☐	☐
116. Know-why is more important than know-how.	☐	☐	☐	☐	☐
117. Thorough planning and organization of time are mandatory for solving difficult problems.	☐	☐	☐	☐	☐
118. I can frequently anticipate the solutions to my problems.	☐	☐	☐	☐	☐
119. I tend to rely more on my first impressions and feelings when making judgements than on a careful analysis of the situation.	☐	☐	☐	☐	☐
120. I feel that laws should be strictly enforced.	☐	☐	☐	☐	☐

Please review to make sure you have answered all 120 questions.

PLEASE COMPLETE NEXT PAGE ➔

FOR CONFIDENTIAL RESEARCH PURPOSES

The questions on this page are not used in scoring the HBDI. However, the answers to these questions are valuable in our continuing brain dominance research. Skip any question you wish, but please answer as many as you feel you can.

Indicate the birth order of your brothers, sisters and self by darkening the appropriate symbols. Then **circle** the symbol representing yourself.

MALE →	♂	♂	♂	♂	♂	♂	♂	♂	♂	♂	♂	← MALE
	Oldest	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
FEMALE →	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀ ← FEMALE

Date of Birth _____ Years in Current Occupation _____ Job Satisfaction: LOW ☐ ☐ ☐ ☐ ☐ HIGH

Citizenship: _____ Native Language: _____ Are You Bilingual? ☐ Yes ☐ No

Ethnicity: ☐ American Indian ☐ Black ☐ Caucasian ☐ Hispanic ☐ Asian ☐ Other _____

Do you consider yourself religious? ☐ Yes ☐ No Religious Affiliation: ☐ Catholic ☐ Protestant ☐ Jewish ☐ Other: _____

Level of participation: ☐ Minimal ☐ Trained-but-not-practicing ☐ Casual ☐ Devout ☐ Other: _____

If you are a parent, please indicate: Number of Children _____ Age of Oldest _____ Age of Youngest _____

Couple Status: ☐ Married ☐ Separated ☐ Divorced ☐ Living Together ☐ Widow/Widower ☐ Single Have your parents divorced? ☐ Yes ☐ No

To what extent were you formally educated for the field you are now working in? ☐ Not at all ☐ Somewhat ☐ To A Great Degree ☐ Fully

Please indicate the time(s) of the day/night you feel most mentally capable: 12mid 6am 12noon 6pm 12mid

Have you ever experienced any learning disabilities? Dyslexia Reading Speech Impediments Hearing Impediments A.D.D. Other

Please describe _____ Age of onset _____ Are you recovered _____

If you have filled out the HBDI previously or under a different name (e.g. maiden) or address, please specify _____

_____

How do you see yourself? Please distribute 100 points between these four descriptions

Rational _____ Organized _____ Interpersonal _____ Imaginative _____

Please check the best descriptor indicating your mood or the way you felt at the time you were completing the survey

Happy Enthusiastic Interested Sad Relaxed Indifferent Distracted Tired Unhappy

If you have experienced any significant life-changing events, please indicate the date, event, and impact on you _____

_____

_____

_____

FROM

Please Print

Name _____ Date _____

Company _____

Division _____

Company Address _____

_____

Daytime Phone (_____) _____ Evening Phone (_____) _____ Fax (_____) _____

Home Address _____

_____

Note: There is a fee for processing this survey form.

FOR OFFICE USE ONLY

Astrid Sheil VITA

Astrid Sheil was born and raised in Washington, DC. After completing a bachelor of science in Foreign Service from Georgetown University, Sheil pursued a career in business rising through the corporate communication ranks of two Fortune 500 companies and one global chemical company before returning to school to complete her Ph.D. in Communications.

Today, Sheil is a partner in the consulting firm, *The Polaris Team,* which specializes in communication and creativity breakthroughs for organizations , and safety training for industrial plants. Her research agenda focuses on the efficacy of brain dominance preferences in organizations and on safety behavior, and* the influence of structuratrion theory on organizational communication.