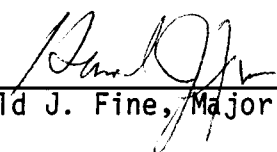
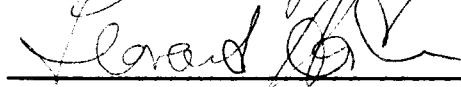
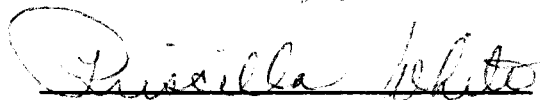


To the Graduate Council:

I am submitting herewith a dissertation written by Nina Beth Cummings entitled "Hemisphere Preference and Its Relationship to Different Therapist Variables." I have examined the final 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 Psychology.

  
Harold J. Fine, Major Professor

We have read this dissertation  
and recommend its acceptance:

Accepted for the Council:

  
Vice Provost and  
Dean of The Graduate School

HEMISPHERE PREFERENCE AND ITS RELATIONSHIP  
TO DIFFERENT THERAPIST VARIABLES

A Dissertation  
Presented for the  
Doctor of Philosophy  
Degree  
The University of Tennessee, Knoxville

Nina Beth Cummings

June 1985

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## ABSTRACT

This research project explored the internal phenomenology of a heterogeneous group of 68 Ph.D. clinical psychologists by assessing cerebral hemisphere dominance. Cerebral hemisphere dominance was operationally defined in terms of individual preferences in styles of thinking as measured by the Style of Learning and Thinking (SOLAT) questionnaire (Torrance, Reynolds, Riegel, & Ball, 1977). Only 24% of the research sample achieved "hemisphere dominance" according to the SOLAT norms. Thus, a new variable called "hemisphere preference" was created which takes into account the overall patterning of the psychologists' responses to the SOLAT. There were no statistically significant differences between psychologist's hemisphere dominance or hemisphere preference on the variables of therapeutic orientation, daydreaming frequencies, activity level in therapy, and thinking style. Significant differences were found in a comparison of psychologists' mean right, left and integrated hemisphere mean scores for the variable of research. Contrary to the research hypothesis, right hemisphere mean scores were significantly higher for those psychologists who engage in research when compared to those psychologists who do not engage in research. While not statistically significant, it was observed that, as hypothesized, a higher percentage of those psychologists with a right hemisphere dominance or preference were analytic/psychodynamic in therapeutic orientation. It was also observed that, contrary to the research hypothesis, those psychologists

who engage in empirical research had higher right hemisphere mean scores when compared to those psychologists who engage in theoretical/conceptual research. Contrary to existing research statistically significant sex differences were found: males had significantly higher left hemisphere mean scores when compared to females, a significantly higher percentage of females than males evidenced a right hemisphere preference, males were significantly more active than females in therapy sessions, significantly more females than males reported thinking in words only, and significantly more males than females reported thinking in words and pictures. It was concluded that the variable of "hemisphere preference" provided useful data on the overall thinking style of the psychologist and that further exploration of the internal phenomenology of psychologists can lead to a better understanding of the therapeutic process.

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## CHAPTER I

### INTRODUCTION

The purpose of this research project is to obtain descriptive data about psychologists' internal thought processes and cognitive styles as they relate both to therapeutic orientation and to different aspects of the therapeutic interaction. Specifically, this research explores the subtle relationships between different styles of thinking and information processes as manifested by the hemispheric functional asymmetry of the brain, and relates these to overt behavioral differences among practicing clinical psychologists.

There exists very little systematic knowledge concerning the frequency, variations and patterning of the internal thought processes for normal adults or children. Despite approximately twenty-five years of research in this area and the advent of more sophisticated research equipment such as EEG machinery which taps directly into the inner world of brain physiology, our internal phenomena are not sufficiently discernible to provide a basis for integration of observable data into a more generally testable theory.

Our present knowledge of cerebral hemispheric specialization for different cognitive modes, derived from split-brain studies (Sperry, 1966; Gazzaniga, 1972; Bogen, 1969), provides a framework for thinking about the interaction of cognitive structures and variations in awareness.

A number of researchers have reliably and validly demonstrated that the two hemispheres of the brain are specialized for different cognitive functions and the activation or use of the hemispheres of the brain under certain conditions can be measured (Galin, 1974; Singer, 1975; Bakan, 1969; Zenhausern & Repetti, 1979; Torrance & Mourad, 1979). Each hemisphere is thought to be associated with different strategies of information processing called "Styles of Learning and Thinking" (SOLAT) (Torrance & Mourad, 1979). Differences in preference for strategies of information processing are thought to reflect "hemisphericity" (Bogen, 1969). Hemisphericity, briefly defined for the purposes of this research project, is the tendency for a person to rely more on one than the other cerebral hemisphere for information processing (Torrance, 1981).

Implicit in this concept of hemisphericity (also referred to interchangeably as hemisphere preference or hemisphere dominance) is that individuals differ with respect to their ability to perform tasks which are more efficiently processed by either the left or right hemisphere (Gur & Gur, 1980). Individuals who are better at tasks assumed to be right hemisphere tasks (those involving holistic, visual-spatial information processing) are considered to be "right dominant." Individuals who excel at those tasks for which the left hemisphere is specialized (sequential, verbal tasks) are considered to be "left dominant."

Until approximately the 1970's the sole means available to measure internal thought processes was by either complicated EEG measurements or by the observations of the ocular shifting of an

individual (Bakan, 1969; Kocel, Galin, Ornstein, & Merron, 1972). In the last few years research psychologists have devised self-report questionnaires that reliably measure an individual's consistent style of learning, thinking and living in general (Zenhausern & Repetti, 1979; Torrance & Reynolds, 1980). These measuring instruments are based upon the accumulated research findings concerning the specialized functions of the two cerebral hemispheres; the measure ascertained is an indication of an individual's preferred style of thinking and information processing, i.e., presumably a measure of hemisphere dominance or the differential efficiency of the use of the two cerebral hemispheres.

This proclivity of individuals to rely on the processing style of one hemisphere has spurred a tremendous interest in research which has correlated hemisphericity with cognitive-defensive patterns and other personality dimensions (Smokler & Shrevin, 1979; Lazare, Kerrman, & Armor, 1966; Dunivan & Zenhausern, 1981). These data have been used by researchers in order to train individuals to control hemisphere activation, to improve learning (Oexle & Zenhausern, 1981; Torrance, 1981), and to enhance creativity (Reynolds & Torrance, 1981).

The primary objective of this research is to obtain an assessment of different psychologists' hemisphere preferences or dominances (right, left or integrated) and to correlate this with specific clinical and non-clinical practices and thoughts of the clinicians. The goal is to determine whether or not there is a relationship between the hemisphere dominance of psychologists and their overt practice of psychology along the following dimensions: therapeutic orientation, research

activity, use of daydreams/fantasies in and out of therapy sessions, and personal therapy on the part of the psychologist.

Bogen and Bogen (1969) associate creativity, or what they term "man's highest functioning," as a condition in which the two cerebral hemispheres are fully active and integrated with each other. They suggest that one of the reasons that the commissurotomy patients (those whose corpus collosum was severed, cutting off communication between the two hemispheres) appear normal to casual observation is because the activities of daily life do not demand much integration of holistic (right hemisphere) and analytic (left hemisphere) thought.

The therapeutic interaction seems to be one situation requiring the synthesis and integration of hemispheric functioning. As delineated by Galin (1974), certain aspects of right hemisphere functioning are congruent with the mode of cognition psychoanalysts have termed "primary process." The right hemisphere primarily uses a nonverbal mode of representation, presumably with considerable imagery. The right hemisphere reasons in a nonlinear fashion; it is less involved with perception of time and sequence, compared with the left hemisphere and it appears to deal more effectively with complex patterns taken as a whole.

The effective therapist must be able to utilize this type of right hemisphere processing if he/she is to be able to formulate metaphors, word pictures and, in a sense, merge with the patient when necessary. At the same time, the therapist must also be able to employ certain ego functions which may be termed left hemisphere, such as

transforming the experience of the right hemisphere into words that are logical and make sense to the patient.

Interestingly, it may well be that when Jay Haley (1973) discusses the use of "paradoxical intention" with therapy patients he is advocating therapeutic maneuvers designed to bypass the left hemisphere processes of logic and rational thinking to get to the patient's right hemisphere experiencing.

The following research is the first known attempt to apply this large body of literature to the field of clinical psychology, specifically, to practicing clinicians and their preferred styles of thinking (or hemisphere dominance) as they relate to actual therapeutic technique and practice. This research obtains self-report data from psychologists about the therapeutic interaction. The therapists' behaviors and thoughts were investigated in the following areas with the following general hypotheses (the specific research hypotheses are delineated in Section III):

1. Therapeutic Orientation. Right hemisphere dominant individuals are described as more inner-directed whereas left hemisphere dominant individuals are described as more outer-directed (Bakan, 1969). It therefore seems reasonable to expect that right hemisphere dominant therapists would be more likely to gravitate towards an analytic or psychodynamic therapeutic style in comparison to left hemisphere dominant therapists since an analytic/psychodynamic orientation emphasizes internal attentiveness and less activity on the

part of the therapist. Conversely, since they tend to emphasize more of an external, outward orientation, left hemisphere dominant therapists may be more likely than right or integrated therapists to gravitate towards more cognitive and behavioral therapeutic techniques. For the same reasons it seems likely that right dominant therapists will see themselves as less active in therapy sessions in comparison to left dominant therapists.

2. Research Interest. Obsessive-compulsive individuals have been found to be more left hemisphere dominant when compared to other personality styles. Those individuals with a hysteric personality style have been found to be more right dominant when compared to other personality styles (Smokler & Shrevin, 1979). Since research and paper publication seem to involve a considerable amount of what might be considered left hemisphere characteristics (obsessiveness, organization, etc.), it seems reasonable to expect differences between those psychologists who do research and those who do not in their hemisphere preferences. Furthermore, experimental research involving laboratory work might require more left hemisphere-type characteristics (due to the amount of planning involved in obtaining research subjects, setting up the project, executing the project and performing the statistical analyses) when compared to theoretical/conceptual research where no laboratory involvement and little statistical analysis is employed. Therefore, when one considers the type of research done, it is hypothesized that those individuals who

engage in theoretical/conceptual research may tend to be more right dominant whereas those individuals whose research is empirical in nature may tend to be more left dominant.

3. Daydreams/Fantasies. Compared to individuals with a left hemisphere dominance, those with a right hemisphere dominance have been found to report a greater frequency of daydream and fantasy material (Meskin & Singer, 1974; Singer, 1974). It is therefore hypothesized that the results of this research will corroborate this phenomenon; right dominant therapists are hypothesized to report a greater frequency of daydream/fantasy material in their daily lives in comparison to left or integrated therapists. In addition, it is hypothesized that right dominant therapists would report higher incidences of daydreaming/fantasizing in their therapy sessions with patients when compared to left dominant and integrated therapists.

4. Personal Therapy. Since therapy may be one of the few generally available means to enhance and/or make oneself aware of right hemisphere phenomena, it seems plausible to hypothesize that those therapists who have undergone therapy will report a greater incidence of daydreams/fantasies both in their overall life and in therapy sessions. It is also hypothesized that the therapeutic orientation of the therapist will have an effect on hemisphere dominance. In addition, breaking down analytic/psychodynamic therapists into subgroups (classical analytic, depth therapy, interpersonal) may yield further individual differences between therapists and their hemisphere dominances. Secondly, years of personal therapy

may also prove to be an important factor in whether or not daydreams and fantasies are frequent in any setting. It is hypothesized that those individuals who have had more prolonged therapy will report a higher incidence of daydream and fantasy material as compared to those individuals who have had only a brief or limited period of personal therapy.

5. Thought Processes. Zenhausern and Repetti (1979) found that right hemisphere dominant individuals tended to experience thoughts in pictorial form, whereas left hemisphere dominant individuals tended to experience thoughts in words or in a verbal form. It is therefore hypothesized that the data from this research will confirm the above finding despite the use of different measuring devices to ascertain hemisphere dominance.

## CHAPTER II

### LITERATURE REVIEW

#### Historical Perspective

While psychoanalysts and psychologists have been exploring the function and nature of the unconscious, neurologists and scientists, with a differing perspective, have been analyzing the brain and the role it plays in human consciousness. Individual neural pathways and functions have been mapped, along with the results of studies concerning the effects on behavior of a procedure where two halves of the brain are partially separated. It has been clearly demonstrated in split-brain studies that the two halves of the brain have different modes of operating and experiencing consciousness (Sperry, 1966; Gazzaniga, 1972; Ornstein, 1973). The early research in this area dealt with human subjects whose two hemispheres had been isolated either congenitally or in an accident (Sperry, 1966), while more recent experiments have attempted to explore the nature and function of the two hemispheres of the brain in normal subjects (Ornstein, 1973; Bakan, 1969). These same authors have advocated research exploring the two major modes of consciousness, the intellectual and the intuitive, and how they relate to the two hemispheres of the brain. The former mode is associated with left hemisphere processes in normal right-handed subjects, and the latter mode is associated with right hemisphere processes. According to Ornstein (1973), Western culture and contemporary science have emphasized an intellectual or a left hemisphere mode of logical, rational-analytic thinking and have

largely ignored other sources or potentialities of experience in the right hemisphere mode.

In the past twenty years, with the growing interest in Eastern religion and philosophies, there have been many psychologists who have sought to explore more right hemisphere processes and experiencing, mostly via hypnosis research and meditational states of consciousness (Shor, 1974; Tart, 1975). Research into chemically induced changes in consciousness pervades the literature (Zinberg, 1977; Tart, 1969, 1975).

In the later 1960's and early 1970's, with the advent of more sophisticated measurement tools such as brainwave biofeedback equipment, research into different states of consciousness, especially sleepdreaming, daydreaming and imagery, has proliferated (Singer & Antrobus, 1972; Singer, 1975; McKellar, 1972). In general, the research done in this period has focused mainly on asking people about the frequency and content of daydreams and related thought processes.

Growing out of the research on hemisphericity and lateralization in the 1960's, a series of research studies emerged relating eye movement phenomena to underlying thought processes, attention, level of anxiety, daydreaming and content (Day, 1964, 1967; Duke, 1968; Bakan, 1969; Kinsbourne, 1972; Singer & Meskin, 1974). This research will be reviewed briefly in a later section.

In the application of some of this research to psychotherapy, the literature is sparse. For the most part, research has been done on imagery and daydream methods in psychotherapy and behavioral modification

(Singer, 1974), with considerable emphasis on clinical biofeedback procedures (Budzynski, 1973).

Redefining classical psychoanalytic terms into a new language for research, Galin (1974) has devoted considerable effort to applying hemispheric differences to coping strategies and affective reactions of therapy patients. For example, he views regression as, "to some extent subserved by a functional disconnection of right hemisphere mental processes . . . [such that] we might expect that unconscious ideation would be expressed primarily through channels that are not preempted by the dominant verbal left hemisphere" (p. 581).

The little research that does exist in the area of psychotherapy focuses exclusively on the implications of hemisphericity for the patient and neglects the role of the differences in cognitive modes of the psychotherapist. In terms of the therapist/patient interaction, extensive research has been done on categorizing 'different therapists' clinical styles and attitudes, comparing different types of therapies, level of professional training and analysis, years of experience, etc., with variables such as empathy with the patient, perception of the patient's problem, diagnosis, prognosis, etc. (Strupp, 1960).

Other research in the area of psychotherapy includes attempts to correlate therapists' internal fantasy life with the type of therapy in which the therapist engages. It has been proposed that analytically-oriented psychotherapists are more inner-oriented and engage in higher levels of fantasy than do behavior therapists (Shaeffer, 1976). Specifically, there are no attempts in the

literature to categorize ongoing thought processes, fantasies, daydreams, etc. of the therapist as reported to occur within therapy sessions. There also have been no known attempts to assess hemisphericity of clinicians as a group to see what effect their preferred styles may have on their work with patients, choice of therapy style, etc. From an examination of the literature, it appears that no efforts have been made in training programs to take this type of information into account or of any conscious, directed efforts on the parts of training institutions to assess strengths/weaknesses in a trainee's preferred style of thinking and to attempt to train the student therapist along lines that would facilitate improved relations with patients.

In summary, a problem throughout the history of experimental psychology, psychoanalysis and even philosophy has been how to describe the relationship of the experience of consciousness with the brain and what we know about physiology. This research project is a unique attempt to approach the mind/body dualism by taking into account both functional physiology and subjective experiencing and by attempting to somehow relate the two in a systematic way.

### Whole-Brained Theories

Research conducted during the last several decades on commissurotomy (split-brain) patients has shown that the two cerebral hemispheres are specialized for different cognitive functions and that when they are surgically disconnected, the two halves of the brain appear conscious, i.e., two separate conscious minds in one head

(Sperry, 1966; Bogen, 1969; Gazzaniga, 1972). Using EEG techniques and measurements of alpha brainwave asymmetry it was later demonstrated that this phenomenon was real. It was found that relatively higher alpha brainwaves (a measure of idling or rest) are consistently found in the cerebral hemisphere not currently engaged in task performance, thus indicating a differential use of hemispheres for different tasks (Bogen, 1969; Sperry, 1966). What was consistently found was higher alpha amplitude over the right hemisphere during the verbal tasks and greater alpha amplitude over the left hemisphere during spatial tasks (Galin, 1974).

Just how the two hemispheres are integrated under normal conditions has been a perpetual source of speculation, with no current definitive explanation of how to predict when one hemisphere will be "on" or "off." The explanation that currently receives considerable support has been called "resolution of motivation," i.e., the hemisphere that "cares most" about the outcome preempts the output (Galin, 1974). Based on ingenious experiments with split-brain monkeys, it has been concluded that the hemisphere most successful in earning reinforcement comes to dominate (Gazzaniga, 1972). This theory has been applied to intact humans, suggesting that since the left hemisphere developed its language capability in the second or third year of life, it gains a considerable advantage over the right hemisphere in manipulating its environment and securing reinforcements. This forms the basis for the left hemisphere's seeming superiority with overt behaviors in situations of conflict with the right hemisphere (Galin,

1974). Further support for experience-based explanations of left hemisphere dominance in situations of conflict (where both hemispheres are simultaneously stimulated) is the obvious societal reinforcement for left hemisphere functions. Current and traditional public school teaching strategies appeal to and develop primarily the left hemisphere through their heavy emphasis on logical, sequential information processing.

### Hemispheric Specialization

What most characterizes the two hemispheres is that each hemisphere is specialized for a different cognitive style. In most normal, right handed individuals, the left hemisphere is specialized primarily for verbal, abstract, analytical, temporal and digital operations whereas the right hemisphere is specialized primarily for nonverbal, holistic, concrete, spatial, analogic, creative and aesthetic functions (Bogen, 1969; Gazzaniga, 1970; Ornstein, 1972).

Other factors discriminating the functions of the two hemispheres have been more descriptively defined: the left hemisphere is more active, outwardly oriented, characterized by a separation of object and self from others and associated with biological survival; the right hemisphere mode is receptive, quiescent, entails decreased visual attention to the external environment and can be characterized as the dark, subtle area of consciousness in which future and past are irrelevant (Ornstein, 1977).

### Hemisphericity

A surprising and interesting finding about the specialized functions of the two cerebral hemispheres was that the hemisphere activated during a particular task was not always the hemisphere most capable for that task (Levy & Trevarthan, 1976). The tendency for an individual to prefer one hemisphere over the other to process information has been referred to as "hemisphericity" (Bogen, 1969) or as "styles of learning and thinking" (Torrance, Reynolds, Riegal, & Ball, 1977).

Briefly defined, hemisphericity is the tendency of an individual to respond habitually to different tasks in either a manner characteristic of the right hemisphere (spatial-holistic-emotional) or the left hemisphere (logical-verbal-unemotional) (Frederick, 1976). A person with a preferred mode of functioning does not lack the capability of the less preferred hemisphere but rather, stylistically the functions of the less preferred hemisphere are shunned in favor of other preferred ways of responding to stimuli. Thus, hemisphere asymmetry reflects a differential efficiency rather than a "can-do"/"can't do" dichotomy. A hemisphere not specialized for a certain task is probably still able to perform that task but at a slower rate and less efficiently (Oexle & Zenhausern, 1981).

The specialized functions of each hemisphere appear well lateralized and are established early in the preschool and primary grades, continuing essentially unaltered throughout the normal life span (Kinsbourne, 1972; Zelinski & Marsh, 1976; Reynolds & Kaufman,

1978). There is some evidence that the communication between the two hemispheres increases with age and that the hemispheres become more similar as time passes (Kocel, 1980). If the Performance section of the Wechsler Adult Intelligence Scale is taken as a measure reflecting right hemisphere functions, it appears that there is a relatively greater decline with increasing age in right hemisphere abilities (Brown & Jaffe, 1975; Catell, 1971).

Kocel (1980) has also proposed that with age there is an increasing reliance on left hemisphere strategies, either in response to or provoking right hemisphere decline. Whether this seeming age-related decline in right hemisphere functions stems from disuse in a country where greater value seems to be attached to verbal-analytic approaches to problem solving, or whether this phenomenon is related to the differential effect of age on the neural system of the brain is unclear and remains a research problem.

Since a person's two hemispheres are able to function in a complementary manner (Bogen, 1969), any improvement in right hemisphere functions often results in an improvement in left hemisphere functions. There exists some evidence that modification in the tendency to use a particular hemisphere during problem solving can be done by modification of reinforcement contingencies (Gazzaniga, 1971), and that modification in preferred modes of thinking and learning are possible within relatively short-term (6-12 weeks) intensive training programs (Reynolds & Torrance, 1981).

### Hemisphere Dominance

Based on the differential efficiency of the two cerebral hemispheres, a model of cognitive functioning, called hemisphere dominance, has been proposed (Zenhausern, 1978). According to this model, a right dominant person is one who tends to experience thoughts in pictorial form and is more efficient at the tasks for which the right hemisphere is specialized, e.g., holistic, parallel information processing. A left dominant person is one who tends to experience thoughts in a verbal form and is more efficient at the tasks for which the left hemisphere is specialized, e.g., logical, sequential information processing.

Hemispheric dominance has been found to provide an accurate classification in recall and recognition. What has been most consistently found is that left dominant individuals retrieve auditorially-presented material better than visually-presented material; the opposite is true for right dominant individuals (Zenhausern & Gebhardt, 1979). Using lateralized retrieval strategies, right dominant individuals have been found to be significantly faster (both in terms of speed and encoding strategies) than left dominant individuals. In a maze-learning task, right dominant individuals were found to need fewer trials, take less time and make fewer errors than the left dominant group (Zenhausern & Nickel, 1979). In general, this model of hemisphere dominance has consistently predicted what intuitively makes sense: if a hemisphere is specialized for a certain function, individuals who are dominant in that hemisphere will do better on tasks related to that function than those whose opposite hemisphere is dominant.

### Personality Style

The proclivity to rely on the processing style of one hemisphere is believed by some to be relevant for understanding cognitive-defensive patterns and certain psychopathological personality styles of individuals. Hemisphere dominance has been correlated with a number of different factors. Right dominant individuals have evidenced greater hypnotic susceptibility (Bakan, 1969; Gur & Gur, 1974), have been shown more likely to internalize anxiety (Day, 1964) and to report more psychosomatic symptoms (Gur & Gur, 1975). It has also been found that right dominant individuals scored significantly higher than left dominant individuals in a category of defensive reactions that included repression, denial, negation, and reaction formation, whereas left dominant individuals scored higher higher on the defense clusters of projection and turning against others (Smokler & Shrevin, 1979; Gur & Gur, 1975). Highly significant differences were also found between those individuals deemed as "hysterical personality style" and those deemed as "obsessive personality style." The hysterical style group of individuals tended to be right hemisphere dominant, whereas those falling in the obsessive style group tended to be left hemisphere dominant.

In general, research in hemisphericity and personality style is quite sparse. It is also noteworthy that most of those studies reviewed above have used conjugate lateral eye movements to index hemispheric activities. However, there are innumerable problems with this type of research (to be reviewed in a later section).

Dunivan and Zenhausern (1981) recently replicated Smokler and Shrevin's (1979) research on obsessive/hysterical personalities. Instead of using lateral eye movements as a measure of hemisphericity, Dunivan and Zenhausern used a paper and pencil test they have developed and validated as a group-administered trait measure of hemispheric preference (Zenhausern & Repetti, 1979). These researchers found a consistent positive relationship between right handed individuals whose obsessive scale of the personality test was high and those who obtained a left dominant score on the hemisphere preference test. The correlations between the right hemisphere score and the hysterical scale of the personality test were somewhat lower but significant for all right handed individuals.

While observing the difference between the two hemispheres in the affective or coping strategies that appear following cerebral injuries, a similar phenomenon was noted. Denial of illness or euphoria is seen most often following right lesions, whereas "catastrophic" or depressive reactions most often follow left lesions (Galín, 1974). This particular study, however, observed the patient's reaction to the injury only; it still remains unclear whether or not, or to what extent, the two hemispheres of the brain each have a characteristic defensive style or affective tone.

#### Handedness

Both in language and social custom, the dual symbolism whereby "right" is synonymous with perfection and goodness and "left" is the symbol of evil and impurity seems universal. In the English

language this can poignantly be seen in the terminology used. Right handed individuals are referred to as "dextrals," suggesting dexterousness and coordination, whereas left handed individuals are referred to as "sinistrals," emphasizing bad and sinister qualities. Some researchers have seen the pathological qualities in left handedness: "left handedness is not only a neurotic symptom but one of the signs of an infantile psychoneurosis" (Blau, 1946).

For a long time, while the Behaviorists' school of psychology dominated psychological theory, research and practice, handedness was believed to be determined by training and reinforcement. John Watson ran a series of infant studies (1924; 1925) concluding that "left handers were hearty souls who resisted social pressure." The model of pathological left handedness has also received support from the observation that a significant percentage of left handers (compared to overall population norms) may be found among such clinical populations as stutterers, epileptics, the learning disabled and the mentally retarded (Springer & Searleman, 1980).

Contrary to the above-stated prejudices, there is growing support for the belief in the genetic determinants of handedness. In reviewing studies that consider neuroanatomical asymmetry in relation to handedness, almost every case manifested a correlation between morphological asymmetry and functional asymmetry. Right/left asymmetry was found in the parietal operculum, prefrontal region, occipital regions, venous drainage patterns and blood volume supply (Witelson & Pallie, 1973). Left handers manifest less or reverse

asymmetry compared to right handers. These authors also note that neonates show a comparable morphological asymmetry, suggesting a physiological or genetic basis for handedness.

The incidence of handedness varies according to the sampling procedures employed and to the date of the research publication. It has been shown that the incidence of left handedness has increased monotonically over a forty-year period (1932-1972), probably attributable to the relaxation of cultural pressure to be right handed (Levy, 1976). The following statistics of handedness are generally accepted: 11-15% of the population is left handed, 98% of right handed individuals have their language processes located in the left hemisphere; 50-60% of left handers have their language processes in the left hemisphere (Levy, 1974; Levy & Reid, 1976).

It has also been demonstrated that left handers who write in the "normal posture" (under the line) have right hemisphere speech representation whereas those who write with the "hooked posture" (the hand curled above the line of writing) have left hemisphere speech representation (Levy & Reid, 1976). The later group also showed an overall decrease in functional laterality of hemispheric specialization.

In a study of eye directionality in left handers, it was found that whereas most right handers moved their eyes differentially according to the problem type (i.e., left in response to spatial questions and right in response to verbal questions), 85% of the left handers had eye movements that inconsistently related to problem type and appeared haphazard. Fifteen percent of all left handers performed

in the predicted direction; they moved their eyes to the left for verbal questions and to the right for spatial questions, the exact opposite of what is generally expected for most right handed individuals (Gur & Gur, 1975). These statistics seem to fit in with the overall population percentages cited above, suggesting that those left handers who do not seem to activate a particular hemisphere as a function of problem type are those left handers whose language function is primarily in the left hemisphere. On the other hand, the smaller percentage of left handers show activation patterns indicating right hemisphere language specialization and left hemisphere specialization for spatial processing.

Research has also suggested that while functions are widely distributed across the cerebrum in the right handers, left handers tend to perform the majority of ALL functioning in one hemisphere or the other, suggesting a more "closely packed" type of information processing (Kinsbourne, 1972).

Well validated research on graduate students has found that left handed graduate students manifest a perceptual disability (a right hemisphere skill) when compared to right handed graduate students (Levy, 1969; Miller, 1971). It has also been suggested that left handed graduate students have equal or superior verbal skills when compared to right handed graduate students (Levy, 1969). Levy suggests that an explanation for this phenomenon is that the left handed population of graduate students observed tend towards cerebral symmetry that has produced what may be referred to as two left hemispheres.

Consequently, gestalt/perceptual capabilities (right hemisphere skills) suffer in left handed graduate students. Evidence thus appears rather strong that a majority of left handers have a more symmetrical (less lateralized) brain, compared with right handers.

While the research reviewed above appears to be the most widely accepted and cited, other studies of left handers have not observed a verbal/spatial discrepancy in left handers when they are compared to right handers (Briggs, Nebes, & Kinsbourne, 1976; Heim & Watts, 1976). Some have gone so far as to assert right hemisphere superiority in certain left handers, finding higher incidences of left handedness than expected in groups of musicians (Byrne, 1974), artists (Mebert & Michel, 1977) and architects (Peterson & Lasky, 1977).

From the above cited research it is clear that those left handers with specific talents do not represent left handers as a total group and that perhaps when taken into conjunction with gender differences one may be able to explain these inconsistencies. For example, Levy and Gur (1980) propose that left handed males with inverted hand posture (hooked or over the line hand posture), which represent approximately 50% of all left handers, are most likely to evidence superior spatial abilities as compared to verbal abilities. It seems possible that those left handed individuals who do evidence superiority in spatial abilities over verbal abilities are also the ones that Levy and Gur describe as having "inverted" hand posture.

One of the major problems in this whole area of research is that left and right handers are almost always taken as a homogenous

group when, in fact, there appear to be subgroups within each group of handedness whose functional asymmetry is very different. The fact that right handers are more homogenous as a group is probably why they are most usually used in research. The contradictory findings concerning left handers may be due to the fact that different subgroups are rarely ascertained.

Further research has found that right handers with left handed relatives have been found to have a much higher probability of recovery from aphasia following a left hemisphere lesion than those individuals who have only right handed relatives (Luria, 1970). The research indicates that right handers with left handed relatives are only weakly laterally differentiated and thus are better able to compensate for damage to either hemisphere (Levy & Gur, 1980). It has been found that left handers with reverse lateralization (right hemisphere language) have very well lateralized functions and those with the reverse display weak lateral differentiation (Levy & Reid, 1976).

Only initial steps have been taken towards explicating the effect of handedness on personality correlates of individual differences in hemispheric activation. Some tentative evidence relating handedness to hypnotizability has been provided (Bakan, 1970). It was found that left handers were more likely than right handers to score at the extremes (high or low) on a hypnotic susceptibility scale.

It has also been proposed that left handers have greater trust than right handers (Etaugh, 1972). To further validate previous research on hemispheric activation and obsessive and hysterical personality styles, Dunivan and Zenhausern (1981) found that "left activators" (left hemisphere dominant) thought in words and scored high on hysteric personality scales (this research was reviewed in a previous section). Interestingly, these authors found that this relationship did not appear for left handers and was less powerful for right handers with a family history of left handedness. While minimal efforts have been made to correlate personality factors with handedness, it seems clear that handedness does appear to be an individual difference variable that may prove to have some predictive validity in as yet undetermined personality correlates. Thus there is strong agreement in the literature that left handers deviate significantly in cerebral organization from the majority of right handers; they either have a reverse laterality pattern or are less strongly lateralized.

The differences in cognitive organization found between left and right handers both in terms of the degree and direction of hemispheric specialization seems to have a profound effect on cognitive capacity and style. These differences have yet to be explained by research. However, it seems clear that handedness is an individual difference variable that appears to have some predictive value in terms of how an individual will process information. This suggests that any research endeavor in the area of hemispheric specialization or in

understanding an individual's style of learning and thinking needs to take the handedness of an individual into account.

In summary, the vast proportion of studies on laterality are restricted to right handers and, often, to right handed males with no left handed first degree relatives (Levy & Gur, 1980). This is largely due to little understood complications that left handers seem to present when they are included in statistical analyses of data. Based upon the above cited research, handedness of an individual needs to be considered along with gender before any predictive value or correlational significance can reliably and validity be obtained.

Also, as previously mentioned, the different subgroups within each category of handedness need to be ascertained, i.e., to just assume that left handers have the reverse pattern of laterality from right handers is erroneous. Therefore, an individual's specific pattern of hemispheric specialization needs to be assessed in order to reflect the heterogeneity that appears to exist within the different categories of handedness.

#### Sex-Related Differences in Cerebral Organization

Most of the early split brain research was done on males, largely because the population most easily accessible to research consisted of male veterans of war in Veterans Administration hospitals. The factor of gender has only very recently been considered to be relevant to cerebral dominance. In fact, many of the studies reviewed did not analyze their results according to sex, even when data were available.

Levy and Gur (1980) estimate that only about 15-20% of the neurological population from which cerebral dominance estimates have been obtained are female.

Current available research in general indicates little support for a sex difference in right/left neuroanatomical asymmetry (Witelson, 1980). When taken in conjunction with handedness, however, strong correlation between morphological asymmetry with functional specialization was observed (see review of handedness literature in the previous section).

Recently, however, gender has been reported to be associated with individual differences in the pattern of hemispheric specialization. An increasing number of studies has been consistent in reporting that the degree of overall cerebral lateralization is less in females than in males. Males appear to have a greater lateralization of spatial functions to the right hemisphere and a greater lateralization of verbal functions to the left hemisphere when compared to females (Levy & Gur, 1989; Witelson, 1980). It is noteworthy that this is usually only a difference in the degree of functional asymmetry between males/females rather than a difference in the direction of functional asymmetry. This sex-related difference has also been observed to exist with left handers, even those who are weakly lateralized (Levy & Reid, 1976).

The above research seems to suggest that females are less specialized in their use of a particular hemisphere. This may account for other research cited where females have been found to be better

able to resist damage to intelligence that can come from deficiencies in mothering (McBroom, 1981). Perhaps what this suggests is that females are less "stuck" in the use of a particular hemisphere for certain tasks and that consequently females are better able to compensate for any damage incurred to either cerebral hemisphere.

In studying children, Reid (1979) found that at age five the left hemisphere of females and the right hemisphere of males, regardless of cognitive functions, were sufficiently developed to manifest an asymmetric superiority on verbal or spatial tasks. Research thus increasingly confirms what has been intuitively cited for decades, that across most of the population (those individuals with left hemisphere language) females are generally more proficient at verbal tasks whereas males tend to be more proficient at spatial tasks. Exactly the reverse pattern of sex-related differences has been found in children with right hemisphere language dominance.

A similar pattern to that stated above, where males are better at spatial tasks than females, has been evidenced by well known psychological research. On the "rod and frame" test where field dependence/independence is assessed, women are consistently more influenced by the tilt of the frame (called "field dependent") than are males (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). Women's perception thus appears to be influenced by the total gestalt or context of a given situation rather than focusing and separating out the specifics of the situation. Possibly since women appear to be less lateralized, they derive more information from both hemispheres and, in tests such

as the "rod and frame" they are deceived by certain perceived "tricks." As suggested by McBroom (1981), perhaps perceiving an overall context (the female tendency) and simultaneously analyzing detail (the male tendency) may be difficult or impossible, resulting in sex-related differences in the ability to perform such tasks as the "rod and frame" test.

That males are relatively superior to females in visual-spatial functions and females superior to males in verbal fluency may pertain only to those individuals whose language functions are in the left hemisphere (Levy & Gur, 1980). These authors further postulate that sex-related differences in cognition are increased when the individual is assessed to have weak hemispheric differentiation. To further explicate, in most right handed females and males the main language hemisphere is on the left. The females in this group tend to have bilateralized verbal functions (across both hemispheres, i.e., weak lateralization) and the males tend to have bilateralized spatial functions with the reverse pattern if the main language hemisphere is the right hemisphere. It therefore follows that in cases of the bilateralization of one function, this particular function (verbal skills in most right handed females and spatial skills in most right handed males) will evidence superior ability over the other function.

Thus, based on the literature review, when considering both gender and handedness, one could summarize the following patterns:

1. Right handed females (with normal hand posture) generally evidence better verbal (left hemisphere) skills than spatial skills (right hemisphere), with males showing the reverse pattern.

2. Left handed females with normal hand posture will evidence unusually good spatial abilities and unusually poor verbal abilities when compared to right handed females, with males showing the reverse pattern.

3. Right handed females with inverted posture (hooked or "over the line") will evidence unusually good spatial abilities and unusually poor verbal abilities when compared to right handed females, with males showing the reverse pattern.

4. Right handed females with inverted posture (hooked or "over the line") will evidence better spatial abilities than verbal abilities when compared to left handed females, with the opposite pattern for males.

5. Left handed females with inverted hand posture will evidence unusually good verbal abilities and unusually poor spatial abilities, with the opposite pattern for males.

These predictions cited above have not been validly demonstrated in empirical investigations and merely reflect the current thinking and knowledge about sex-related differences in cerebral functioning. In general, research about gender differences in cognitive functioning is quite inconsistent, accounting for the greater use of males in many research studies. It is quite clear that sex is an important variable to

at least consider when analyzing measurements of hemispheric specialization.

### Measurements of Cerebral Lateralization

Lateral Eye Movements. One of the methods that has been used as a means of observing hemispheric asymmetry and cognitive styles in normal persons makes use of lateral eye movements (LEM's). Lateral Eye Movements refer to the shifts in gaze to the right or left that occur when people engage in reflective thinking. During ongoing cognitive activity, eye shifts to the left are believed to reflect right hemisphere predominance and shifts to the right to reflect left hemisphere predominance (Ehrlichman & Weinberger, 1978).

In a critical review of lateral eye movement and hemispheric asymmetry research, Ehrlichman and Weinberger (1978) assert that in only 50% of all reviewed studies was the predicted pattern of LEM's found (more right LEM's for left hemisphere questions and vice versa). These authors found conceptual and methodological ambiguities in the questions asked of subjects, in the actual methods used to score LEM's, and in the experimental situations themselves.

While it is clear that studies of individual differences in LEM patterns have a fair degree of stability and some consistency in their correlates, these correlates have not clearly been related to hemispheric asymmetry and thus there is question about whether there is sufficient justification existing to correlate LEM patterns with hemisphericity. While observations of LEM patterns provide an important heuristic device for the overt manifestation of hemispheric

asymmetry, very recent research has yielded paper and pencil tests where both conceptual and methodological ambiguities seem less cumbersome and less potentially confounding than the current research status of LEM correlates with hemispheric asymmetry (see next section).

Questionnaire: Style of Learning and Thinking (SOLAT)

Torrance, Reynolds, Reigel, and Ball (1977) devised an instrument for classifying subjects according to hemisphericity or style of information processing called "Your Style of Learning and Thinking" (SOLAT). It is a self-report, multiple choice questionnaire which classifies persons according to right, left and integrated styles of information processing. It was based on the accumulated research findings concerning the specialized functions of the cerebral hemispheres (Torrance & Reynolds, 1980; Torrance & Mourad, 1979). Each item presents the respondent with three choices: a right hemisphere mode of processing information, a left hemisphere mode, and an integrated way of information processing.

The SOLAT questionnaire has undergone three major revisions; the current form, FORM C, has fairly extensive norms, reliability data and validity information accumulated and documented in journal articles (Torrance et al., 1977; Torrance & Reynolds, 1980). The mean of the test-retest coefficients of correlation is about .85. The test-retest reliability study was conducted in a treatment situation known to have produced changes in styles of learning and thinking in the direction of right hemisphere and integrated styles of learning and thinking.

Much of Torrance's research with SOLAT has been in assessing and enhancing creativity. Research with SOLAT has indicated that both cerebral hemispheres are involved in creative behavior. However, it appears that persons classified as having a left hemisphere style of processing information ("Lefts") attained lower scores than either the right hemisphere ("Rights") or integrated groups ("Integrates") on the measures of creative thinking ability and on the personality measures associated with creative behavior. Lefts excelled over the other two groups only on the Associates Test and the overall differences were not statistically significant (Torrance & Mourad, 1979).

In this same study of creativity, few differences were found between the Rights and the Integrates. Persons classified as having a right hemisphere style of information processing were found to be less aware of others but were generally more intuitive. The Rights also obtained higher scores than Integrates on certain tests of originality and tests of creative thinking. In sum, the authors found that the extent to which hemisphericity affects creativity varies according to the nature of the task. However, those individuals who are Right and Integrated appear to be generally more effective than Lefts and to have the motivations and personality characteristics usually associated with creative achievement.

In further studies using SOLAT measurements, Rights and Integrates were found to make significantly more applications of new learning, compared with Lefts (Torrance & Ball, 1979). It was also found that Rights, described as "Innovators" were better capable of generating

ideas for more radical changes, whereas Lefts, described as "adaptors" were better skilled in initiating changes that improve the current way of doing things (Torrance & Yun Horng, 1980).

In sum, Torrance's SOLAT questionnaire determines whether or not a subject typically uses the specialized capabilities of the right or left hemisphere and also yields an integrated score which assesses the integrated functioning of both cerebral hemispheres. In the last two years a vast number of research studies, mostly in the areas of learning and education, have used the SOLAT questionnaire in an attempt to further explore internal processes and overt behavioral correlates.

#### Questionnaire: Hemisphere Preference Test

Zenhausern (1978) proposed a model of cognitive functioning based on individual differences with respect to the ability to perform tasks which are most efficiently processed by the two cerebral hemispheres. This concept of hemisphere dominance defines those individuals as right dominant if they are better at the holistic, visual-spatial tasks (for which the right hemisphere is specialized) than the verbal-sequential tasks (for which the left hemisphere is specialized). Those individuals who excel on sequential, verbal tasks are considered to be left dominant. Zenhausern's model further predicts that right dominant individuals tend to experience thoughts in pictorial form and prefer a deductive mode of reasoning or a holistic, parallel processing style; left dominant individuals tend to experience thoughts in verbal form and are more efficient at and prefer a logical, sequential or inductive mode of reasoning. It is important to note that the

categories of "picture" versus "word" thinkers are not absolute categories. For example, a left dominant individual may have very vivid imagery; however, the imagery is merely in addition to the preferred use of words to trigger thoughts.

Several lines of research have lent support to the above model of cognitive functioning. Zenhausern and Repetti (1979) developed a paper-and-pencil test, "The Hemisphere Preference Test" (HPT) that has successfully differentiated right versus left hemisphere activators in regard to "picture" versus "word" thinkers. This questionnaire is based on a further analysis of items used in the questionnaire "Your Style of Learning and Thinking" reviewed in the previous section (Torrance et al., 1977).

The purpose of the HPT questionnaire is to classify an individual as a word or picture thinker. The last question of the test poses this question directly to the subject; all previous questions are exercises to help subjects focus on that distinction.

In a study using both the HPT and Torrance's SOLAT questionnaire, Zenhausern and Repetti (1979) found significant differences between picture thinkers and word thinkers; the former characterize themselves as typically using the abilities of the right hemisphere, whereas the latter group of word thinkers were found to characterize themselves as typically using the abilities of the left hemisphere. Seventy percent agreement between the two questionnaires was found.

Thus, support exists for Zenhausern's assertion that those individuals who think in words tend to be left dominant whereas those

who think in pictures tend to be right dominant. Furthermore, this research lends support to the assertion that there is a relationship between self reported styles of thinking and the differential use of the two hemispheres.

Interestingly, no significant sex difference was found among the subjects used in Zenhausern and Repetti's study. A total of 65% of the males and 67% of the females classified themselves as picture thinkers. The authors themselves assert the possibility that the vividness of visual imagery is not perfectly correlated with picture thinking and that the distinction between thinking in pictures and having pictures merely in addition to thought can be difficult to make and may result in subjects misclassifying themselves due to this difficulty.

Zenhausern and Gebhardt (1979) found the Zenhausern model of hemisphere dominance to be an accurate way to classify performance in recall and recognition. Left dominant individuals were found to retrieve auditorily presented material better than visually presented material, with the opposite being true for right dominant individuals. Differences have also been found between information processing speed and encoding strategies (Coleman & Zenhausern, 1979) with right dominant individuals being significantly faster in their overall encoding and retrieval strategies. Similarly, right dominant individuals were found to take fewer trials, less time and make fewer errors than the left dominant group on a task requiring subjects to learn a 10-blind-alley finger maze (Zenhausern & Nickel, 1979).

In a study described in a previous section, Dunivan and Zenhausern (1981) applied Zenhausern's model of hemisphere dominance to a previous study relating personality characteristics to differential hemispheric activation, that is, to Smokler and Shrevin's (1979) study on obsessive and hysteric personality styles. Using the HPT as a measure of differential hemispheric activation, Dunivan and Zenhausern found the expected relationships between the obsessive personality and a left preference score and the hysteric personality and a right preference score.

Recently, the knowledge obtained about information processing and differential hemispheric activation using the HPT as a measure of hemispheric activity has been applied to education. In a study of good versus poor readers, Oexle and Zenhausern (1981) found 17 out of the 20 poor readers to be right hemisphere dominant. More extensive applications to theories of learning and education have been developed by Torrance (1980, 1981) who has used the SOLAT questionnaire rather than the HPT questionnaire.

### Summary

Both Torrance's SOLAT questionnaire (40 questions) and Zenhausern's HPT questionnaire (26 questions) appear to be measuring the phenomenon of hemispheric preference and/or efficiency based on the model of cognitive style that predicts individual differences in hemispheric dominance, regardless of the nature of the problem or task. For the purposes of the present research, Torrance's SOLAT

questionnaire has been chosen for use due to its seemingly wider scope of interest. As noted by Zenhausern (1978) the sole criterion for classifying an individual as right/left dominant is his/her self description of thought processes as either primarily a word or picture thinker. Most of Zenhausern's 26 questions were derived from Torrance's original list of 50 questions (Torrance & Reynolds, 1980) and sample a broader range of behavioral correlates in their assessment of hemisphere preference. It seems important that, in scoring of the SOLAT questionnaire, one can obtain both an "integrated" score which assesses the integrated functioning of both cerebral hemispheres, and a "right" and "left" score. Finally, in administering both questionnaires to ten subjects in an exploratory study, nine out of ten said they felt the SOLAT questions better reflected their internal thought processes.

## CHAPTER III

### METHODS AND PROCEDURE

#### Specific Research Hypotheses

1. Therapeutic Orientation. Those psychologists with a right hemisphere dominance or preference will be more likely than those psychologists with a left or integrated hemisphere dominance or preference to indicate engaging in analytic/psychodynamic therapeutic techniques. Those psychologists with a left hemisphere dominance or preference will be more likely than those psychologists with right or integrated preferences to indicate engaging in cognitive/behavioral therapeutic techniques and practices.

2. Activity Level. Those psychologists with a right hemisphere dominance or preference will report that they are less active in their therapy sessions than those psychologists with left or integrated hemisphere dominances or preferences.

3. Research. Those psychologists with a right hemisphere dominance or preference will report engaging in less overall research than those psychologists with a left or integrated dominance or preference. Separately analyzing those psychologists who engage in research: (a) those psychologists with right hemisphere dominances or preferences will be more likely than those psychologists with left or integrated dominances or preferences to engage in theoretical/conceptual research and (b) those psychologists with left hemisphere dominances or

preferences will be more likely than those psychologists with right and integrated hemisphere dominances and preferences to engage in empirical research.

4. Daydreams and Fantasies. Those psychologists with a right hemisphere dominance or preference will report a greater frequency of overall daydreaming and in-session daydreaming when compared to those psychologists with left or integrated hemisphere dominances or preferences.

5. Personal Therapy. Those psychologists who have undergone therapy will report a higher incidence of daydreams/fantasies in both their overall life and in therapy sessions when compared to psychologists who have not had their own therapy. Those psychologists whose therapist was analytic/psychodynamic in therapeutic orientation will report a higher incidence of daydreams/fantasies in both their overall life and in therapy sessions when compared to those psychologists whose therapist was cognitive/behavioral in therapeutic orientation.

6. Thought Processes. Those psychologists with right hemisphere dominances or preferences will be more likely to report that they think in PICTURES than psychologists with left or integrated hemisphere dominances or preferences. Those psychologists with left hemisphere dominances or preferences will be more likely to report that they think in WORDS than those psychologists with right or integrated hemisphere dominances or preferences.

7. Sex. Each of the above six variables will be compared on the basis of sex (male or female) to determine what, if any, relationship exists between sex and each of the dependent research variables.

8. Handedness. Each of the above six variables will be compared on the basis of handedness (left or right) to determine what, if any, relationship exists between handedness and each of the dependent research variables.

### Sampling Procedure

The subjects for this research project were 68 Ph.D. clinical psychologists chosen from the Philadelphia Society for Clinical Psychologists' 1982 membership directory. In an effort to obtain a sample of Ph.D. clinical psychologists who did research in addition to clinical work, subjects were chosen if they listed a university affiliation in the directory. Furthermore, an effort was made to include roughly equal groups of those psychologists who view themselves as analytic/psychodynamic in theoretical orientation and practice and those psychologists who view themselves as cognitive/behavioral in theoretical orientation and practice. Since the pilot study that was conducted (see Appendix B) revealed a larger number of analytic/psychodynamic respondents, for the research project all psychologists who listed in the directory an affiliation with well known cognitive/behavioral clinics (e.g., depression clinics, clinic for agoraphobics) were included in the study.

No attempt was made to ascertain handedness prior to inclusion in the research study; both left and right handed individuals were included, but no attempt was made to control for size of groups according to handedness. Similarly, no attempt was made to control for sex of the subject. However, equal numbers of questionnaires were mailed to both male and female psychologists.

### Description of Sample

Number of respondents. A total of 190 questionnaires were distributed by mail. A total of 68 were returned; 36% of the sampled population returned the questionnaire. This is not considered to be a representative sample of urban psychologists because there was a self-selection bias in terms of who responded. Furthermore, since the questionnaire was distributed by mail, the percentage that did respond may not be a representative sample of the group of urban clinical psychologists as a whole.

psychologists as a whole.

Sex. Of the total number of 68 subjects, 44 were males, 24 were females. There were roughly two times as many males as females who responded to the research questionnaire despite the fact that equal numbers of questionnaires were mailed to males and females. No adequate explanation of this sex bias can be determined by this researcher. However, due to the small number of female respondents, the results are not considered representative of the group of female psychologists.

Handedness. Ninety-one percent of the subjects were right handed, 7% were left handed and 1% were mixed. Since only five research subjects were left handed, no significant statement can be made in comparing handedness to the research questions. In the general population, sinistrality (left handedness) is purported to comprise 10-13% of all individuals (see literature review). The subject population of this research study is slightly under the expected percentage for left handers. Of the five left handed individuals in this study, no consistent pattern was noted in relation to any of the research questions.

Age. The subjects ranged from 30 to 65 years of age with the average age of 40.1 years. Twenty-five percent of the subjects were under 34 years of age, 52% were under 40 years of age, 75% were under 50 years of age and 25% were over the age of 50. Surprisingly, there was a considerable number of older clinicians who responded to the questionnaire. Not so surprising was the fact that males in the research sample were significantly older than the females in the sample ( $t=2.13$ ,  $df=64$ ,  $p=.03$ ). This is probably due to the recentness with which females have obtained degrees in clinical psychology. This also helps explain the difference in the number of male/female respondents.

Years of practice. The subjects ranged from one to 40 years of practice, with a mean of 14.0 years ( $S.D.=14.6$ ) of practice. Again, males in the research sample had significantly more years of practice

as clinicians than females ( $t=2.38$ ,  $df=66$ ,  $p=.02$ ). The average number of years of practice for males was 17 years whereas the average for females was 8.4 years.

Length of time see patients. Twenty-eight percent of the subjects reported seeing their patients, on average, less than six months; 36% reported seeing their patients an average of 6-12 months; 36% seeing their patients, on average, over one year.

Hours of patients per week. Twenty-one percent of the subjects reported seeing less than ten hours of patients per week. Thirty-six percent of the subjects reported seeing 10-20 hours of patients per week. Forty-three percent of the subjects reported seeing over 20 hours of patients per week. Overall, the sample of respondents appears to provide a large amount of direct clinical services; close to half of the subjects reported over 20 hours of patient contacts a week. In addition, males in this research sample reported more hours of patient contacts per week than the females; 50% of the males reported over 20 hours of patient contacts per week whereas only 30% of the females reported over 20 hours of patient contacts per week.

Work affiliations. Thirty-five percent of the subjects listed their primary work affiliation as private practice, 30% as academic, 16% as hospitals, 13% as Mental Health Centers and 4% as administrative. Sixty-three percent listed their secondary work affiliation as private practice, 17% as academic institutions, 12% as Mental Health Centers, 9%

as hospitals (see Table I). It is noteworthy that males were twice as likely as females to list private practice as their primary work affiliation. It was also interesting to note that a considerably higher percentage of females (30%) compared to males (5%) reported Mental Health Centers as their primary work affiliation.

TABLE I  
Primary and Secondary Work Affiliations

| Work affiliation     | Adjusted frequencies (%)<br>(N=68) |                          |
|----------------------|------------------------------------|--------------------------|
|                      | Primary<br>affiliation             | Secondary<br>affiliation |
| Private Practice     | 35                                 | 63                       |
| Mental Health Center | 13                                 | 12                       |
| Hospital             | 16                                 | 8                        |
| Academic             | 31                                 | 17                       |

Preferred type of therapy. Fifty-nine percent of the sample preferred individual therapy, 13% preferred family and couples therapy, and 28% reported preferring a combination of therapies. Generally, it appears that the psychologists sampled in this research engage in the type of therapy which they prefer.

It is noteworthy that there were sex differences in regard to the type of therapy with which individuals were most comfortable. Sixty-nine percent of the males reported preferring individual therapy compared to 30% of the females. The majority of females reported preferring to engage in a combination of different types of therapies.

Personal therapy. Eighty-four percent of the psychologists reported having had their own personal therapy; there were only 11 subjects who had had no personal therapy. Of those who reported having been in therapy, 23% had one year of therapy, 21% had two years of therapy, 33% had four years of therapy, and 23% reported having had over five years of therapy. In regard to the therapeutic orientation of the subjects' therapists, 76% reported to have been in an analytic/psychodynamic type of therapy, 12% in a cognitive/behavioral type of therapy, and 12% reported other than these two categories of therapy. Because so few subjects had been in behavioral types of therapy, it was impossible to make any statistical comparisons using this variable.

#### Summary of Subject Population

The sample of psychologists for this research tended to have the following characteristics: the psychologists tended to be male, right handed, middle aged, fairly experienced clinicians (practicing ten years or more), saw a considerable number of patients per week (over 15 hours per week), generally saw each patient over six months, and engaged in and preferred individual therapy. Numerous sex differences were noted; males in this sample were considerably older than the females, had more years of clinical experience and saw more hours of patients per week than the females in this sample. Thus, the generalizability of the results of this study are limited by the characteristics stated above. Furthermore, as previously stated,

since only roughly one-third of the entire sample of psychologists was female, the generalizability of the results to female psychologists as a group is particularly limited.

Instrumentation. All subjects were asked to fill out two questionnaires, The Personal Data Questionnaire devised for the purpose of this research project, and Your Style of Learning and Thinking (SOLAT), Form C, by Torrance and Reynolds (1980). See Appendix A for a copy of each of these questionnaires. The SOLAT questionnaire was discussed in the literature review. For this 40-item multiple choice questionnaire the scoring is objective. Scoring criteria were entirely based on Torrance and Reynold's 1980 norms manual which included standardized norms for all research subjects. Their guidelines included the criterion that the individual must have a standard score of 120 or above ( $\bar{X} = 100$ , S.D. = 20) to be included in the right dominant, left dominant or integrated categories. This means that an individual termed right, left or integrated in hemisphere dominance must fall in the upper 15% of his or her particular category for inclusion. Furthermore, the authors note that there must be a 10-point difference between the individual's raw score on their "dominant" scale and their raw scores on the other two scales in order for dominance to be ascertained. The specific SOLAT test items that reflect right, left and integrated hemisphere functioning have been extracted from the questionnaire and are listed in Appendix A.

### Operational Definitions

Hemisphere dominance. Consistent with the norms in Torrance and Reynold's (1980) manual for determining hemisphere dominance, each psychologist's hemisphere dominance was ascertained from responses to the SOLAT questionnaire. "Dominance" refers to only those psychologists whose scores on the SOLAT questionnaire reached criteria according to SOLAT norms (these are delineated in the instrumentation section). An individual's hemisphere dominance fell into one of three areas: right hemisphere, left hemisphere or integrated hemisphere. Those psychologists whose scores on the SOLAT did not meet the criteria as stated in the previous section were not deemed as having a particular hemisphere dominance.

Hemisphere preference. This variable was created specifically for the purpose of this present research project. This variable includes all research subjects and is the label used to describe the psychologists' overall cognitive style, e.g., the patterning of responses to the SOLAT questionnaire on each of the three scales (right, left and integrated).

Pilot study results (see Appendix B) indicated that only a small portion (less than 50%) of the psychologists reached Torrance and Reynold's (1980) criteria for dominance on either the right, left or integrated scales of the SOLAT. For this research project, only 27 out of the 68 psychologists were found to manifest a hemisphere dominance. This new variable was created so that all psychologists

could be included, not merely the psychologists that manifested clear cut dominance.

The psychologists who manifested a hemisphere dominance according to SOLAT norms were included in this variable of hemisphere preference. For those psychologists whose scores did not reach significance according to the SOLAT criteria, the category in which their numerical score was the highest (either right, left or integrated) was chosen as the "preferred" mode of thinking, as long as there was at least a 10 point difference between the highest score and the next highest score. If no such difference existed, the subject was designated to one of the following three categories depending upon which two scores of the three were the highest (regardless of the range of the difference): right/left, right/integrated, left/integrated. No attempt was made to discriminate which of the two scores was higher, just that the individual was higher on these two scales than on the third scale. Thus, there was a total of six categories in which an individual might fall: right, left, integrated, right/left, right/integrated, left/integrated.

The following operational definitions were used to delineate each of the dependent variables.

1. Therapeutic Orientation. In an effort to limit the choices and maximize the number of psychologists in each group, each psychologist was given a choice of two therapeutic schools: analytic/psychoanalytic (which was subdivided into classical analytic, depth therapy, interpersonal or other) or cognitive/behavioral. The subject was also given a third option in which they could write in their preference if

they felt two choices were too limiting. The therapeutic orientation of the psychologist was addressed in question #7 of the Personal Data Questionnaire.

2. Activity Level. The activity level of the subject was operationally defined in terms of psychologists' self-reports of the level of activity that they engaged in during a typical therapy session. Two examples were given to define "activity": the amount of talking engaged in by the therapist, and the prescription of specific therapy tasks to patients. The subject was presented with a scale, ranging from one to five, where one was "hardly active at all," three was "moderately active" and five was "very active." The subject had to circle a number which best reflected his or her general activity level in a typical therapy session. Question #10 on the Personal Data Questionnaire was the research question that addressed the variable of activity level.

3. Research Activity. The subject's research behavior was operationally divided into two parts, (a) the percentage of time in the total work week in which he/she engaged in research, and (b) the specific type of research in which he/she engaged. For the latter, the subject was given three options: empirical research, theoretical/conceptual research, and a blank space in which to write a third alternative. Question #6 of the Personal Data Questionnaire was the research question that addressed the variable of research activity.

4. Daydreams/Fantasies. Daydreams and fantasies were not operationally defined for the subject. However, for the purposes of this research daydreams and fantasies were viewed as the same variable

describing thoughts which wandered at any given moment away from the task at hand. There were two questions devoted to daydreams/fantasies. The subject was specifically asked to rate the overall frequency of his or her daydreams/fantasies along a five point scale, where one was "never," three was "moderate" and five was "very frequent." The subject was given the same scale with which to rate the overall frequency that he or she engaged in daydreams/fantasies when in a session with a patient. Questions #11 and #12 on the Personal Data Questionnaire were the items that addressed the variable of daydreams/fantasies.

5. Personal Therapy. This variable was operationally defined in terms of the subject's self report about whether or not he or she had had their own personal analysis or therapy. No attempt was made to distinguish between analysis or therapy. The subject was also asked the number of years he/she had been in therapy and the therapeutic orientation (analytic/psychodynamic, cognitive/behavioral, or other) of his/her therapist. Question #8 on the Personal Data Questionnaire was the research question addressing the variable of personal therapy.

6. Thought Processes. Thought processes were operationally defined for purposes of this research as the subject's self-perception of whether or not he or she thinks: (a) mostly in pictures, (b) mostly in words, or (c) equally in words and pictures. The Personal Data Questionnaire item #13 was the research question that addressed the variable of thought processes.

7. Handedness. Handedness was determined according to the same guidelines used in other research in the area (Levy & Gur, 1980;

Briggs, Nebes, & Kinsbourne, 1976). An individual was deemed right or left dominant in handedness if he or she performed at least three of the following activities with the preferred hand: writing, eating, hammering, throwing, batting, cutting. Question #3 on the Personal Data Questionnaire was the item that addressed the variable of handedness.

## CHAPTER IV

### RESULTS

#### Hemisphere Dominance

No specific hypotheses were formulated regarding the percentage of psychologists in this study that would manifest a hemisphere dominance according to Torrance and Reynold's (1980) criteria. Of the 68 research subjects, 28 manifested a hemisphere dominance. Forty-three percent of the psychologists were found to have an integrated hemisphere dominance, 40% were found to have a right hemisphere dominance and 15% manifested a left hemisphere dominance. For each of the research hypotheses, this group of 28 psychologists was compared to the total research group to ascertain whether or not those psychologists with a hemisphere dominance responded any differently from the total research group. These results are delineated in the following sections.

A comparison of the psychologists' right, left, integrated and mixed hemisphere dominance in this study and college students in Torrance and Reynold's study (1980) can be seen in Table II. As can be seen from the table, Torrance and Reynolds (1980) found that their gifted college students fell roughly equally into all four groups. Their result appears to be considerably different from the results obtained from the psychologists in this research. There are considerably fewer psychologists in this study with a left hemisphere dominance and considerably more psychologists with an integrated hemisphere

dominance when compared to Torrance and Reynold's gifted college students. No statistical comparisons were made between these two groups.

TABLE II  
A Comparison of Frequencies of Hemisphere  
Dominance in Two Research Projects

| Hemisphere dominance | Adjusted frequency (%)    |                                         |
|----------------------|---------------------------|-----------------------------------------|
|                      | Cummings (1984)<br>(N=68) | Torrance and Reynolds (1980)<br>(N=200) |
| Right                | 19                        | 29                                      |
| Left                 | 7                         | 26                                      |
| Integrated           | 25                        | 29                                      |
| Mixed                | 49                        | 16                                      |

The mean scores for the left, right and integrated hemispheres for all research subjects can be seen in Table III. The mean scores obtained in this study appear to be consistent with both Torrance and Reynold's (1980) research and Lord and Brigg's (1983) research (see Table III). No statistical comparisons were made among these three groups.

TABLE III  
A Comparison of Mean Right, Left and Integrated Hemisphere  
Scores in Three Different Research Projects

| Hemisphere | Mean Scores               |                                         |                                  |
|------------|---------------------------|-----------------------------------------|----------------------------------|
|            | Cummings<br>(1983) (N=68) | Torrance and Reynolds<br>(1980) (N=154) | Lord and Briggs<br>(1983) (N=23) |
| Right      | 12.9                      | 12.2                                    | 11.3                             |
| Left       | 11.2                      | 11.5                                    | 11.9                             |
| Integrated | 15.6                      | 16.3                                    | 16.5                             |

As can be seen in Table III, the right, left and integrated hemisphere mean scores of the psychologists in this study appear to be comparable to the mean right, left and integrated mean hemisphere scores obtained in other research using the same SOLAT questionnaire. That the mean hemisphere scores of the psychologists in this study do not appear to differ from the mean hemisphere scores of Torrance and Reynolds' (1980) group of gifted students is contrary to Lord and Briggs' research (1983) which found clinical psychology graduate students to have higher integrated hemisphere scores than two other student groups.

Torrance and Reynolds and other researchers in this field of study typically analyzed their research data on the SOLAT by using right, left, and integrated hemisphere raw scores as the independent research variables. This is one method of data analysis used in the present study. Analysis of variance or t-tests were used to determine whether thinking style, daydreaming frequency, theoretical orientation, activity level in therapy, and research behavior of the psychologists differed for right, left and integrated hemisphere groups.

For the variable of hemisphere dominance, individual subjects' raw scores in the SOLAT were not used in the data analysis. The psychologists who reached criteria for dominance fell into one of three categories (right, left or integrated). Chi-square was used to determine whether theoretical orientation, research, daydreaming, activity level in therapy and thinking style were related to right,

left or integrated hemisphere dominance. The results of these analyses are in the following sections.

### Hemisphere Preference

When the specific breakdown of all the psychologists' hemisphere preferences was considered, roughly 50% evidenced a right, left or integrated hemisphere preference. The remainder of the psychologists fell into the following categories: left/right (16%), left/integrated (9%), right/integrated (19%) and none (4%) (see Table IV). Since the variable of hemisphere preference was created for the purpose of this research, there is no other research with which to compare these percentages. No specific research hypotheses were made regarding the breakdown of psychologists expected to fall into the different categories of hemisphere preference.

TABLE IV

A Comparison of Hemisphere Dominance and Hemisphere Preference

| Hemisphere       | Adjusted frequency (%)         |                                 |
|------------------|--------------------------------|---------------------------------|
|                  | Hemisphere dominance<br>(N=28) | Hemisphere preference<br>(N=68) |
| Right            | 40.8                           | 19.1                            |
| Left             | 15.3                           | 7.4                             |
| Integrated       | 43.9                           | 25.0                            |
| Right/left       | --                             | 16.2                            |
| Right/integrated | --                             | 19.1                            |
| Left/integrated  | --                             | 8.8                             |
| None             | --                             | 4.4                             |

No specific research hypotheses were made regarding sex of the psychologist and hemisphere preference. Student's t-tests were used to determine whether there were any differences between male and female psychologists in their right, left and integrated hemisphere scores on the SOLAT. Differences between males and females in their right and integrated hemisphere scores were nonsignificant. However, males had significantly higher left hemisphere mean scores than females ( $t=2.01$ ,  $p<.05$ ), despite the fact that few males or females evidenced an overall left hemisphere preference (see Table V).

TABLE V

A Comparison of Sex Differences in Mean Hemisphere Scores

| Hemisphere |            | Mean scores | t-Value        |
|------------|------------|-------------|----------------|
| Right      | a) Males   | 12.5        | -0.94<br>2.01* |
|            | b) Females | 13.7        |                |
| Left       | a) Males   | 11.9        |                |
|            | b) Females | 9.8         |                |
| Integrated | a) Males   | 15.3        | -0.55          |
|            | b) Females | 16.0        |                |

\* $p < .05$ .

This study also found significant sex differences in hemisphere preferences using a chi-square analysis ( $\chi^2=10.9$ ,  $df=5$ ,  $p<.05$ ) (see Table VI). Thirty-seven percent of the females in this study evidenced a right hemisphere preference, whereas 14% of the males manifested a right hemisphere preference. In fact, 63% of all females evidenced a

right or right/integrated hemisphere preference. Males were more dispersed across all groups than were females.

TABLE VI

A Comparison of Sex Differences in Hemisphere Preference

| Sex    | Hemisphere preference (%) |      |            | Left/<br>right | Left/<br>integrated | Right/<br>integrated |
|--------|---------------------------|------|------------|----------------|---------------------|----------------------|
|        | Right                     | Left | Integrated |                |                     |                      |
| Male   | 14.0                      | 7.0  | 27.9       | 23.3           | 14.0                | 14.0                 |
| Female | 31.8                      | 9.1  | 22.7       | 4.5            | 0.0                 | 31.8                 |

$\chi^2$  is significant at the  $p < .05$  level.

No statistical comparisons were made between psychologists' primary work affiliations and hemisphere preferences. However, in a frequency distribution of psychologists' hemisphere preferences (according to their raw scores on the SOLAT questionnaire) by work affiliations, a higher percentage of psychologists with high right hemisphere scores and high right/integrated scores reported academics as their primary work affiliation when compared to the other groups of hemisphere preference (see Table VII). A higher percentage of psychologists with high integrated scores and high left/integrated scores reported practice as their primary work affiliation compared to the other groups of hemisphere preference (see Table VII). When compared to other groups, a higher percentage of those psychologists with high integrated hemisphere scores listed private practice as their primary work affiliation (see Table VII).

In fact, when considering only psychologists with right, left or integrated hemisphere preferences, all psychologists who listed private practice as their primary work affiliation were integrated in hemisphere preference (see Table VII).

TABLE VII  
Hemisphere Preference and Its Relationship to  
Primary Work Affiliations

| Hemisphere preference | Primary work affiliation (%) |           |            |
|-----------------------|------------------------------|-----------|------------|
|                       | Private practice             | Academics | All others |
| Right                 | 7.7                          | 46.2      | 46.2       |
| Left                  | 0                            | 40.0      | 60.0       |
| Integrated            | 64.7                         | 17.6      | 17.6       |
| Left/right            | 18.2                         | 18.2      | 55.7       |
| Left/integrated       | 66.7                         | 33.3      | 0          |
| Right/integrated      | 30.8                         | 46.2      | 43.1       |

In addition to the two methods of data analysis discussed in the previous section of hemisphere dominance, for the variable of hemisphere preference, chi-square analyses were done for the six hemisphere preference groups on each of the dependent variables. The results of these analyses are noted in the following sections.

#### Therapeutic Orientation

Of the total sample, 53% of the psychologists reported their therapeutic orientation as analytic/psychodynamic, 35% as cognitive/behavioral and 12% as other. The number of psychologists who noted the different subgroups of the analytic/psychodynamic category of therapeutic orientation (classical analytic, depth therapy, or

interpersonal) were too few to consider as separate subgroups in the data analysis. It is important to note that the total number of psychologists who reported being cognitive/behavioral in therapeutic orientation was five; this number is quite small and makes any comparisons between theoretical orientation and other research questions unreliable.

It was hypothesized that psychologists with a right hemisphere dominance or preference would report an analytic/psychodynamic therapeutic approach rather than a cognitive/behavioral therapeutic approach. Similarly, it was hypothesized that psychologists with a left hemisphere dominance or preference would report using a cognitive/behavioral therapeutic orientation rather than an analytic/psychodynamic therapeutic orientation.

In accordance with Torrance and Reynolds' statistical procedures, the first method of data analysis used in this research did not address the psychologists' hemisphere preferences or dominances, but rather it entailed a separate analysis of the psychologists' raw scores on the SOLAT questionnaire for each of the three hemisphere categories (right, left and integrated). Three analyses of variance were used to determine whether any differences existed between psychologists with different therapeutic orientations (cognitive/behavioral; analytic/psychodynamic or other) on their right, left or integrated hemisphere scores of the SOLAT. A separate analysis of variance was done for each of the three hemisphere scales of the SOLAT. No significant differences were found between

psychologists' therapeutic orientations and their right, left or integrated hemisphere scores (right hemisphere:  $F=1.84$ ,  $df=2$ ,  $p=.1$ ; left hemisphere:  $F=1.3$ ,  $df=2$ ,  $p=.3$ ; integrated hemisphere:  $F=.36$ ,  $df=2$ ,  $p=.7$ ).

Chi-square was used to determine whether or not there was a relationship between hemisphere preference and therapeutic orientation (analytic/psychodynamic, cognitive/behavioral or other). No statistically significant differences were found between psychologist's therapeutic orientation and their hemisphere preferences ( $\chi^2=6.28$ ,  $df=10$ ,  $p=.7$ ).

Although no significant differences were found among the six hemisphere preference groups on the variable of therapeutic orientation, 69% of those psychologists with a right hemisphere preference were analytic/psychodynamic in their therapy orientation and 60% of those psychologists with a left hemisphere preference were cognitive/behavioral in their therapeutic orientation (see Table VIII). While these frequencies are in the hypothesized direction, the number of psychologists in the latter group is too small from which to draw any inferences.

Chi-square was used to determine whether or not there was a relationship between hemisphere dominance and therapeutic orientation (analytic/psychodynamic, cognitive/behavioral or other). No significant differences were found ( $\chi^2=4.2$ ,  $df=4$ ,  $p=.3$ ). However, of those psychologists who were right dominant, 73% were analytic/psychodynamic and 27% were cognitive/behavioral. Of those psychologists who were

TABLE VIII

Hemisphere Preference and Its Relationship to  
Therapeutic Orientation

| Hemisphere preference | Therapeutic orientation frequencies (%) |                          |       |
|-----------------------|-----------------------------------------|--------------------------|-------|
|                       | Analytic/<br>psychodynamic              | Cognitive/<br>behavioral | Other |
| Right                 | 69                                      | 31                       | 0     |
| Left                  | 40                                      | 60                       | 0     |
| Integrated            | 53                                      | 35                       | 12    |
| Right/left            | 46                                      | 36                       | 18    |
| Right/integrated      | 50                                      | 33                       | 17    |
| Left/integrated       | 54                                      | 23                       | 23    |

left dominant, 25% were analytic/psychodynamic and 75% were analytic/behavioral. Of those psychologists with an integrated hemisphere dominance, 58% were analytic/psychodynamic, 34% were cognitive/behavioral and 8% listed themselves as something other than these two categories of therapeutic orientation (see Table IX).

TABLE IX

Hemisphere Dominance and Its Relationship to  
Therapeutic Orientation

| Hemisphere dominance | Therapeutic orientation frequencies (%) |                          |       |
|----------------------|-----------------------------------------|--------------------------|-------|
|                      | Analytic/<br>psychodynamic              | Cognitive/<br>behavioral | Other |
| Right                | 73                                      | 27                       | -     |
| Left                 | 25                                      | 75                       | -     |
| Integrated           | 58                                      | 34                       | 8     |

Thus, while the comparisons between hemisphere preference or dominance on the variable of theoretical orientation did not yield

statistically significant differences, the frequencies of psychologists were in the hypothesized direction, e.g., higher percentages of psychologists with right hemisphere dominances or preferences reported analytic/psychodynamic theoretical orientations when compared to psychologists with left hemisphere dominances or preferences. Similarly, also in the hypothesized direction, a higher percentage of psychologists with a left hemisphere dominance or preference reported themselves to be cognitive/behavioral in their therapeutic orientation when compared to those psychologists with a right hemisphere dominance or preference.

In addition, a discrepancy between the sexes was noted in regard to therapeutic orientation. Chi-square was used to determine whether sex is related to the different categories of therapeutic orientation (cognitive/behavioral; analytic/psychodynamic or other). No significant differences were found ( $\chi^2=1.68$ ,  $df=2$ ,  $p=.43$ ). However, higher percentages of females reported an analytic/psychodynamic therapeutic orientation (63%) than males (48%), and males evidenced a slightly higher tendency to report themselves as cognitive/behavioral in therapeutic orientation (39%) than females (30%). That higher percentages of females, compared to males reported an analytic/psychodynamic therapeutic orientation is consistent with the finding in this study that a significantly higher percentage of females manifested a right hemisphere preference and dominance than to males.

### Research

One-half of the entire sample of psychologists reported doing research. In a frequency distribution of all subjects' research activities, 38% reported engaging in empirical research, 44% in theoretical/conceptual research, and 18% in a combination of these two types of research.

When comparing those psychologists who engage in research to those who do not, it was hypothesized that those psychologists who do research would evidence a left hemisphere dominance or preference and those who do not do research would evidence a right hemisphere dominance or preference. There were too few subjects in each of these two groups (research/no research) to assess differences between hemisphere dominance and hemisphere preference. To assess whether or not there was a difference between those psychologists who engage in research and those psychologists who do not do research on the basis of the psychologists' right, left and integrated hemisphere mean scores, three t-tests were done. There were no significant differences between those psychologists who do research and those who do not for their mean left or integrated hemisphere scores. However, a significant difference was found between the two groups on the right hemisphere mean scores. Those psychologists who engage in research were found to have significantly higher right hemisphere mean scores than those psychologists who do not do research ( $t=2.10$ ,  $df=66$ ,  $p=.04$ ) (see Table X). This finding is the opposite of that which was hypothesized.

Further breaking down the variable of research into type of research (empirical or theoretical/conceptual), it was hypothesized

TABLE X

A Comparison of Research Activity by Mean Right, Left, and Integrated Hemisphere Scores

| Hemisphere |                | Mean scores | t-Value |
|------------|----------------|-------------|---------|
| Right      | a) research    | 14.18       | 2.10*   |
|            | b) no research | 11.70       |         |
| Left       | a) research    | 10.59       | -1.27   |
|            | b) no research | 11.88       |         |
| Integrated | a) research    | 15.05       | -0.82   |
|            | b) no research | 16.09       |         |

\* $p < .05$ .

that there would be differences between those psychologists who reported engaging in empirical and theoretical/conceptual research and their right, left and integrated hemisphere mean scores. Specifically, it was hypothesized that those individuals who engage in empirical research would have higher left hemisphere scores than those psychologists whose research is theoretical/conceptual. Similarly, it was hypothesized that those psychologists who reported engaging in theoretical/conceptual research would have higher right hemisphere than those psychologists who do empirical research.

To test these hypotheses, three t-tests were done comparing psychologists who engage in empirical research to those who engage in theoretical/conceptual research on their right, left and integrated hemisphere scores. No significant differences were found in any of the three comparisons. However, in comparing the mean hemisphere scores, psychologists who engage in empirical research appear to have higher mean scores on right hemisphere questions ( $\bar{X}=16$ , S.D.=4.3) than

those psychologists who report engaging in theoretical/conceptual research ( $\bar{X}=13$ , S.D.=4.7). This is contrary to the research hypothesis (see Table XI).

TABLE XI

A Comparison of Type of Research by Mean Right, Left, and Integrated Hemisphere Scores

| Hemisphere |                               | Mean scores | t-Value |
|------------|-------------------------------|-------------|---------|
| Right      | a) Empirical                  | 15.6        | 1.43    |
|            | b) Theoretical/<br>conceptual | 13.2        |         |
| Left       | a) Empirical                  | 10.2        | -0.70   |
|            | b) Theoretical/<br>conceptual | 11.3        |         |
| Integrated | a) Empirical                  | 13.8        | -0.72   |
|            | b) Theoretical/<br>conceptual | 15.3        |         |

Chi-square was used to determine whether the type of research in which psychologists engage (empirical or theoretical/conceptual) is related to hemisphere preference. As in the above analysis, no significant differences were found. However, in looking at the specific numerical percentages of psychologists in each group (shown in Table XII), it appears that higher percentages of those psychologists who engage in empirical research were found to evidence a right hemisphere preference or a right/integrated preference than those psychologists who engage in theoretical/conceptual research. Furthermore, higher percentages of those psychologists who engage in theoretical/conceptual research were found to evidence an integrated

preference or a left/right hemisphere preference when compared to those psychologists who engage in empirical research (see Table XII).

TABLE XII  
A Comparison of Type of Research by  
Hemisphere Preference

| Hemisphere preference | Research (%)        |                                  |
|-----------------------|---------------------|----------------------------------|
|                       | Empirical<br>(N=13) | Theoretical/conceptual<br>(N=15) |
| Right                 | 62.5                | 12.5                             |
| Left                  | 50.0                | 50.0                             |
| Integrated            | 16.7                | 66.7                             |
| Right/left            | 20.0                | 80.0                             |
| Left/integrated       | 0                   | 50.0                             |
| Right/integrated      | 45.5                | 36.4                             |

Chi-square was used to determine whether the type of research in which psychologists engage (empirical or theoretical/conceptual) is related to hemisphere dominance. No statistically significant differences were found ( $\chi^2=4.67$ ,  $df=4$ ,  $p=3$ ). However, contrary to the stated hypothesis, it was found that 71% of those psychologists who engage in empirical research were right dominant. Also contrary to the research hypothesis was the finding that 67% of those psychologists who engage in theoretical/conceptual research were integrated and 50% were left dominant, with only 14% manifesting a right hemisphere dominance.

It appears that the opposite of what was predicted for the variable of research was found in analyses of hemisphere mean scores as well as in the analyses for the variables of hemisphere dominance and hemisphere preference.

### Daydreaming

Two categories of daydreaming were considered in this study, general daydreaming and in-session daydreaming patterns of psychologists. For general daydreaming, no psychologists said they "never" daydream, 18% reported daydreaming "slightly," 47% reported daydreaming "moderately" and 35% reported daydreaming "frequently." For in-session daydreaming, 8% reported "never" daydreaming in therapy sessions, 65% reported "slight" daydreaming, 23% reported "moderate" daydreaming and 5% reported "frequent" daydreaming in therapy sessions (see Table XIII). As expected, in-session daydreaming frequencies were considerably lower than general daydreaming frequencies.

TABLE XIII

A Comparison of General and In-Session Daydreaming Frequencies

|          | Daydreaming frequency (%) |            |
|----------|---------------------------|------------|
|          | General                   | In-session |
| Never    | 0                         | 8          |
| Slight   | 18                        | 65         |
| Moderate | 47                        | 23         |
| Frequent | 35                        | 5          |

Three analyses of variance were done comparing psychologists' reports of their daydreaming frequencies (collapsed to three categories: slight/moderate/frequent) on their right, left and integrated hemisphere scores of the SOLAT. Psychologists who engage in slight, moderate or frequent daydreaming were not found to be significantly different on their right, left or integrated hemisphere

scores: (right hemisphere:  $F=.48$ ,  $df=2$ ,  $p=.47$ ; left hemisphere:  $F=.7$ ,  $df=2$ ,  $p=.5$ ; integrated hemisphere:  $F=1.74$ ,  $df=2$ ,  $p=.2$ ).

It was hypothesized that those psychologists with a right hemisphere dominance or preference would report greater frequencies of both overall (general) and in-session daydreaming when compared to those psychologists with a left hemisphere or integrated hemisphere dominance or preference.

To test this hypothesis, a chi-square analysis was done to determine whether general daydreaming frequencies (slight/moderate/frequent) were related to hemisphere preference. No significant differences were found ( $\chi^2=8.5$ ,  $df=10$ ,  $p=.5$ ). It seems important to note that due to such a large number of groups of hemisphere preference, a majority of the research cells for the chi-square analysis did not have the expected cell frequency. Despite the lack of statistical significance of the comparison, it was found that those psychologists with a left hemisphere preference reported more frequent daydreaming than the other groups (however, there were only five subjects with a left hemisphere preference, which makes the reliability of this finding questionable). Right/integrated and left/integrated psychologists reported the lowest percentages of general daydreaming (see Table XIV).

Chi-square was used to determine whether in-session daydreaming frequencies (collapsed to two categories: never/slight and moderate/frequent) were related to hemisphere preferences. Again, no significant differences were found ( $\chi^2=7.56$ ,  $df=5$ ,  $p=.1$ ). However, lower

TABLE XIV  
Hemisphere Preference and Its Relationship to  
General Daydreaming

| Hemisphere preference | Daydreaming frequency (%) |          |          |
|-----------------------|---------------------------|----------|----------|
|                       | Never/slight              | Moderate | Frequent |
| Right                 | 17                        | 42       | 42       |
| Left                  | 0                         | 40       | 60       |
| Integrated            | 18                        | 41       | 41       |
| Left/right            | 18                        | 36       | 46       |
| Left/integrated       | 33                        | 67       | 0        |
| Right/integrated      | 23                        | 62       | 15       |

percentages of those psychologists with integrated hemisphere preferences reported daydreaming in therapy sessions compared to other groups. Higher percentages of integrated/right and integrated/left psychologists reported daydreaming in therapy sessions when compared to other groups (see Table XV).

TABLE XV  
Hemisphere Preference and Its Relationship to  
In-Session Daydreaming

| Hemisphere preference | Daydreaming frequency (%) |                   |
|-----------------------|---------------------------|-------------------|
|                       | Never/slight              | Moderate/frequent |
| Right                 | 67                        | 33                |
| Left                  | 80                        | 20                |
| Integrated            | 94                        | 6                 |
| Left/right            | 73                        | 27                |
| Left/integrated       | 67                        | 33                |
| Right/integrated      | 50                        | 50                |

Chi-square was used to determine whether general daydreaming frequencies (slight/moderate/frequent) were related to hemisphere dominance. No significant differences were found ( $\chi^2=1.27$ ,  $df=4$ ,  $p=.8$ ).

Chi-square was used to determine whether in-session daydreaming frequencies (never/slight and moderate/frequent) were related to hemisphere dominance. No significant differences were found ( $\chi^2=1.74$ ,  $df=2$ ,  $p=.4$ ). Consistent with above-noted findings, a lower percentage of those psychologists with integrated hemisphere dominances reported moderate/frequent daydreaming in therapy sessions than those psychologists with right and left hemisphere dominances. Those psychologists with right and left hemisphere dominances reported roughly equal frequencies of in-session daydreaming.

Three more hypotheses were made regarding psychologists' daydreaming patterns and their personal involvement in their own therapy. First, it was hypothesized that a higher percentage of psychologists who have had their own therapy would report increased frequencies of daydreams in both their overall life and in therapy sessions when compared to those psychologists who have not had their own therapy. Out of 66 subjects who responded to this research question, 56 reported having been involved in their own therapy and only ten reported that they had had no personal therapy at all.

A chi-square analysis was done comparing psychologists who have had therapy to those psychologists who have not had their own therapy on the frequency with which they reported general daydreaming

(collapsed to three categories: slight/moderate/frequent). No significant differences between psychologists who have or have not had their own therapy was found in regard to general daydreaming ( $\chi^2=1.33$ ,  $df=2$ ,  $p=.5$ ). While not significant, those psychologists who have not had their own therapy reported a higher percentage of "frequent" daydreaming (50%) compared to those psychologists who have had their own therapy (32%). This finding is contrary to the research hypothesis. Also contrary to the hypothesis was the finding that those psychologists who have had their own therapy reported higher frequencies of both "slight" (20%) and "moderate" (48%) daydreaming than those psychologists who have not had their own therapy (10% and 40%, respectively).

A chi-square analysis was done comparing psychologists who have had their own therapy to those psychologists who have not had their own therapy on the frequency with which they reported in-session daydreaming (never/slight; moderate/frequent). No significant differences were found ( $\chi^2=.04$ ,  $df=1$ ,  $p=.18$ ). However, those psychologists who have had their own therapy reported a slightly higher frequency of "moderate/frequent" daydreaming (30%) than those psychologists who have not had their own therapy (20%). This finding is in the hypothesized direction.

The second hypothesis made in regard to psychologists and their daydreaming patterns on the variable of personal therapy was that the theoretical orientation of the psychologists' therapists would affect the psychologists' reports of both general and in-session daydreaming.

Specifically, it was hypothesized that those psychologists whose therapist was analytic/psychodynamic would report a higher frequency of daydreaming in both their general life and in their therapy sessions than those psychologists whose therapist was cognitive/behavioral in therapeutic orientation.

Chi-square was used to determine whether one type of therapy which psychologists have had (either cognitive/behavioral or analytic/psychodynamic) is related to the frequency with which they report general daydreaming (slight/moderate/frequent). No significant differences were found ( $\chi^2=1.7$ ,  $df=4$ ,  $p=.7$ ). There were only six psychologists who reported having had a therapist whose theoretical orientation was cognitive/behavioral which diminished the strength of the statistical comparisons. Those psychologists whose therapist was reported as analytic/psychodynamic in theoretical orientation reported a higher percentage of "frequent" general daydreaming (33%) than those psychologists whose therapists were cognitive/behavioral (16%). This finding is in the hypothesized direction. However, those psychologists whose therapists were cognitive/behavioral reported a higher percentage of "moderate" daydreaming (67%) than those psychologists whose therapists were analytic/psychodynamic (50%). This finding is not in the hypothesized direction.

Chi-square was used to determine whether the type of therapy which psychologists have had (cognitive/behavioral or analytic/psychodynamic) is related to the frequency with which they report in-session daydreaming (never/slight/moderate/frequent). No

statistically significant differences were found ( $\chi^2=.9$ ,  $df=2$ ,  $p=.6$ ). Those psychologists whose therapists were analytic/psychodynamic reported a higher percentage of "moderate/frequent" in-session daydreaming (32%) compared to those psychologists whose therapists were cognitive/behavioral (16%). A lower percentage (68%) of those psychologists whose therapists were analytic/psychodynamic reported "never/slight" daydreaming, compared to those psychologists whose therapists were cognitive/behavioral (84%). These findings are in the hypothesized direction.

The third hypothesis made regarding psychologists' daydreaming patterns and personal therapy was that the number of years that the psychologists had been in therapy would affect their reports of daydreaming frequencies. Specifically, it was hypothesized that the more therapy the psychologist reported they had had, the greater frequency of daydreaming they would report in both their overall life ("in general") and in their therapy sessions.

A chi-square analysis was done to determine whether a relationship existed between psychologists and the number of years of therapy they have had (one, two, three-four, five and over) and their reports of general daydreaming (slight/moderate/frequent). No significant differences were found ( $\chi^2=4.01$ ,  $df=6$ ,  $p=.6$ ). While the resulting percentages of psychologists in each group do not appear to be consistently in the hypothesized direction, those psychologists who had been in therapy over five years reported the highest percentage of "frequent" general daydreaming and the lowest percentage of "slight" and

"moderate" daydreaming which is in the hypothesized direction (see Table XVI). However, this finding disappeared when a chi-square analysis was done on the same groupings for in-therapy frequencies of daydreaming. No significant differences were found in this analysis ( $\chi^2=.6$ ,  $df=3$ ,  $p=.8$ ).

TABLE XVI  
General Daydreaming Frequencies Compared to  
Years of Personal Therapy

| Years of personal therapy | Daydreaming frequency (%) |          |          |
|---------------------------|---------------------------|----------|----------|
|                           | Slight                    | Moderate | Frequent |
| 1 Year                    | 25                        | 50       | 25       |
| 2 Years                   | 17                        | 58       | 25       |
| 3-4 Years                 | 21                        | 53       | 26       |
| 5 And over                | 15                        | 31       | 54       |

A chi-square analysis was used to determine whether sex was related to frequency of general daydreaming. No significant difference was found. Similarly, in a chi-square analysis of sex and in-session daydreaming, no significant difference was found.

#### Activity Level in Therapy

For activity level in therapy sessions, no psychologists reported that they were "hardly" or "never" active in their therapy sessions, 6% reported themselves to be "slightly" active, 51% reported themselves to be "moderately" active and 43% reported themselves to be "very" active in therapy sessions. In all statistical comparisons, these five groups were collapsed into two groups: "slightly active"

(scaled items zero to three) and "very active" (scaled items four and five) in order to attempt to obtain stronger statistical comparisons.

It was hypothesized that those psychologists with a right hemisphere dominance or preference would be less active in therapy sessions than those psychologists with a left hemisphere dominance or preference.

Three t-tests were done comparing those psychologists who reported being "slightly active" in therapy sessions to those psychologists who reported themselves to be "very active" in therapy sessions on their right, left and integrated hemisphere scores. No statistically significant differences between the two activity level groups were found for the hemisphere scores (right hemisphere:  $t=.53$ ,  $p=.6$ ; left hemisphere:  $t=1.63$ ,  $p=.10$ ; integrated hemisphere:  $t=.67$ ,  $p=.5$ ).

A chi-square analysis was used to determine whether activity level in therapy (slight/moderate; active/very active) was related to hemisphere preference. No significant differences were found ( $\chi^2=.8$ ,  $df=5$ ,  $p=.9$ ). In all six hemisphere preference groups, greater percentages of psychologists were found to be "slightly active" than "very active." Those psychologists with a right hemisphere preference and a left/integrated preference were least often in the "very active" group. Those psychologists with an integrated, left/right and right/integrated hemisphere preference were most often in the "very active" group (see Table XVII).

TABLE XVII

Hemisphere Preference and Its Relationship to  
Activity Levels in Therapy

| Hemisphere preference | Activity level (%) |                    |    |
|-----------------------|--------------------|--------------------|----|
|                       | Slight/moderate    | Active/very active |    |
| Right                 | 67                 | 33                 | 12 |
| Left                  | 60                 | 40                 | 5  |
| Integrated            | 53                 | 47                 | 17 |
| Left/right            | 55                 | 45                 | 11 |
| Left/integrated       | 67                 | 33                 | 6  |
| Right/integrated      | 55                 | 46                 | 11 |

Chi-square was used to determine whether activity level in therapy (slight/moderate and active/very active) were related to hemisphere dominance. No significant differences were found ( $\chi^2=.36$ ,  $df=.2$ ,  $p=.8$ ). While not significant, in comparing the frequencies of activity level for the three hemisphere dominance groups, the findings were generally in the hypothesized direction. Those psychologists with a right hemisphere dominance had a lower frequency of "active/very active" activity level in therapy sessions than those psychologists with a left hemisphere dominance (see Table XVIII).

TABLE XVIII

Hemisphere Dominance and Its Relationship to  
Activity Levels in Therapy

| Hemisphere dominance | Activity level (%) |                    |
|----------------------|--------------------|--------------------|
|                      | Slight/moderate    | Active/very active |
| Right                | 60                 | 40                 |
| Left                 | 50                 | 50                 |
| Integrated           | 67                 | 33                 |

A chi-square analysis was done to ascertain relationships between sex and activity level in therapy. Female psychologists in this study were found to be significantly more often in the less active group than male psychologists ( $\chi^2=4.23$ ,  $df=1$ ,  $p=.03$ ). Fifty-four percent of the males reported being "very active" in therapy sessions, whereas 23% of the females reported being "very active" in therapy sessions (see Table XIX). This finding appears to be consistent with other trends noted in this research. Since higher percentages of females in this research reported an analytic/psychodynamic therapeutic orientation than the males, then it makes sense that the female psychologists in this research sample were also considerably less active in their therapy sessions when compared to the male psychologists.

TABLE XIX

## A Comparison of Sex Differences in Activity Level

| Sex    | Activity level (%) |             |
|--------|--------------------|-------------|
|        | Slight/moderate    | Very active |
| Male   | 47                 | 54          |
| Female | 77                 | 23          |

$\chi^2$  is significant at the  $p < .04$  level.

Thinking Style

The percentages of psychologists who think primarily in (a) pictures, (b) words, or (c) words and pictures were determined. It was found that 28% of the psychologists in this study indicated

that they thought in pictures, 41% reported that they thought primarily in words, and 31% reported that they thought in words and pictures. Compared to existing norms based on graduate and undergraduate students which reported 61% of their sample to think in pictures (Zenhausen & Repetti, 1979), clinical psychologists in this study appear to differ considerably from this student group in their reports of thinking processes.

It was hypothesized that a higher percentage of those psychologists with a right hemisphere dominance or preference would report thinking in pictures than psychologists with a left hemisphere or integrated hemisphere preference or dominance. Similarly, it was hypothesized that a higher percentage of those psychologists with a left hemisphere dominance or preference would report thinking in words than psychologists with a right or integrated hemisphere dominance or preference.

Three analyses of variance were used to determine whether any differences existed between psychologists' thinking styles (pictures only, words only or words and pictures) on their right, left or integrated hemisphere scores. No significant differences were found between psychologists who think in pictures only, words only or words and pictures for right, left or integrated hemisphere scores (right hemisphere:  $F=.2$ ,  $p=.8$ ; left hemisphere:  $F=1.1$ ,  $p=.3$ ; integrated hemisphere:  $F=.23$ ,  $p=.8$ ).

Chi square was used to determine whether psychologists' thinking styles (pictures only, words only, words and pictures) were

related to hemisphere preference. No significant differences were found ( $\chi^2=3.53$ ,  $df=10$ ,  $p=.9$ ). However, compared to the other five groups of hemisphere preference, a higher percentage of those psychologists with a right hemisphere preference reported thinking in words only or pictures and words, with the least number reporting thinking in pictures only. There were only five psychologists with a left hemisphere preference; two of these reported thinking in pictures only, two in words only and one in words and pictures. Of those psychologists with integrated hemisphere preferences, higher percentages reported thinking in words and pictures or words only compared to the pictures only group (see Table XX). These findings are contrary to existing research and to the hypotheses stated for the research project.

TABLE XX

## Hemisphere Preference and Its Relationship to Thinking Style

| Hemisphere preference | Thinking style frequencies (%) |       |                    |
|-----------------------|--------------------------------|-------|--------------------|
|                       | Pictures                       | Words | Words and pictures |
| Right                 | 23                             | 39    | 39                 |
| Left                  | 40                             | 40    | 20                 |
| Integrated            | 18                             | 41    | 41                 |
| Left/right            | 27                             | 46    | 27                 |
| Left/integrated       | 33                             | 50    | 17                 |
| Right/integrated      | 39                             | 39    | 23                 |

Chi-square was used to determine whether psychologists' thinking styles (words only, pictures only, or words and pictures) is related to hemisphere dominance. No significant differences were found ( $\chi^2=3.0$ ,  $df=4$ ,  $p=.5$ ). However, consistent with the research

hypothesis was the finding that a higher percentage of those psychologists with a right hemisphere dominance reported thinking in pictures only as opposed to other thinking styles, a higher percentage of psychologists with a left hemisphere dominance reported thinking in words only, and a higher percentage of those psychologists with integrated hemisphere dominances reported thinking in words only than when compared in the other groups.

To ascertain whether there were sex differences in thinking styles a chi-square analysis was done. While the results of this analysis were not significant at the conventionally acceptable level ( $p < .05$ ), the significance level of  $p=.07$  obtained in this analysis suggests that there is a tendency towards a sex difference in thinking styles ( $\chi^2=5.19$ ,  $df=2$ ,  $p=.07$ ). A higher percentage of females reported thinking in words only when compared to males. A higher percentage of males reported thinking in words and pictures when compared to females (see Table XXI). Previous research has indicated no significant sex differences in thinking styles.

TABLE XXI  
A Comparison of Sex Differences in Thinking Style

| Sex    | Thinking style (%) |       |                    |
|--------|--------------------|-------|--------------------|
|        | Pictures           | Words | Words and Pictures |
| Male   | 29.5               | 31.8  | 38.6               |
| Female | 25.0               | 58.3  | 16.7               |

$\chi^2$  is significant at the  $p < .07$  level.

## CHAPTER V

### DISCUSSION

The purpose of this research study was to obtain information on the internal phenomenology and thought processes of clinical psychologists as assessed by hemisphere dominance and hemisphere preference and to relate this to psychologist's day-to-day practice of psychology.

In general, strong statistical and predictive statements cannot be made based on the data collected because less emphasis was placed on evenly matching groups of psychologists than on acquiring a large amount of self report data to determine how clinical psychologists as a group think and act.

A major problem found in this whole area of research lies in the use and definition of the term "hemisphere dominance." In a thorough search of the literature in this area, nowhere was it noted that "dominance" in a particular hemisphere (whether it be on the SOLAT questionnaire or on one of the other questionnaires available with which to measure hemisphere dominance) was not a particularly common phenomenon. No research study was found that included the percentage of research subjects needed before a sufficient number of subjects was found to reach the criterion for "dominance." Also, nothing was available in the literature by which to compare the percentages of psychologists in this study reaching "dominance" with

other groups of subjects. Whether or not clinical psychologists as a group differ from other professional groups on this variable might be a fruitful area for future research.

The implication in the literature that hemisphere dominance is a common phenomenon may be a misleading one. Furthermore, one then wonders if the questionnaires available are adequate measurements of hemisphere dominance if, as in this study, a majority of the subjects cannot even be called dominant in a particular hemisphere. It was felt that a variable that would reflect an individual's overall patterning of thinking would present a broader picture of that individual's thinking processes. The creation of the new variable of hemisphere preference in this study was found highly useful because it allowed the inclusion of all research subjects in the study (not just the psychologists who achieved "dominance" on the SOLAT), and it provided data on the psychologists' performance on all three hemisphere scales of the SOLAT rather than on just the one major hemisphere scale.

A major problem that was encountered with the creation of the variable of hemisphere preference was the inability of this present research to narrow down the number of groups to less than six (i.e., right, left, integrated, right/integrated, right/left, left/right). Possibly as a result of so many groups and only 68 research subjects, many of the statistical comparisons were not significant. However, to collapse groups any further than this would have meant the loss of critical information about the psychologists; this would have been

counterproductive. If future research finds this hemisphere preference construct useful, as is presently indicated, much larger numbers of research subjects need to be used.

Overall, in a comparison of right, left and integrated hemisphere scores on the SOLAT questionnaire, clinical psychologists as a group yielded scores that were found to be virtually identical to existing norms based mostly on college students (Torrance & Reynolds, 1980). In other words, as a group, clinical psychologists do not appear to evidence higher right, left or integrated hemisphere scores when compared to college students. Differences between student groups in a Mental Health Sciences University are currently being reported (Lord, et al., 1983). More research needs to be done to determine whether or not real differences in hemisphere scores exist between professional or student groups.

In regard to hemisphere preference and dominance, the clinical psychologists in this research study were mostly integrated or right dominant, with very few manifesting a left preference or dominance. No norms with which to compare these results could be found in the existing research. However, considering the emphasis society places on the development of left hemisphere skills and problem solving styles (language, math, deductive reasoning abilities) in addition to the fact that such a large percentage of the psychologists reported engaging in research, it is interesting that so few subjects in this study manifested a left hemisphere preference or dominance.

Contrary to hypothesized expectations was the finding of this research that right hemisphere scores were significantly higher for

those individuals who do research as compared to those psychologists who do not do research. Since research activity would appear to necessitate the researcher to engage in considerable left hemisphere activity, it was hypothesized that the psychologists who engage in research would evidence higher left hemisphere scores on the SOLAT than psychologists who do not engage in research. Furthermore, it was predicted that the type of research being done (empirical versus theoretical/conceptual) would produce differences in hemisphere preference, dominance, or hemisphere mean scores. It was hypothesized that those psychologists who engage in theoretical/conceptual research evidence a right hemisphere preference and psychologists who engage in empirical research would evidence a left hemisphere preference. While not statistically significant, the opposite tendency was observed in this study. It was found that those individuals who engage in empirical research are most likely to manifest a right hemisphere preference and those individuals who engage in theoretical/conceptual research are most likely to evidence an integrated preference or a left/right preference. Clearly, engaging in research and the type of research done is a far more complex phenomenon than had been predicted in this research. What was most surprising was the large percentage of right dominant psychologists who engaged in empirical research (71%). Perhaps the purported creative ability of the right hemisphere plays an important part in the conceptualization of research projects. This finding seems to violate the stereotypical "spacy, creative, off-the-wall,

disorganized" adjectives that are sometimes used to describe a strongly right dominant individual. Based on this study, it would appear that what are typically viewed as right hemisphere problem solving capabilities are important skills to have as a researcher.

Consistent with the findings of this study on research differences are the trends noted in subjects' descriptions of their work affiliations. One might have predicted that those individuals with a right hemisphere preference would tend to choose a less structured work setting than academic institutions. However, of the subjects in this study, those who manifested a right hemisphere preference (or right/integrated preference) were the ones who were most likely to be in academic settings. Furthermore, the large percentages of those individuals with an integrated preference who work only in private practice was a surprise. Not surprisingly, this suggests that clinical work (direct patient contact) demands a constant integration of left and right hemisphere skills. However, this remains a chicken and egg issue, i.e., do higher percentages of integrations choose private practice because they are the ones most comfortable going back and forth between the different problem solving and thinking styles demanded for clinical work, or does direct patient contact for therapy develop or demand the development of the skills of both hemispheres. This nature/nurture issue that pervades all psychological research on human behavior is also an issue for hemisphere lateralization research.

Also, quite surprising, and, contrary to virtually all existing research in the area of hemisphere lateralization, is the large

number of sex differences found in this research. A statistically significant larger percentage of females evidenced a right hemisphere preference than males. Similarly, males had significantly higher mean scores on the left hemisphere scale than females. Females tended to be more analytic/psychodynamic than males in their therapeutic orientation (however, the number of individuals with a behavioral or other orientation was so small that it takes away from the strength of this difference). Consistent with the higher percentages of analytic/psychodynamic females, females also reported being significantly less active in therapy sessions than males.

Not so consistent with these trends was the finding that a considerably higher percentage of females reported that they think in words only (a left hemisphere task), compared to males who reported thinking equally in words and pictures. While this trend is consistent with what is often noted to be a difference between the sexes, i.e., females are more verbal (left hemisphere) than males (Reid, 1979), it is not consistent with the right hemisphere preference nor the analytic/psychodynamic tendencies that females manifested in this research study. This present research lends some credence to the adage of "female intuition," where intuition is presumably a right hemisphere function. Regardless of sex differences, it is clear that the intuitive nature of the right hemisphere could be used to an advantage in the therapeutic relationship.

Contrary to the above-noted hemisphere preference differences, and contrary to existing research by Zenhausern and Repetti (1979) was

this study's failure to replicate research on thinking style (word, picture, or words and pictures). While high correlations have been found by Zenhausern between picture thinkers and individuals with a right hemisphere preference and word thinkers and a left hemisphere preference, no such predicted differences were found in this present study. As noted, proportionately fewer subjects overall had high individual left hemisphere mean scores or manifested a left hemisphere preference or dominance. However, close to half the sample stated they thought in words, close to one-third in pictures and words and only approximately one-fourth in pictures only. In regard to sex differences, females in this study were far more likely to think in words than males, males were considerably more likely than females to think in words and pictures, and the sexes were equally likely to think in pictures only. In other words, subjects' thinking in words or pictures did not correlate, as in previous research, with hemisphere preferences. As noted previously, making the discrimination between thinking in words and/or pictures is a difficult process. Perhaps, the way the question was worded in this research did not enable subjects to make the subtle distinction necessary. Based on this research study, it seems that pulling the question out of the context of the hemisphere preference test questionnaire destroys the reliability of the question.

Findings of the research questions pertaining to general and in-session daydreaming patterns supported some hypotheses and not others. As previously mentioned, analytically oriented psychologists

are described as more inner-oriented and are reported to engage in higher levels of fantasy compared with behavioral therapists. While not statistically significant, this research supports this assertion in the hypothesized direction; those psychologists who were analytic/psychodynamic in theoretical orientation reported a slightly higher incidence of both overall and in-session daydreaming. This is consistent with the finding that those psychologists who manifest a right hemisphere preference tend to be analytic/psychodynamic in their theoretical orientation and those with a left hemisphere preference tend to be behavioral. It is also consistent with findings in this research pertaining to activity level in therapy sessions; those with a left hemisphere preference tended to report more activity in therapy sessions than those individuals who evidenced a right hemisphere preference. It would be expected, as found, that those psychologists who are less active in therapy sessions would be more likely to daydream in therapy sessions than those who are more active in sessions.

On the other hand, it was hypothesized that those psychologists who have undergone therapy would be more in touch with their right hemisphere processes and therefore would be more likely to report higher levels of both general and in-session daydreaming. It was found that psychologists who have undergone therapy tended to daydream less in general compared to those who have not undergone therapy. However, as predicted, those individuals who have undergone therapy report a slightly higher tendency to daydream in therapy sessions when compared to those psychologists who have not undergone therapy.

That those psychologists who have undergone therapy would daydream less overall but more in therapy sessions compared to those who have not undergone therapy may suggest a greater ability to appropriately regress in therapy.

### Conclusions

Fluctuations and flexibility in the different states of consciousness are important in doing therapeutic work, i.e., oscillation between the intuitive (right hemisphere) and the cerebral (left hemisphere). That some clinicians favor one mode over the other and that their preferred mode or style of thinking will affect the nature and type of therapy in which they engage has been explored in this paper.

It is clear that further exploration of the internal phenomenology of clinicians can lead to a better understanding of the subtle nuances of the therapeutic interaction. Further research that takes into account the sameness or differences between both the patient's and the therapist's preferred modes of information processing may lead to a better understanding of the issues and difficulties some therapists have in "tuning into" certain types of patients. Respondents to the research questionnaire occasionally expressed anxiety about their performance, "I hope I come out right [hemisphere] dominant." The task of further research in this area is to explain the differences in cognitive style and the implications this has for both the patient and the therapist rather than to judge the individual.

Another fruitful area for further research would be in the training of clinical psychologists. As previously mentioned, most masters and doctoral training programs appear to focus almost exclusively on what might be termed left hemisphere development (statistics, reading vast numbers of books and writing papers, having seminars and dialogues about therapy cases, etc.). There is no known American Psychological Association approved program that appears to focus on training procedures and techniques that would further enhance right hemisphere development. Such training might include personal dreamwork, relaxation/meditational training, work with biofeedback equipment and techniques and practice in visual imagery. Research that specifically delineated helpful versus nonhelpful approaches to the training of clinicians in a more holistic fashion could provide the basis for changing the entire nature of masters and doctoral programs in psychology.

This research is the first known attempt to describe the implications for therapy and research of individual differences among therapists and researchers using the criterion of hemisphere lateralization. The research reviewed here does appear to indicate an important and profitable direction for further research and theory.

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## APPENDIXES

## APPENDIX A

PERSONAL DATA QUESTIONNAIRE; SOLAT QUESTIONS FOR  
RIGHT, LEFT AND INTEGRATED  
HEMISPHERE SCORES

# PERSONAL DATA QUESTIONNAIRE

**Sex:** \_\_\_\_\_

1.) Age: \_\_\_\_\_

2.) Highest degree and year you obtained it: \_\_\_\_\_

Average number of hours of direct patient contact per week: \_\_\_\_\_

3.) Handedness: (check one)     right     left     mixed  
(To be classified in the right or left category, you must perform at least THREE of the following activities by the preferred hand: writing, eating, hammering, throwing, batting, cutting. If you do not meet this criteria, check mixed.)

4.) Please put a 1 and a 2 next to the work setting you consider your primary and secondary work affiliations. Next to your notation, please mark the approximate percentage of your time involved in each:

private practice                      hospital

mental health clinic                      academic

other: \_\_\_\_\_

5.) Approximately how many hours per week do you engage in the following therapies:\*\*

individual

family

marital/couples

other:

**\*\*Please put a star next to the type of therapy with which you feel the most comfortable.**

6.) Please note below the percentage of time in your total work week that you engage in various types of research.

% of time:

no research at all

empirical research

theoretical-conceptual research

- 7.) In general, how would you characterize your psycho-therapeutic technique: Please check only one:
- \_\_\_\_\_ analytic/psychodynamic (Please subdivide below):
- \_\_\_\_\_ classical analytic, \_\_\_\_\_ interpersonal,
- \_\_\_\_\_ depth therapy \_\_\_\_\_ other: \_\_\_\_\_
- \_\_\_\_\_ cognitive/behavioral
- \_\_\_\_\_ other: \_\_\_\_\_
- 8.) Have you had your own personal analysis or therapy?
- \_\_\_\_\_ yes \_\_\_\_\_ no
- If yes, approximate number of years: \_\_\_\_\_
- List the theoretical approach of your therapist:
- \_\_\_\_\_
- 9.) How long do you see your average patient: (check one)
- \_\_\_\_\_ less than 3 mos. \_\_\_\_\_ 6-12 mos.
- \_\_\_\_\_ 3 - 6 mos. \_\_\_\_\_ over 1 year
- 10.) Rate your general activity level in a typical therapy session (e.g., amount of talking, prescription of tasks, etc.):
- Circle the number where you fit on the scale
- |                         |          |                      |          |                |
|-------------------------|----------|----------------------|----------|----------------|
| <u>1</u>                | <u>2</u> | <u>3</u>             | <u>4</u> | <u>5</u>       |
| hardly active<br>at all |          | moderately<br>active |          | very<br>active |
- 11.) Rate the overall frequency of your daydreams and fan-  
tasies:
- |          |          |          |          |                  |
|----------|----------|----------|----------|------------------|
| <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u>         |
| never    | slight   | moderate | frequent | very<br>frequent |

- 12.) Rate the frequency with which you engage in daydreams and fantasies when you are in a session with a patient:

|          |          |          |          |                  |
|----------|----------|----------|----------|------------------|
| <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u>         |
| never    | slight   | moderate | frequent | very<br>frequent |

- 13.) Check which of the following describes your thinking processes most clearly:

\_\_\_\_\_ I think mostly in PICTURES, any accompanying words are merely in addition to the PICTURES.

\_\_\_\_\_ I think mostly in WORDS, any accompanying pictures are merely in addition to the WORDS.

\_\_\_\_\_ I think equally in WORDS and PICTURES.

The following list itemizes the specific test items on the SOLAT questionnaire that correspond to right, left, and integrated hemisphere processes:

### Right Hemisphere Questions

- 1a) reads for main ideas
- 2b) good memory for details and facts in the environment not specifically studied
- 3a) likes to read fantasy stories
- 4b) more fun to dream
- 5b) solve problems intuitively
- 6a) listen to music or radio while reading or studying
- 7a) would like to write fiction books
- 8a) if seeking mental health counseling, would prefer group counseling and sharing of feelings with others
- 9b) enjoy drawing my own images and ideas
- 10a) believe I would be easily hypnotized
- 11c) more exciting to invent something new
- 12a) prefer to learn through free exploration
- 13c) prefer mystery stories
- 14c) prefer geometry
- 15b) like to organize things to show relationships
- 16b) skilled in showing relationships among ideas
- 17b) good at tonal memory
- 18c) has difficulty in pacing personal activities to time limits
- 19a) have frequent mood changes
- 20b) moderately good in communicating with animals
- 21b) preference for cats
- 22a) enjoy clowning around
- 23c) generally nonconforming
- 24a) frequently somewhat absentminded
- 25b) preference for openended assignments
- 26a) when viewing advertisements, am most often influenced by attractive signs, pleasant scenes, and sensual overtones
- 27b) enjoy creative storytelling
- 28c) more valuable to illustrate stories read
- 29c) more valuable to act out stories
- 30b) moving rhythmically is more fun
- 31c) producing ideas is more fun
- 32b) would like to do interpretive dancing
- 33a) enjoy interacting affectively with others
- 34b) strong in recalling spatial imagery
- 35a) can think better while lying down
- 36b) would like to be a music composer
- 37a) skilled in the intuitive prediction of outcomes
- 38b) generally restless during verbal explanations
- 39c) preference for summarizing over outlining

40b) prefer demonstration

Left Hemisphere Questions

- 1b) read for specific details and facts
- 2a) usually learn or remember only those things specifically studied
- 3b) like to read realistic stories
- 4c) more fun to plan realistically
- 5a) solve problems logically, rationally
- 6b) must have total quiet in order to read or study
- 7b) would like to write non-fiction books
- 8b) if seeking mental health counseling, would prefer the confidentiality of individual counseling
- 9b) enjoy copying and filling in details
- 10c) do not believe I could be hypnotized
- 11b) more exciting to improve something
- 12b) prefer to learn systematically through ordering and planning
- 13b) prefer action stories
- 14b) prefer algebra
- 15a) like to organize things sequentially
- 16a) skilled in sequencing ideas
- 17a) good at remembering verbal materials
- 18b) uses time to organize self and personal activities
- 19c) stable; almost no mood changes
- 20c) cannot communicate very well with animals
- 21c) preference for dogs
- 22c) do not enjoy clowning around
- 23b) generally conforming
- 24c) almost never absentminded
- 25c) preference for well structured assignments
- 26b) when viewing advertisements, am most often influenced by the information comparing several products
- 27a) enjoy analyzing stories
- 28b) more valuable to discuss stories read
- 29b) more valuable to tell stories
- 30c) rhyming is more fun
- 31b) drawing conclusions is more fun
- 32b) would like to do ballet dancing
- 33b) enjoy interpreting the affective interaction of others
- 34a) strong in recalling verbal materials (names, dates, etc.)
- 35b) can think better while sitting up straight
- 36a) would like to be a music critic
- 37b) skilled in the statistical, scientific prediction of outcomes
- 38a) generally attentive to verbal explanations
- 39b) preference for outlining over summarizing
- 40c) prefer verbal instructions

Integrated Questions

- 1c) read for main ideas and for details and facts equally
- 2c) have noticed no differences in my abilities in these areas (remembering things specifically studied versus facts in the environment not specifically studied)
- 3c) no preference between fantasy and realistic stories
- 4a) equally as much fun to dream as to plan realistically
- 5c) equally skilled in solving problems intuitively and logically
- 6c) listen to music or radio only if reading for enjoyment, not if studying
- 7c) no preference between writing fiction and non-fiction
- 8c) have no preference for group over individual counseling
- 9c) enjoy drawing my own images and copying and filling in equally
- 10b) could probably be hypnotized but it would be difficult
- 11a) just as exciting to me to improve something as to invent something new
- 12c) no preference between learning through free exploration and learning through systematic ways
- 13a) no preference between mystery stories and action stories
- 14a) no preference between algebra and geometry
- 15c) no preference for sequential over residential organization.
- 16c) equally skilled in sequencing and showing relationships
- 18a) paces personal activity to time limits with ease
- 19b) have few mood changes
- 20b) moderately good in communicating with animals
- 21a) no preference for cats over dogs or vice versa
- 22b) can clown or be serious depending upon the occasion
- 23a) conforming or nonconforming depending upon the situation
- 24b) occasionally absentminded
- 25a) no preference for well structured over openended
- 26c) primarily influenced by the advertising medium only when accompanied by information on the quality of the product
- 27c) enjoy actually analyzing stories and creative storytelling
- 28a) equally valuable to discuss stories and illustrate them
- 29a) equally valuable to tell stories and to act out stories
- 30a) moving rhythmically and rhyming are equally enjoyable
- 32c) no preference for ballet over impromptu interpretative dancing
- 33c) equal preference for affective interaction and interpretation of the affective interaction of others

- 34c) equally strong in recalling verbal and spatial imagery
- 35c) equal preference for lying down and sitting up straight
- 36c) would enjoy equally music criticism and composition
- 37c) equally skilled in intuitive and statistical-scientific prediction
- 38c) can control attention during verbal explanations
- 39a) no preference between outlining and summarizing readings
- 40a) no preference for demonstration over verbal instructions

## APPENDIX B

### PILOT STUDY

## PILOT STUDY

Twenty-two clinical psychologists (10 males, 11 females) were given the Personal Data Questionnaire and the SOLAT test. To determine whether or not a relationship existed between hemisphere preferences and the following variables, Mann-Whitney U tests were done: (1) theoretical orientation, (2) therapeutic activity level, (3) type of research (empirical or theoretical/conceptual), (4) time spent daydreaming in and out of therapy, and (5) thinking style. Fisher Exact Probability Tests were done to determine whether or not a relationship existed between hemisphere dominance and the following variables: (1) personal therapy (therapy/no-therapy) and overall daydreaming and in-session daydreaming, and (2) therapeutic orientation (analytic/psychodynamic or cognitive/behavioral and general in-session daydreaming. The issue of the sex of the psychologist was dealt with separately. To determine the relationship between sex and the following variables, Mann-Whitney U tests were done: (1) hemisphere preference and (2) years of practice as a psychologist. Fisher Exact Probability Tests were done to determine the relationship of sex and all research variables. The identical statistical procedures were followed for the variable of handedness.

For the most part, no significant statistical differences could be ascertained due to such a small sample size. The only statistically significant findings were obtained for the variable of sex in relation to both years of practice as a psychologist and for activity level in therapy sessions. For the former variable, the mean for males was 18.5 years in practice and for females the mean number of years in practice was 4.3 ( $t = 23$ ,  $p < .05$ ). Thus, the females in this research sample were found to have significantly less experience doing therapy than the males in this research sample. A significant relationship between sex and activity level was also found ( $t = 9$ ,  $p < .05$ ). The females in this research sample were found to be significantly less active than the males in their therapy sessions.

Since only three out of the 22 subjects for the pilot study were left-handed, it became clear that handedness would probably be a variable that would yield little significant data in either the pilot study or any further research without a considerably larger number of subjects. Similarly, only six sampled psychologists did any research at all, clearly not a large enough sample size with which to even note trends or with which to correlate hemisphere dominances. This suggested that rather than randomly sampling the research population of psychologists as proposed from the Philadelphia Society of Clinical Psychology Directory, it would be necessary either to alter the subject population to include larger numbers of

psychologists who engage in research or to eliminate this variable from the project altogether. Since research activity on the part of psychologists and its correlation to hemisphere dominance is one of the main focuses of this project, it was decided that subjects utilized for further research would have to be chosen with more of an emphasis on research activity than a random selection would allow.

Further trends ascertained from this pilot study included the finding that 40 percent of the subjects evidenced no strong hemisphere dominance, e.g., their preferred cognitive style was a mixed mode, probably more dependent on the particular question rather than on an overall cognitive preference. This implied that for data analysis of the research study proper, in order to utilize all research subjects (rather than selecting out only those whose hemisphere dominances were statistically significant), a simple statement of an individual's cognitive preference based on individual raw scores on the right, left or integrated scales of the SOLAT would not accurately reflect the individual's overall cognitive style. Thus, in addition to a straightforward comparison of raw scores on the right, left and integrated scales of the SOLAT to be correlated with the various research questions, it was felt that an artificial assignment of a preferred hemisphere mode for each subject would provide a means of further comparison which takes into account the overall patterning of the individual scores (see statistical analysis section).

Another important research question that appeared to be unanswerable based on pilot study results was the comparison of individuals who have had their own personal therapy. While 71 percent of the sample (N=15) had had their own personal therapy, 80 percent of these subjects described the type of therapy they underwent as analytic. Thus, there were not enough respondents who underwent behavioral kinds of therapies with which to compare type of personal therapy with any of the variables.

All questions from the pilot study were kept in the subsequent research study. Two additional research questions were added to the study in order to further obtain descriptive data on the research subjects. The two questions added to the Personal Data Questionnaire were questions dealing with the type of therapy in which an individual engages (individual, couples, family) and the personal comfort level with the subject's preferred style of doing therapy. No specific hypotheses were related to the inclusion of these two research questions.

## VITA

Nina Beth Cummings was born in Norristown, Pennsylvania, on August 3, 1954. She was raised in Wayne, Pennsylvania, where she attended public schools and was graduated from Conestoga High School in June 1972. She attended Carnegie-Mellon University from September 1972 to May 1976 when she graduated with honors with a B.A. in Psychology and a minor in Education. She entered the Graduate School of The University of Tennessee, Knoxville, in September 1976. She moved to Philadelphia, Pennsylvania, in August 1980 to do her clinical internship. Ms. Cummings presently resides in Philadelphia where she works as a licensed psychologist.