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NEURO LINGUISTIC PROGRAMMING'S PRIMARY REPRESENTATIONAL SYSTEM: DOES IT EXIST?

A Dissertation Presented

By

DONALD E. RIDINGS

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Dedication

This dissertation is dedicated to my muses, Milton H. Erickson and Harry Chapin, and to my uncle Mo... all whom continue to amuse and amaze me with their magic.

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A special acknowledgement is given to my family; to my wife Sharon... words are not enough in expressing my love.

ABSTRACT

Neuro Linguistic Programming's Primary Representational System: Does It Exist?

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The purpose of this dissertation was to determine if a Primary Representational System (PRS), as hypothesized by Richard Bandler and John Grinder in their Neuro Linguistic Programming (NLP) model of communication, could be identified by a predicate (verbs, adjectives, and adverbs) analysis method. A second purpose was to determine the temporal stability of PRSs over time; a third purpose was to compare two subject populations on PRS occurrence and stability.

There were 65 subjects: 15 female and 17 male undergraduates between the ages of 18 and 23 and 17 female and 16 male mental health counselors between the ages of 30 and 50 from community mental health centers. Each subject was asked three questions privately by an interviewer. At Time 2, six weeks later, the subjects were asked three similar questions. Responses were audiotaped and transcribed. Predicates were coded into one of six

categories (visual, auditory, kinesthetic, olfactory, gustatory, and none) by two representational modality coders. The interrater reliability coefficient between the modality coders on 32 randomly chosen subject predicate lists using Cohen's Kappa was .92.

A PRS was operationally defined as: (a) the representational modality most frequently used, and (b) the representational modality that occurred at a rate 20 percent higher than the next most frequently occurring modality.

Results indicated that 55 of 65 subjects and 50 of 65 subjects showed PRSs at Times 1 and 2 respectively. There was a predominance of one modality over the others as 53 subjects at Time 1 and 47 subjects at Time 2 evidenced kinesthetic PRSs. However, of the 53 subjects showing a kinesthetic PRS at Time 1 only 40 of them evidenced a kinesthetic PRS at Time 2. When Cohen's Kappa was calculated, a value of .18 was obtained; thus temporal stability of PRS was not evidenced in this study. There were no significant differences between males and females as groups or between college students and mental health workers as groups regarding PRS modality preferences.

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CHAPTER I

INTRODUCTION

Psychotherapies of all kinds depend fundamentally on rapport between therapist and client. Without rapport clients rarely improve in therapy (Strupp, Fox, & Lessler, 1969). Rapport indicates a high level of cooperation and implies an understanding and trust between people (Fann & Goshen, 1977). A strong sense of rapport contributes to the client's trust and willingness to work cooperatively with the therapist (Strupp, 1978). It is an important factor in the therapeutic procedure, since it is desirable for the client to feel that the therapist is interested, sympathetic and able to understand (Golderson, 1970).

The importance of rapport as a critical element in the therapeutic process has been well accepted; what rapport actually is, however, has not been clearly established. One definition, from the Psychiatric Dictionary (Campbell, 1981), states rapport is "a conscious feeling of accord, sympathy, trust, and mutual responsiveness between one person and another" (p. 531). Other definitions vary depending on the the context in which they are used.

The diversity of opinion on how to build rapport in therapy is great. In Mesmer's theory of animal magnetism in the 1700's, "en rapport" meant the transmission of magnetic fluids from one person to another. This was usually

accomplished when the therapist made hand passes over the client's body. In psychoanalysis, rapport existed when the client had established a dependable transference upon the therapist (Freud 1924, Vol. 2, p. 360). This was accomplished by the therapist clearing away counter-transference issues, thus leaving a "blank screen" upon which the client could project neurotic conflicts. Jones (1910-11, p. 235) stated that hypnotic rapport indicated sexual affection either in an erotic or sublimated form. Rogers (1967) talks of congruence, unconditional positive regard and empathy as the affective elements that make rapport stronger and facilitate a deeper therapeutic relationship. Bandler and Grinder (1976), utilizing a linguistic approach, emphasize using predicates in the client's primary representational system as one way for the therapist to build rapport. Thus, there is diversity of opinion as to what rapport is, how it functions and how it relates to psychotherapy.

The present research will investigate the validity of a new technique of building rapport as presented in Richard Bandler and John Grinder's model of psychotherapy called Neuro Linguistic Programming (NLP). NLP was developed in the mid 1970's through an analysis of the therapeutic styles of Milton Erickson, Virginia Satir, Fritz Perls and other highly successful psychotherapists. Bandler and Grinder purport to have identified the essential sequences and

patterns of behavior common to these masters as they facilitate rapport with clients.

A basic NLP construct underpinning rapport is the concept of representational systems. Although this concept, along with other NLP concepts, will be explained in greater detail in Chapter 2, the connection between representational systems and rapport in NLP theory will be developed here. Representational systems refer to the processes through which people encode, store and represent experience to themselves and express these experiences to others (Bandler & Grinder, 1976). A representational system acts as a map or model used to organize experience (Bandler & Grinder, 1976). Individuals are thought to create these models based on the sensory input channels of vision, audition, kinesthetics, olfaction and gustation. Each person has the potential ability to create maps in each of the five representational systems. According to Bandler and Grinder (1976, p. 8), however, people tend to use one representational system more often than others. The representational system most often used is called the primary representational system.

Bandler and Grinder (1976, p. 9) state that one way a person's primary representational system can be identified involves noting the predicates (adjectives, verbs, adverbs) used in speech. According to NLP, people understand

information best when it is presented to them in the same representational modality as their primary representational system (Bandler & Grinder, 1976, p. 8). For example, visually oriented people (i.e., people with a visual primary representational system) will understand best when information is presented to them visually--that is, in sentences that contain visual predicates. This has implications for building rapport and influencing clients. Rapport in the NLP model is enhanced and facilitated by the therapist using predicates in the primary representational modality of the client. The following is an example.

Client: "I am so hurt. My husband left and I feel helpless... so alone. I've never felt so much pain. I'm tense, all the time... I can't come to grips with myself."

Therapist: "Let me try to understand your pain. It's important that I get in touch with you... with what you feel. The pressure is great right now that your husband has left." (Lankton, 1980, p. 18)

In this example, the therapist has used kinesthetic predicates which are in the same kinesthetic modality representational system of the client. Rapport in the NLP model can be operationally defined as the matching of therapist predicates to the same representational modality as the client predicates.

The underpinning construct of rapport in NLP is the matching of representational systems. Representational systems, per se, do not exist; they are an explanatory construct. Representational systems cannot be measured. The purpose of this dissertation, therefore, is to gather evidence on the validity of the assumptions on which the construct of representational systems is based by testing predictions derived from the assumptions. The NLP assumptions are:

Assumption 1: People structure their representations of past experience into sensory-based representational systems.

Assumption 2: Language use, including predicates, is a reflection of people's cognitive content- its structure.

Assumption 3: There is a preferred representational system for each person.

Based on these assumptions, NLP predicts that predicate use will show a preference for one sensory category. This prediction will be empirically tested. Specifically, the goals of this study are:

1) to determine whether subjects exhibit a primary representational system as identified by predicate use,
2) to determine the stability of primary representational systems over time, and

3) to compare two subject populations of differing age categories on criteria 1 and 2.

This study is important for the following reasons:

1) Rapport is a central construct in theories about psychotherapy, and Bandler and Grinder's construct of primary representational system is a widely advocated, although vaguely defined, technique for establishing rapport.
2) There is an almost total lack of empirical studies on primary representational systems.
3) NLP is popular (Goleman, 1979) and practitioners are using it without empirical evidence supporting its validity.

Rapport's importance as a central construct in psychotherapy is well established. Good rapport allows the client to feel safe, to work on difficult, embarassing and threatening issues. The client is motivated to follow the therapist's directives and not let the therapist down. Rapport is regarded generally as a precursor to facilitating change with clients. While it is often cited as being critically important and a prerequisite for successful therapeutic outcomes, what it is and how it is attained in therapy remains unanswered. Further study on rapport is needed.

To their credit, Bandler and Grinder have offered a model of rapport that can be empirically tested.

Behaviorally operationalized constructs are easier to validate than non-operationalized ones. Predicate usage can be more easily measured than Mesmer's animal magnetism, Freud's dependable transference or Roger's unconditional positive regard.

Empirical validation of the NLP construct of primary representational system is meager. A review of the literature indicates that Birholtz (1981), Cody (1983), and Dorn, Atwater, Jereb and Russell (1983) are the only investigations that have attempted to verify PRS's existence over time. Most studies on PRS have investigated the rapport effectiveness of a therapist pacing a client in similar predicates. This literature may demonstrate the practical utility of matching predicates, but it does not demonstrate the existence of primary representational systems. Also, practically all the research on primary representational systems has involved testing college students (mostly aged 18-25), leaving the generalizability of NLP to other populations as an open issue.

Since NLP's beginning in the mid 1970's, training workshops offered by its founders and followers have proliferated. This training has been directed primarily at mental health, business and education professionals. NLP's marketing has been extensive and their prices substantial--up to $600-$700 for a two-day workshop. Although case

history data is cited, Bandler and Grinder have not offered any empirical data demonstrating a relationship between a client's language use, their primary representational system, rapport in psychotherapy, and therapeutic efficacy. The following research study will attempt to remedy this lack of empirical validation.

C H A P T E R II

REVIEW OF THE LITERATURE

Introduction

The review of the literature is intended:

1) to provide an overview of the basic principles of NLP theory with sections on cognitive models, language-representational system, transformational grammar, rules of "well-formedness" and modeling processes;
2) to provide an overview of the central NLP construct of primary representational system with sections on predicate analysis, eye-scanning patterns and Satir body positions;
3) to provide a review of the empirical research conducted on the NLP construct of primary representational system with sections on reliability studies, validity studies and utility studies.

This review will place Bandler and Grinder's model in perspective to construct a context for the research hypotheses to be listed at the end of this chapter.

Basic NLP Principles

NLP is a model of human communication and behavior developed by Richard Bandler and John Grinder in the mid 1970's "through the systematic study of Virginia Satir, Milton H. Erickson, Fritz Perls, and other therapeutic

'wizards'" (Bandler & Grinder, 1979, p. 3). Bandler and Grinder described their approach as a "meta-model" because it was reportedly a systemazation of the common patterns in the work of outstanding therapists from a variety of theoretical and technical orientations. As such, Neuro Linguistic Programming is not claimed to be a new approach to psychotherapy, but rather an elucidation of the component patterns, practices and techniques that allow these "therapeutic wizards" to be so effective.

Cognitve Models

The concept of cognitive models is important in NLP. Bandler and Grinder emphasize that people do not experience their environment directly but rather experience it through cognitve models.

> We as human beings do not operate directly on the world-- that is, we create a map or model which we use to generate our behavior. Our representation of the world determines to a large degree what our experience of the world will be, how we will perceive the world, what choices we will see available to us as we live in the world. (1976, p.7)

The essential feature, common to all successful psychotherapy, involves creating change in the client's view or model of the world-- that is , a modification in one's cognitive map.

When people change, their experience and model of the

world is different. No matter what their techniques, the different forms of therapy make it possible for people to change their model of the world and make some part of that model new. (Bandler & Grinder, 1975, p. 39-40)

Language-Representational System

To help a client change, the therapist first understands the client's representational model of the world. This is accomplished by listening to the client's language, as language, according to NLP, is the universal medium by which people represent their sensory experience and world models to themselves and others. Language is based on underlying auditory, visual, kinesthetic, olfactory and gustatory sensory modalities. Humans operate on the basis of interpretations of the environment as it is experienced through the senses. Thus, sensory experiences are the bases upon which models of reality are constructed and changed. Language itself is a representational system and it is the means by which a therapist assists a client in revising and expanding their cognitive models.

"Well-Formedness"

Bandler and Grinder's presentation of well-formedness is heavily dependent on their use of transformational grammar. Transformational grammar (Chomsky, 1975) is an explicit model of the language process and is concerned with explicating certain aspects of patterning in the systems of

language. NLP claims that all models are constructed from a set of structural elements and a syntax. The structural elements represent the content of the model, and the syntax refers to the set of rules that describe how the structural elements are put together. In transformational grammar the structural elements are referred to as "Surface Structure" (sentences, words, phrases) and "Deep Structure" (intuitive meaning behind the surface structure). For example, (Bandler & Grinder, 1975, p. 28), "The woman bought a truck.", is a surface structure sentence derived from the deep structure sentence, "The woman bought a truck from someone for some money." The deep structure sentence is a full linguistic representation of the experience.

Native speakers of any language are able to communicate because they share a common set of intuitive rules that allow them to recognize whether or not a group of words represents a sentence in their language (Bandler & Grinder, 1976, p. 25). NLP calls this set of rules "Well-Formedness" because they allow people to determine whether or not surface structures are well-formed and thus accurately and fully represent their associated deep structures. This has important implications for therapy. If a therapist is sensitive to the well-formedness of the client's statements, then the therapist will be able to recognize when the client is not fully representing their experience (deep structure). Many clients violate the

rules of well-formedness when transforming deep structures to surface structures, which results in a surface structure incongruent with the deep structure. Thus the client's conscious representation of their experience is distorted or missing certain parts resulting in an impoverished model with ineffective strategies and limited options for behavior. Once the distortions are corrected and the missing parts are recovered then congruency is established. Thus, according to Bandler and Grinder, the formal principles of linguistic analysis provide an approach to understanding any system of human modeling.

Modeling Processes

Bandler and Grinder have identified three general processes through which people develop their cognitive models and state that these processes apply to the manner in which surface structures are generated from deep structures. The processes are generalizations, deletions, and distortions.

Generalization refers to the "process by which a specific experience comes to represent the entire category of which it is a member" (Bandler & Grinder, 1975, p. 215). For example, in the sentence, "Nobody listens to what I say," nobody refers to all people and has been generalized from a specific person or persons. Deletion is the "process by which selected portions of the world are excluded from

the representation created by the person modeling" (Bandler & Grinder, 1975, p. 215). More simply, a person selectively pays attention to certain stimuli in the environment and excludes other stimuli. For example, when a person sees only the negative characteristics of their spouse, the person is deleting the positive attributes. Distortion is the "process by which the relationships which hold among the parts of the model are represented differently from the relationship which they are supposed to represent" (Bandler & Grinder, 1975, p. 216). Nominalization is a form of distortion where an ongoing process is construed as a static entity or event. For example, in the sentence, "I regret my decision to return home," decision is a nominalization implying the choice is irreversible when it actually cound be.

By identifying the generalizations, deletions and distortions in the linguistic structure of the client's statements, the therapist can assist the client in modifying their faulty or impoverished cognitive model. Thus, linguistic analysis is central in the process of change in NLP.

The Construct of Primary Representational System

The concept of representational systems plays a basic role in the Neuro Linguistic Programming model. Representational systems refer to the processes by which persons receive, store and express their experiences of the world as derived through the five senses to themselves and

to others. Bandler and Grinder hypothesize that humans use "representational systems" as methods of information organization; it models one way cognitive content is structured.

Humans receive input from all five senses simultaneously. The sensory channels used most often are sight, hearing, and kinesthetic (body sensations) and thus these three are the major representational systems. Although each human has the ability to create cognitive maps in each of the five representational systems, the NLP model claims each person has a most highly valued representational system (or primary representational sytem)-- that is, one used substantially more often than the others. People tend to have more distinctions available in this primary representational system than in the other representational systems. For example, a musician, who probably has a highly developed auditory representational system, is able to detect nuances of sound, e.g., tonal quality, pitch, etc., more fully than an artist whose most developed representational system might be visual. Bandler and Grinder (1976) define the most highly valued representational system as:

> the representational system the person typically uses to bring into consciousness-- that is, the one he typically uses to represent the world and his

experiences to himself (p. 26).

People with differing primary representational systems will perceive the external world differently. Visually oriented people will be attuned to, as well as influenced by, visual aspects of experience; while kinesthetically oriented people will be sensitive to kinesthetic aspects of experience, etc. The differences between persons' representational preferences will be associated with differences in the cognitive models people derive from their experience.

NLP postulates that people provide clues as to what are their primary representational systems. These clues are called "accessing cues" because they allow the observer to gain access to the representational system the person observed is using at a particular point in time. Bandler and Grinder propose three accessing cues for determining a person's primary representational system are: 1) predicate analysis, 2) eye-scanning patterns and 3) Satir body positions (Bandler & Grinder, 1976, p. 69). Predicate analysis and eye-scanning patterns are the two methods discussed most in the NLP literature. A fourth method used by researchers has been self-report questionnaires.

Predicate Analysis

The first technique involves an analysis of the person's language to identify the relative frequencies of references to the various sensory categories. This is

accomplished by attending to the predicates (verbs, adjectives, and adverbs) in a person's language. The primary representational system is identified as the system most frequently used. Bandler and Grinder believe that communication through language is more often literal rather than metaphorical. Thus when an individual says, "I see what you're saying", the inferred underlying representational system for the word "see" is visual and Bandler and Grinder postulate that this individual is literally "making pictures" out of what they hear. Language is assumed to reflect the underlying representational system. The identification of the primary representational system requires listening to which types of predicates are predominately used and subsequently inferring the underlying representational system.

While the rationale is that expression of language is based on the underlying representational system, Bandler and Grinder present no empirical justification for it and many other NLP concepts are based on this assumption. Thus, if the concept of representational systems was found to be fallacious, the entire NLP model could be called into question.

Bandler and Grinder have poorly operationalized their definition of primary representational system through predicate analysis. For example, what if a person used a

visual predicate in one sentence and an auditory predicate in the next sentence? How would a listener determine which representational system is primary? What exactly does the word "primary" mean? Also, how stable is a primary representational system from day to day, or from topic to topic, or form one emotional state to another emotional state? Bandler and Grinder have not discussed these and related issues, and, as will be discussed later in this chapter, there have been errors in research methods resulting from this poorly operationalized definition.

Eye-Scanning Patterns

Another major NLP method for determining a representational system is through observation of eye gaze scanning patterns or visual accessing cues as they are referred to in NLP nomenclature. An individual's eyes move in distinct directions purportedly in correspondence to the ongoing internal cognitive processes. The location of the eye gaze is associated with particular representational systems or sensory categories. Bandler and Grinder (1979, p. 25) have indicated that for normal right handers, the primary representational system can be determined by noting the following patterns of eye movements:

1) When the eyes are straight ahead, closed or move upwards and to the left or right, the individual is having visual images at that point in time.
2) When eyes are level and to either side or downward to

the left, the individual is processing auditorily at that point in time.

3) When eyes are down to the right, the individual is processing kinesthetically at that point in time. Empirical research is lacking to verify that eye movements are indicators of underlying representational processes and whether gazes in specific directions indicate representational processes in any particular modality.

Satir Body Positions

A third method for identifying primary representational systems is based on Virginia Satir's (1972) four categories of dysfunctional communication, ones people tend to use under stress. Each category is associated with particular body postures. The "placater" is relaxed, the head is square on the shoulders and the palms are open and turned up in the lap. The "blamer" evidences tension in the neck and shoulders, the shoulders are hunched, the neck is extended and a hand is extended with one finger pointing. The "super-reasonable" manifests generalized muscle tension, the shoulders are thrown back but are slightly slouched, the arms are crossed and if sitting might be leaning back in the chair. The "irrelevant" is constantly moving in a rather purposeless body motion. NLP (Bandler & Grinder, 1976, p. 69) claims that three of Satir's communication modes are

associated with the use of different primary representational systems. Blamers tend to be visually oriented, placaters tend to be kinesthetically oriented and super-reasonable types tend to be auditorily oriented. By noting which Satir category a client is in, a therapist can infer which representational system the observed person is using. There is no empirical justification to substantiate NLP's claim that there are underlying primary representational systems corresponding to the Satir categories.

Self-Report Questionnaires

Beside the above methods, a PRS could also be determined by simply asking the client their preferred modality (Dilts, Grinder, Bandler, DeLozier, & Cameron-Bandler, 1979, p. 71). To this end, some researchers have developed subject self-report measures for determining PRSs. The self-report measures have been in several forms. For example, Gumm, Walker and Day (1982) devised a 24-item questionnaire adopted from Hill and Nunney's Cognitive Style Mapping Inventory. Eight each of the 24 items expressed preferences for the visual, auditory and kinesthetic processing of sensory experiences, and subjects responded to each item by checking a "rarely," "sometimes," or "usually" category. Cole-Hitchcock's (1980) self-report questionnaire contained 23 multiple choice items. Each question had three possible choices that corresponded to auditory, visual or kinesthetic

modalities. After a subject read the three choices for each question, a neutral, i.e., modality free, stimulus word was spoken to the subject by an experimenter. The subject then indicated which of the three choices came to mind first after hearing the stimulus word. Other self-report instruments have included Shaw's (1977) story version preference method, Yapko's (1981) sentence preference method and Hill's (1983) sentence completion method.

Review of the Empirical Research

A review of the literature indicated 51 research studies on the NLP constructs of representational system and Primary Representational System. None of these, however, had been produced by Bandler and Grinder, the originators of NLP. A review of the studies is presented in the following order:

1) Reliability studies-- those examining the stability of a Primary Representational System (PRS) over time. 2) Validity studies-- those investigating the concurrent validity between pairs of the three PRS assessment measures and studies investigating the construct validity of the eye-scanning assessment method, and 3) Utility studies-- those investigating the effectiveness of therapist's using predicates in the same representational system as the client.

Reliability Studies

Two categories of reliability studies have been done on PRS assessment techniques: 1) those determining the stability of PRS over time using the eye movement assessment method and 2) those determining the stability of PRS over time using the predicate analysis method.

Stability of PRS over time using eye movement assessment method. Dorn, Atwater, Jereb and Russell (1983) and Cody (1983) have investigated the stability of eye movements over time. In Dorn et. al's (1983) study, 26 female undergraduate students were asked six questions from Shaw's (1977) Eye Movement Questionnaire (EMQ). Three male doctoral-level graduate students in counseling psychology were interviewers for the study. One of the interviewers sat in the testing room with the subject and asked the six experimental questions, while the other two interviewers, with the knowledge of the subject, observed the session through a one-way mirror. During the interview, rather than requiring a verbal response, subjects lifted a hand to signal that an internal response was experienced to each of the six questions on the EMQ. The eye movement just prior to the hand signal was recorded by all three experimenters as the PRS eye movement. One week later the subjects were retested under the same procedures. Each interviewer had six ratings for each subject after an interview was conducted. The six ratings were tabulated and each

interviewer's determination of the subject's PRS was calculated on the basis of the sensory category indicated most often. The interrater reliabilities between the three judges were .66, .88, and .78. An overall PRS rating was assigned to each subject on the basis of the category assigned most often among the three raters. A contingency coefficient was calculated to determine the reliability of the eye movement procedure over time and the results were not statistically significant-- thus questioning the reliability of the eye movement technique for assessing PRS.

One of the main purposes of Cody's (1983) study was to determine if a subject's PRS could be reliably identified by eye movements and to determine if eye movements were stable over time. Another purpose was to determine the descriminant validity of the eye movement construct by comparing two different eye movement methods of measurement over time. According to Cody (1983, p. 42) this was undertaken because Falzett (1981) had used the initial eye gaze movement of the subject as the basis for assessing representational preferences. Although not completely explicated, Bandler and Grinder have designated the last eye gaze movement as the one indicating a subject's PRS. Thus, Cody measured both first and last eye gaze movements for comparison purposes. Another intention of Cody's investigation was to determine the degree of primacy, or

strength of representational preferences in the eye movement assessment method by noting the frequency of eye gaze movements in the various categorical directions. To this end, assignment rules, representing increasing degrees of stringency for assigning subjects to a particular modality, were established. To be assigned to the low preference category, a subject gave a minimum of 5 responses in a particular representational modality out of 11 questions asked, which is a 45% PRS criterion level. For the medium preference category, 7 responses in a particular representational modality were required, which is a 64% PRS criterion level, and for the high preference category, 9 responses in a particular representational modality were required, which is an 82% PRS criterion level.

Eighty-eight undergraduate college students were tested twice with a one week interval between assessments. A pair of interviewers from a pool of eight trained undergraduate students were randomly assigned to conduct each interview and each subject was tested by a different team during the retest. Following explanatory instructions, each subject was asked 11 experimental questions over a speaker in the assessment room. The subject was sitting in front of a one-way mirror with both experimenters observing from behind the mirror. The subject was instructed to face the mirror and to give a head nod when a response to a question came to mind. The eye movement responses recorded independently by

the experimenters were the first eye movement shift after each experimental question was asked and the last eye movement shift before the subject nodded to acknowledge having generated a response. For the interview, a set of 11 questions was randomly selected from a total of 20. In the second interview, the questions used included 7 of the 9 questions not employed in the first session, along with 4 questions randomly selected from the set of 11 used in the first assessment interview.

Interrater agreement on the scoring of subjects' eye movements was better than 90% of the time for the two assessment sessions. Results indicated there was little difference (no statistical tests of data were reported) when the first eye movement cue was the targeted response compared to when the last eye movement cue was the targeted response. As to stability over time, it was found "that under the least stringent assignment rule, approximately two of three subjects could be consistently assigned to a specific category of preferences over two assessment sessions" (Cody, 1983, p. 61). As more stringent assignment rules were employed, there was a substantial decrease in the number of subjects who could be so assigned-"only about one in five subjects could be assigned to a single category of preference over the two assessment sessions with a high degree of consistency in responding was required" (Cody,

1983, pp. 61-63). Also, it was consistently found that with an increasingly stringent assignment rule, the percentage of subjects for whom no representational preference could be identified increased dramatically which "suggested that the primacy of a Primary Representational System is a fragile phenomenon" (Cody, 1983, p. 69). Of note was that under all levels of stringency, the visual category of preference substantially outnumbered the auditory and kinesthetic categories.

Stability of PRS over time using predicate analysis method. Birholtz (1981) investigated the stability of PRS over time using the predicate analysis method. The study also investigated PRS's consistency across reports of positive and negative experiences and across reports of past, present, and future experiences. Twenty-seven undergraduate college students were tested independently in a private cubicle in a university language laboratory testing cite. The subjects were given written instructions on how to operate an audio-tape cassette machine. On the audio tape were instructions to answer six questions. The questions were neutrally phrased, i.e., without reference to any sensory modality. The subjects were asked to describe positive and negative experiences in their past, present and projected future. The subjects were given three minutes to respond to each question and the responses were audiotaped. One week later the same procedures were followed, except six

similar but different questions were asked.

Following transcription of tapes, lists of predicates (verbs, adjectives and adverbs) were made by two coders. Two separate coders then categorized the words into six categories: visual, auditory, kinesthetic, gustatory, olfactory and mode-free (predicates without a sensory modality reference). The PRS was operationally defined as the mode "most frequently used and is used 20 percentage points more frequently than the next most frequently used mode (Birholtz, 1981, p. 48). Results indicated that 15 of the 27 subjects had a stable preferred modality over time ($p < .0001$). Of note was that all 15 stable subjects evidenced a kinesthetic PRS. These subjects showed stability over reports of positive and negative experiences and across reports of past, present, and future experiences.

Criticisms of Birholtz's research design include:

1. The statistical method used to calculate interrater reliability on words is not specified; the intercoder reliability on words is not reported.
2. No internal reliability data on self-report questionnaire was reported.
3. There was an inadequate number (N=27) of subjects for the correlational approach used. Thus, the correlation is overly sensitive to the addition or deletion of a small number of subjects.

4. Birholtz claims PRS is stable over time. The stability she found, however, is largely an artifact. Nineteen out of 27 subjects had a kinesthetic PRS at Time 1. If the 70.4% kinesthetic base rate (19 out of 27) is continued at Time 2 and assuming the 19 kinesthetic subjects occur at random among the 27 subjects (no relation to Time 1), then you would expect by chance 13.38 agreements between Time 1 and Time 2. Birholtz found 13 agreements. A reanalysis of Birholtz's data (1981, Table G-2, pp.128-130) produced a Cohen's Kappa (Leach, 1979) of -.02, which is obviously nonsignificant.
5. Birholtz (1981, p. 48) bases one of her criterion for PRS classification on the population base rates of representational mode usage (i.e., Criterion 2: Preferred mode is equal to or is the most frequently used mode, and is at least .67 standard deviations above the mean usage of that mode). When Criterion 2 says most subjeccts do not have a PRS, it is discarded. Criterion 2 was not used because its results disagreed with theory, yet Criterion 2's results are also a reflection of the data. Birholtz never addressed the problems for NLP theory that a population-wide high base rate of one representational system can cause.
6. No breakdown of sex or age of subjects is given.

In summary of the reliability studies, subjects in Dorn et al.'s (1983) study did not evidence temporal stability

of eye movements over a one week time period; Cody's (1983) subjects showed decreasing stability of eye movements over a one week time period as increasing degrees of stringency for assigning subjects to a particular modality were applied; and a reanalysis of data did not find the temporal stability of PRS reported in Birholtz's (1981) study.

Validity Studies

There have been studies that have attempted to determine the concurrent validity between pairs of the three PRS assessment measures. The purpose of this research was to determine the congruity or agreement between the predicate analysis method, the eye movement method and the self-report method. Also, studies have assessed the construct validity of the eye movement measure. The purpose of this research was to determine if subjects made characteristic eye movements based on whether they are processing visual, auditory or kinesthetic information.

Concurrent validity studies. Some studies (Birholtz, 1981; Cole-Hitchcock,1980; Gumm, Walker, & Day, 1982; Owens, 1977) have compared the congruity of the three assessment measures of PRS.

One part of Birholtz's (1981) multifaceted study determined the agreement between a predicate analysis method and a self-report method. The PRSs of 27 undergraduates were initially determined by a predicate analysis method. Two

weeks later the subjects filled out an 8-item self-report questionnaire which had components dealing with understanding, memory, and sensory modality preferences. The correlation between the two measures was not significant.

The degree of agreement among the three PRS assessment measures was examined using 79 undergraduate students by Owens (1977). The subjects were presented with nine verbal stimulus cues. Six of the cues were used for rating eye movements only; three were used for eye movements ratings and subjects' verbal responses to these cues were used to rate predicates. Subjects were then given a forced choice self-rating instrument identifying their PRS. Results of all ratings were categorized as either visual, auditory or kinesthetic on each of the three identification procedures and data were analyzed for agreement between these procedures. Owens reported a significant agreement between predicate analysis and eye movement methods but the other comparisons between predicate analysis and self-report and between eye movements and self-reports were not significant. Gumm et al. (1982, p. 329) reanalyzed Owen's data and discovered a statistical error which indicated no significant association between any two of the three assessment methods.

In a similar study, Gumm et al. (1982) assessed 50 female college students' PRS in each of the three methods.

PRS was operationally defined as the most frequently occurring modality in the predicate analysis and eye movement methods. The interrater reliability between the two predicate raters was .71 and the interrater reliability for eye movement raters was .69. In the self-report quesionnaire, subject scores were assigned weights of 1, 3, and 5 to the "rarely," "sometimes," and "usually" responses, respectively, for each of the three modalities. The modality with the highest sum of weights was selected as the PRS. No significant agreement occurred between any pair of methods used to determine the subject's PRS.

In Cole-Hitchcock's (1980) study to determine agreement among the three PRS assessment measures, 150 undergraduates were initially screened by a self-report instrument composed of 23 multiple choice questions. Only 33 of the subjects showed a modality preference by this instrument. Fifteen of the 33 subjects showed a kinesthetic preference, 11 showed an auditory preference and 7 showed a visual preference. Each of the subjects then gave verbal responses to seven cards from the Thematic Apperception Test. These responses were videotaped and transcribed. The transcript of the verbal interview and the videotape of the eye movements exhibited by each subject during the interview were categorized as to representational system by three trained raters. Interrater reliability coefficients ranged between

.72 and .91 with a median of .79. For all three measures, PRS was operationally defined as the modality used at a rate 20 percent higher than the next highest modality. Results indicated that a PRS could not be identified by the predicate analysis method. While there was no significant agreement between the self-report and predicate analysis methods, there was significant ($p < .05$) agreement between the self-report and eye movement methods.

Birholtz (1981), Owens (1977), Gumm et al. (1982), and Cole-Hitchcock (1980) have attempted to determine concurrent validity among the three PRS assessment measures. However, it seems premature to look for concurrent validity among measures when the reliability of the three types of measures has not been established. This point is made at the end of Cole-Hitchcock's (1980) study: "No valid generalizations can be drawn until instruments have been standardized and determined reliable and valid measures of representational systems have been developed" (p. 101).

Construct validity of the eye movement assessment measure. Three studies (Beale, 1981; Hernandez, 1981; Thomason, Arbuckle, & Cady, 1981) have attempted to determine the construct validity of PRS and eye movements. Beale (1981) examined the congruence of sensory-specific information with eye movements on 40 undergraduate college students. Each subjects' eye movements were videotaped in response to 24 stimulus items. Regardless of stimulus

changes in sensory content, subjects' eye movements were predominately in an upward direction in the visual category-- thus contradicting NLP theory.

In a similar study, Thomason et al. (1980) videotaped 40 undergraduate college students' eye movements in response to 30 stimulus items. There were 10 questions for each of the three major sensory modalities and each question required the subject to see mentally an image, hear a sound, or feel a tactile sensation. Three judges coded the subjects' eye movements; however, their interrater reliability was not reported. A validity criterion of 75% consistency between question and eye movement modalities was set. Although eye responses were not random, i.e., most were categorized as visual, the sensory process obligated by the question did not influence eye movement as hypothesized-- thus failing to verify NLP eye movement theory.

In Hernandez's (1981) study of congruency between eye movement responses and sensory specific information, 64 undergraduate students were presented with six visual, six auditory, six kinesthetic and six non-specific statements. Eye movements were videotaped in response to each question and later coded into modalities by three independent raters. Interrater reliability coefficients ranged from .66 to .88. The results were mixed: visual statements showed significant

correlations with visual-category eye movements, half of the auditory statements resulted in auditory eye movements and none of the kinesthetic statements were correlated with kinesthetic eye movements in subjects.

In summary, Birholtz (1981) Owens' (1977), Cole-Hitchcock's (1980), and Gumm et al.'s (1982) PRS concurrent validity studies have not produced significant agreement between the three PRS assessment measures. This is not surprising considering Beale's (1981), Thomason et al.'s (1981), and Hernandez's (1981) studies have failed to demonstrate construct validity of PRS and eye movement.

Utility Studies

There have been two types of utility studies: a) those using ongoing representational matching and b) those using a preidentified PRS. In the ongoing matching studies, a therapist used predicates in the same representational system used by the subject throughout the treatment condition. If the subject switched from one modality to another, the therapist would also switch. No attempt was made to determine a PRS prior to treatment conditions. In the preidentified PRS studies, the subject's PRS was identified before treatment and then this preferred modality was the only representational modality used by the therapist during the treatment condition.

Ongoing matching studies. A number of studies (Brockman, 1980; Dorn, 1983; Dowd & Hingst, 1983; Dowd &

Pety, 1982; Ellickson, 1980; Frieden, 1981; Green, 1979; Hammer, 1980; Rebstock, 1980; Schmedlin, 1981; Shobin, 1980) have investigated how the therapist matching the client's representational system affects the establishment of trust/rapport between therapist and client. For example, Brockman (1980) studied the relationship of matching representational systems and empathy. The subjects were 20 undergraduate college students who met with two counselors, in counterbalanced order, for an analogue of a beginning counseling interview. One counselor used ongoing predicate analysis; the other counselor took a more generic, human relations approach to empathy. After each interview, subjects completed Barrett-Lennard's Relationship Inventory and Jourard's Willingness-to-Disclose Questionnaire. Results indicated that subjects perceived the representational system matching counselor as more empathic than the generic empathy counselor.

In a similar study, using 88 female college students as subjects, interviewers matched predicates on an ongoing basis by predicate analysis for one group and used dissimilar predicates for the other group (Hammer, 1980). Trust was measured by the perceived empathy scale from the Barrett-Lennard Relationship Inventory. Those students in the similar predicate condition rated their interviewers higher on perceived empathy than those students in the

dissimilar predicate condition.

Ongoing eye movements were used to determine subject's representational systems in a related study (Ellickson, 1980). Thirty-six male and 36 female undergraduates were randomly assigned to a predicate-matching or to a predicate-mismatching interview in a study designed to evaluate the effects of predicate matching on the dependent variables of empathy, ease, anxiety and hostility. Although females showed no significant effects due to matching/mismatching of representational systems, males were more at ease in the matching than in the mismatching condition. Analysis of the main effect showed that only the sex of the interviewer was significant.

The purpose of Brockman's, Hammer's, Ellickson's and other similar research has been to determine the usefulness of matching predicates on an ongoing basis. For these ongoing matching studies, the results are mixed: six studies (Dorn, 1983; Dowd & Hingst, 1983; Dowd & Pety, 1982; Ellickson, 1980; Green, 1979; Rebstock, 1980) did not support the theory that matching predicates enhances rapport, while three studies (Brockman, 1980; Hammer, 1980; Shobin,1980) did. It is important to note that in these ongoing matching studies there was not a determination of a subject's PRS. These ongoing matching studies, either by the predicate analysis method or by the eye movement analysis method, are indirectly concerned with primary

representational systems. The studies are concerned mainly with rapport effectiveness of a therapist pacing a client in similar predicates. This literature may demonstrate the practical utility of matching predicates, but it does not demonstrate the underlying existence of primary representational systems.

Preidentified PRS studies. There have been studies (Falzett, 1981; Kraft, 1983; Mattar, 1980; Pantin, 1982; Paxton, 1980; Shaw, 1977; Yapko, 1981) that have identified subject's PRS prior to treatment conditions. In Paxton's (1980) study of 48 intake clients at a family and children's center, a subject's PRS was determined prior to treatment conditions by analyzing pre-treatment subject tapes using a predicate analysis method. The subjects, women between 26 and 35 years of age, were then randomly assigned to one of three experimental groups: PRS-matching, PRS-mismatching, or PRS-non-matching treatment. After the counseling interview, subjects rated the counseling relationship on the Barrett-Lennard Relationship Inventory. Results indicated that both matching and mismatching of PRS treatments were significantly superior to non-matching PRS, but there was no significant difference between matching and mismatching treatments on the variable of client perception of the counseling relationship. Paxton operationally defined the PRS as the representational system with the highest number

of predicates. A post hoc data analysis indicates that 56% of the subjects had auditory PRSs, 27% had kinesthetic PRSs, and 4% had visual PRSs.

In another study in which the dependent variable was trust, Falzett (1981) had counselors match or mismatch predicates with 24 female college students whose PRS had been determined by eye movement responses to questions prior to treatment. The PRS was operationally defined as the sensory system "recorded most often by each of the recorders" (Falzett, 1981, p. 307). Only 3 of the 26 subjects were not kinesthetic in their predicate usage. Subjects rated the counselor on the Trustworthiness scale of the Counselor Rating Form. Results indicated that perceived trustworthiness was higher when counselors matched predicates with clients than when they did not match predicates.

Pantin (1982) studied the relationship of PRS to memory on a standard memory task and subjects' ratings of a counselor on establishing trust on a one-page transcript simulating a therapy session. A predicate analysis method was used to determine the PRS of the 124 undergraduates prior to treatment. The PRS was operationally defined as the most frequently used modality that is also used at a rate 20 percent higher than the next highest modality. None of the subjects demonstrated a kinesthetic PRS by this method. Results supported NLP theory on both dependent

measures.

Thirty college subjects' PRS were assessed by predicate analysis of subjects' open-ended spontaneous conversation prior to each of three hypnotic inductions by Yapko (1981). The predicates were then categorized according to representational systems, and the PRS was operationally defined as the modality containing the largest number of predicates. Each subject experienced three taped inductions varying on PRS; the dependent variable was change in relaxation state as indicated by muscular tension reduction measured by an electromyograph (EMG). The results indicated subjects obtained greater relaxation when experiencing the hypnotic induction containing predicates corresponding to their PRS-- thus supporting NLP theory. Kraft (1983, p. 16), however, noted several methodological errors in the EMG measures of Yapko's study-- thus seriously questioning the positive results.

In Kraft's (1983) research on relaxation and PRS with 18 male and 18 female undergraduates, the PRS was operationally defined as the majority of visual, auditory, or kinesthetic predicates summed over the responses to six questions prior to treatment. The stimulus situation consisted of three sessions in which subjects were exposed to different relaxation audiotapes. The scripts varied in the three sensory modalities- visual, auditory and

kinesthetic. Dependent variables were electromyographic recordings, the A-State scale of the State-Trait Anxiety Inventory and a semantic differential-type relaxation scale. Results indicated no differences.

The relationship of PRS and undergraduate college subjects' ability to recall items from a story was investigated by Shaw (1977). Three forms of the story used auditory, visual, and kinesthetic predicates to describe items in the story. Using a predicate analysis, the PRS was operationally defined as the modality with the highest number of predicates. None of the subjects demonstrated a visual PRS by this method and there were no significant differences between the auditory and kinesthetic groups in recall ability. Ellis (1980) noted numerous inconsistencies in Shaw's method of classifying predicates into modalities and concluded "it it impossible to decide to what degree the outcomes belie inadequacies in the model itself, versus inadequacies with the rating methodology" (pp. 21-25).

Mattar (1980) studied the relationship of PRS and comprehension on 40 undergraduate college students. A predicate analysis method was used to determine the subjects' PRS prior to treatment. In determining the subjects' PRS, three independent judges classified subject's predicates into auditory, visual and kinesthetic categories. Each subject's score was the total of the three scores provided by the judges on frequency of auditory, visual and

kinesthetic predicates. A subject was determined to prefer a particular representational system "if the frequency of predicates representative of that system was at least one greater than the frequency of predicates of the other two categories combined (Mattar, 1980, p. 40). None of the subjects demonstrated an auditory PRS by this method. The experimental conditions consisted of a test of comprehension given over a role-played, taped therapy session using primarily either visual or kinesthetic predicates. Comprehension was operationalized into general information (GI) and specific predicate usage segments (SPU). Results indicated that the V and K groups did not differ in their overall comprehension of V and K taped therapy sessions. These groups did differ, however, when the type of comprehension (GI or SPU) factor was considered. Specifically, it was found that V individuals comprehended V SPU questions better than K individuals and that K individuals comprehended K SPU questions better than V individuals. It was also noted that V individuals were relatively worse at comprehending K SPU questions than K individuals were at comprehending V SPU questions.

A number of problems emerge when the preidentified PRS studies are examined. First, the operational definitions of PRS are flawed. Falzett (1981), Kraft (1983), Owens (1977), Paxton (1980), Shaw (1977), and Yapko (1981) operationally

define the PRS as the modality with the highest number of predicates. Perhaps in these studies the subject's secondary modality preference occurred almost as frequently as the primary one. For example, if a frequency tabulation of a subject's speech sample reveals 47 visual predicates, 43 auditory predicates and 29 kinesthetic predicates, then by the above operational definition, this subject would be categorized as having a visual PRS. This categorization is rather meaningless, as well as misleading, considering the next highest modality occurs almost as frequently as the first.

Mattar's (1980) operational definition of a PRS is similarly flawed. Mattar states that a modality is considered primary if the frequency of that modality is at least one greater than the frequency of predicates of the next two categories combined. This definition could be misleading. For example, if a frequency tabulation of a subject's speech sample shows 7 auditory predicates, 1 kinesthetic predicate and 9 visual predicates, then by Mattar's definition, this subject would be categorized as having a visual PRS. This categorization is not useful as the next highest modality occurs almost as frequently as the primary one.

Pantin's (1982) operational definition of the PRS, i.e., a modality is considered primary if it's frequency is used at a rate 20 percent higher than the next occurring

modality, is stricter than the above definitions but still flawed. For example, a subject using kinesthetic predicates 60% of the time and auditory predicates 40% of the time in a sample would be categorized as having a kinesthetic PRS according to Pantin's operational definition. However, a therapist using only kinesthetic predicates with this subject could be mismatching 40% of the time, which is considerable. This is not a unique problem with Pantin, but with Bandler and Grinder and any other researcher interpreting PRS as if it were the exclusive representational system. Primary does not mean exclusive.

Another major problem with the research relates to how the predicates were selected and coded into the various representational modalities. Each researcher devised unique methods in selecting predicates to be coded. For example, colloquial expressions were excluded from the word lists of Mattar's (1980) subjects. Other researchers did not specify what types of predicates were included.

Coding criteria and instructions to judges varied considerably. Problems in this area usually focused on what to do with words that possibly could be interpreted as referring to more than one sensory modality. Practice examples in most training exercises for judges were simplistic and the practice word lists unrepresentative of actual subjects' transcripts. Also, criteria for rater

accuracy and interrater reliability were often missing and generally ambiguous when included.

Bandler and Grinder have not adequately defined their use of predicates, and their attempts at differentiating or defining visual predicates, kinesthetic predicates or auditory predicates are inadequate. Bandler and Grinder (1976, p. 7) give only a few fairly obvious examples for illustrative purposes. For example, the words silent, squeal, and blast describe something in an auditory system.

Bandler and Grinder (1976) refer to the most highly valued representational system as "the representational system the person typically uses to bring information into consciousness-- that is, the one he typically uses to represent the world and his experience to himself" (p. 26). Bandler and Grinder have not specified what "typically" means with the result that researchers have operationalized the term "primary representational system" in so many diverse ways that cross study comparisons are difficult.

Conclusions

A summary and critique of NLP theory and research related to NLP's construct of Primary Representational System follow:

1. Bandler and Grinder have not provided any empirical justification to support their hypothesis that people exhibit a primary representational system as evidenced in language predicates and eye movements.

2. Bandler and Grinder's definition of primary representational system is insufficiently operationalized. The word "primary" and the phrase "the representational system the person typically uses" have not been adequately explicated. The degree of primacy of PRS, i.e., the strength of representational preference, has not been adequately addressed in their definition. As a result the operational definition of the construct of PRS varies considerably among the researchers making cross study comparisons difficult. Dorn et al. (1983), Falzett (1981), Kraft (1983), Owens (1977), Paxton (1980), Shaw (1977), and Yapko (1981) operationally define PRS as the modality recorded most often. Mattar (1980) operationally defined PRS as the modality in which the frequency of predicates was at least one greater than the frequency of predicates of the other two categories combined. Birholtz (1981) and Pantin (1982) operationally defined PRS as the modality that occurs at a rate 20 percent higher than the next most frequently occurring modality. Cody (1983), in assigning subjects to a particular modality preference to determine PRS, analyzed subject's responses using increasing levels of stringency- 45%, 64%, and 82%. Cody's (1983) research study is important because it specifically addressed the issue of primacy of PRS by noting the frequency of

representational modality occurrences.

3. The purpose of the utility studies conducted on representational systems (Brockman, 1980; Dorn, 1983; Dowd & Hingst, 1983; Dowd & Pety, 1982; Ellickson, 1980; Frieden, 1981; Green, 1979; Hammer, 1980; Rebstock, 1980; Schmedlin, 1981; Shobin, 1980) has been to determine the usefulness of a therapist using predicates in the same representational system used by the subject throughout the treatment condition. These studies were concerned with the validity of representational systems in general but do not provide information about the existence of a primary representational system.
4. The concurrent validity studies (Cole-Hitchcock, 1980; Gumm, Walker, & Day, 1982; Owens, 1977) compared the congruity of the three assessment measures of PRS. This type of research seems premature considering construct validity and reliability of the three types of measures have not been established.
5. There has been little research attempting to demonstrate the construct validity of representational systems. Beale's (1981), Hernandez's (1981), and Thomason et al.'s (1981), studies have not established that sensory-specific information corresponds with particular eye movements.
6. There has been little research attempting to demonstrate the stability of PRS over time. Subjects in

Dorn et al.'s (1983) investigation did not evidence stability of eye movements over a one week interval when the PRS was operationally defined as the modality occurring most often. In Cody's (1983) study of stability of eye movements over a one week interval, approximately 2/3 of the subjects evidenced a stable modality preference when the PRS criterion level was 45%. However, when the PRS criterion level was 82%, only about 1/5 of the subjects demonstrated a stable PRS. Subjects did not demonstrate PRS stability over a one week time period as reported previously in Birholtz's (1981) predicate analysis study.

7. The research populations have been restricted. Almost all the research subjects have been college students, mostly aged 18-25, who were volunteers for experimentation. Of 21 studies reporting subject demographic data, only Paxton's (1980) study of 48 intake clients at a mental health center were non-college subjects.
8. An analysis of the predicate analysis and eye movement PRS assessment methods was done to determine possible method dependency effects. For the predicate analysis method, subjects in Birholtz's (1981), Owens' (1977), and Gumm et al.'s (1982) studies evidenced a predominant kinesthetic modality preference. No subjects in Mattar's

(1980) study evidenced an auditory modality preference; no subjects in Pantin's (1982) evidenced a kinesthetic modality preference, and no subjects in Shaw's (1977) study evidenced a visual modality preference. Subjects in Paxton's (1980) study showed a predominate auditory modality preference. Thus, no strong method dependency effect emerges.

There were inconsistencies in the subject response patterns for the eye movement assessment method of determining PRSs. Subjects in Beale's (1981), Cody's (1983), and Thomason et al's (1980) were predominately visual in their PRS preference; subjects in Gumm et al's (1982) were predominately auditory in their PRS preference, and subjects in Falzett's (1981) study were predominately kinesthetic. Subjects in Owens' (1977) and Hernandez's (1981) studies were predominately auditory and visual. With the exception of Falzett (1981), these eye movement studies indicate a tendency for subjects to exhibit a visual modality preference more often than either auditory or kinesthetic modality preferences. In summary, no method dependency effect emerges in the predicate analysis method of assessing the PRS but the eye movement method of assessing the PRS tends to concentrate a larger proportion of subjects in the visual modality.

Hypotheses

The foregoing discussion suggests many useful and pertinent targets for empirical attention. Three areas that will be addressed in this study are: (a) the existence of a subject's Primary Representational System as identified by predicate usage; (b) the temporal stability of the Primary Representational System construct; (c) an analysis of four subject populations of differing age categories on questions (a) and (b).

To summarize, the hypotheses of the present investigation, as drawn from the literature on Neuro Linguistic Programming, are:

1. A subject's language behavior is characterized by a predominant preference of predicates in one sensory modality (referred to as a Primary Representational System in Neuro Linguistic Programming terminology). In this study, a subject's PRS is operationally defined as the modality most frequently used, and in addition occurs at a rate 20 percent higher than the next most frequently occurring modality.
2. A subject's Primary Representational System will evidence temporal stability over a six week time interval.
3. (a) Subjects from four different populations will exhibit a Primary Representational System on the basis of criteria outlined in Hypothesis 1 above. (b) Differences

in modality preference of PRSs will be found between males and females and between 30-50 year old mental health workers and 18-23 year old college students. The four populations in this study are: (1) male college students between the ages of 18 and 23, (2) female college students between the ages of 18 and 23, (3) male mental health counselors between the ages of 30 and 50, and (4) female mental health counselors between the ages of 30 and 50.

C H A P T E R III

RESEARCH METHOD

Subjects

The subjects for the experiment were from two population groups. One group was 17 male and 15 female undergraduate students enrolled in psychology and sociology classes at Pacific Lutheran University. The students ages ranged from 18 to 23. Student participation in the research was on a voluntary basis with course points given as compensation.

The other subject group was 16 male and 17 female volunteer mental health counselors with a minimum of a bachelor's degree in a mental health field. The counselors were from community mental health centers in the Tacoma, Washington area and their ages ranged from 30 to 50. Thus, there were a total of 65 subjects for the experiment, 32 college students and 33 mental health counselors.

Procedures

Experimental Steps

The sequence of experimental steps was:

1. Testing of subjects
2. Retesting of subjects
3. Transcription of audiotapes
4. Selection of predicates from subjects' transcriptions
5. Categorization of predicates into representational

modalities

6. Analysis of data

Interviewers

Two male and two female undergraduate students from Pacific Lutheran University volunteered to be interviewers for the experiment. These four students had been recommended by their psychology class instructor and were given course points as compensation. The four interviewers met as a group with the experimenter on two separate occassions for three hours of training. They received information on the general purpose of the experiment and responsibilites entailed as an interviewer. The logistics of the experimental procedures, such as testing times, testing sites, time parameters, etc., were reviewed. Subject lists, which included names, phone numbers and code numbers, as well as blank audiotapes and casette tape-recorders were distributed. Each interviewer was assigned 18 subjects to test. One male and one female interviewer were assigned the college student subjects to test and the other two interviewers were assigned the mental health counselor subjects to test.

The interviewers received the written instructions (Appendix B) that they were to read to each subject during the testing. These instructions were carefully reviewed by the experimenter and points of clarification were made.

Particular attention was addressed to the four probe questions that an interviewer was to use when a subject gave too short of a response to an experimental question. It was emphasized to the interviewers that they were to use language without sensory modality referents while conversing with the subjects so as not to inadvertently suggest or cue the subjects to use a particular sensory referential modality. Examples of language with and without sensory based predicates were given. Each interviewer did two practice interviews and clarifications were made as needed.

Test Questions

In this study there were two testing forms (Forms A & B), each with three questions that subjects were asked by the interviewers. One form was used during the initial testing session and the other form was used during the retest session six weeks later. In the original design of this study, the two forms were to be counterbalanced so that during the initial round of testing 1/2 the subjects would be answering one testing form and the other 1/2 of the subjects would be answering the other testing form with the forms being reversed for the retesting session six weeks later. Because of an error this did not happen. Rather, during the first round of testing, 20 subjects (15 students and 5 counselors) received Form A and 45 subjects (17 students and 28 counselors) received Form B. Care was taken to ensure that the testing forms were reversed for

the second round of questioning and at no time did the subjects receive the same form for both rounds of testing.

Each testing form had three questions that asked the subject to tell about:

1. a positive experience in the past
2. a positive experience in the present
3. a positive experience in the future

The audiotapes containing the subjects' responses to these questions comprised the raw test data.

The six test questions were identical to six questions used by Birholtz (1981) in her study of college students. In Birholtz's (1981) study there were 12 questions: six of the questions elicited subject responses regarding positive experiences in the past, present, and in the future; and six of the questions elicited subject responses regarding negative experiences in the past, present, and future. In this study only the six questions regarding positive experiences were used as Birholtz (Birholtz, personal communication, spring, 1983) had stated that subject responses to six questions would provide data containing sufficient predicates to determine a subject's PRS.

The six experimental questions used in this study were:

<u>Form A</u>

1. What was one of the best experiences you had when you

were in elementary school. I would like as many details about your experience of that.

2. What was one of the best experiences you have had within the past month? I would like as many details as possible about your experience of that.
3. What would be one of the best things that could possibly happen to you within the next 10 years? I would like as many details as possible about what your experience of that could be.

Form B

1. What was one of the best experiences you had when you were a child? I would like as many details about your experience of that.
2. What was one of the best experiences you have had recently? I would like as many details as possible about your experience of that.
3. What would be one of the best things that could possible happen to you in the future? I would like as many details about what your experience of that would be.

In Birholtz's (1981) study the experimental questions were presented to the subjects on audiotape; there were no interviewers to ask the questions. In the present study interviewers were used in an attempt to more closely approximate an actual counseling session in which there is a dialogue between therapist and client.

Research Design

The time interval between test and retest was six weeks and was based on Bandler and Grinder's strong assumption that PRSs are measurable and stable over time. The six week time interval was used for two reasons. First, the time interval in previous research (Birholtz, 1981; Cody, 1983; and Dorn et al., 1983) conducted on the reliability (the temporal stability) of PRS, was one week. Theoretically, the time interval between test and retest should not be a factor as the NLP assumption is that subjects' PRSs are stable over time. Practically, however, an argument could be made that identical subject responses over a one week time interval could be attributed to memory. Using a longer time interval, such as six weeks, minimizes memory effects. The second reason for a six week time interval was to minimize possible subject drop-out rate due to a too lengthy time period between testings.

Instructions to Subjects

Prior to experimentation, the college student subjects received verbal instructions and the mental health counselor subjects received written instructions from the experimenter that generally outlined the task to be performed and the time commitment required. Research subjects were requested to sign an informed consent statement (Appendix A) stating that confidentiality would be maintained at all times, that they could withdraw their participation at any time, and

that a written summary of the research would be provided following completion of the experiment.

The college student subjects were contacted by phone by one of the interviewers and a testing time was arranged. The subjects were instructed to meet the interviewer at the reference desk in the university library at the arranged time and from there the interviewer would escort the subject to small private room for the testing. The subjects were given a code number over the phone and instructed to use it during the testing. The subjects were reminded that their responses would be audiotaped during the testing.

At the designated time, the interviewer and the subject met at the reference desk and the interviewer escorted the subject to the testing room where the subject was instructed to sit at the table with the tape-recorder. The interviewer turned the tape recorder on and then read the prepared script (Appendix B). The subject's responses were audiotaped. At the end of the questioning, a date was established approximately six weeks later for retesting.

During the retest the same procedure was followed except the subject was asked three questions from the other testing form. At the end of the retest, subjects were informed of the availability of the test results following completion of the study.

The procedure for testing the mental health counselor

subjects was the same as for the college student subjects except the testing sites were in private rooms at each of the mental health counselor's place of employment. When the mental health counselors were contacted by the interviewer over the phone to establish testing times, etc., the interviewer asked the mental health counselor to have a private room available in their respective agencies for the testing. Otherwise, the procedures were the same.

Transcription of Audiotapes

Four professional secretaries were hired to transcribe the audiotapes. There were 72 subjects for the initial testing session. However, five subjects were dropped because of inaudible tapes, one subject was dropped because one interviewer forgot to ask one of the experimental questions, and one subject was dropped because the subject's total number of predicates was below the criterion level established for minimal number of responses. A subject was excluded from scoring if the total number of predicates extracted from their transcription was two standard deviations below the mean average of predicates for the subjects for that interviewer during that round of questioning.

Selection of Predicates

The selection of predicates from the subjects' transcribed audiotapes was done by a paid part-of-speech coder. The part-of-speech coder was an experienced high

school Enlish grammar teacher. The primary task of the part-of-speech coder was to extract and list the predicates (verbs, adjectives, and adverbs) from the transcribed audiotapes. In Appendix C are instructions for the part-of-speech coder and includes rules for selecting predicates with directions to include certain types of predicates and exclude certain other types of predicates. Inclusion and exclusion rules were formulated because numerous types of predicates do not have sensory referents in or out of context. Elimination of these types of predicates greatly reduced the amount of time required to perform the next scoring step of codifying the predicates into representational modalities.

The part-of-speech coder met with the experimenter for two hours of training and received information on the experimental purpose and the instructions for selecting predicates (Appendix C). These instructions were carefully reviewed by the experimenter and points of clarification were made.

It is important to note that Bandler and Grinder have not delineated any specific rules for selecting predicates. Consequently, subsequent researchers have generally included all predicates, regardless of type.

Categorization of Predicates

Categorization of subjects' word lists into sensory

representational modalities was done by two volunteer modality coders. Both modality coders had graduate degrees, one in school psychology and the other in library science. The primary task of the modality coders was to classify each predicate on the subject predicate word lists into one of the five sensory representational modalities of vision, audition, kinesthetics (body sensations), olfaction and gustation or into a sixth none category for those predicates without a sensory reference.

The two modality coders met with the experimenter on three separate occassions for nine hours of training. They received information on the general purpose of the experiment and their responsibilites as modality coders were reviewed. In Appendix D are the instructions to the modality coders and contains procedural instructions, background information on relevant NLP theory, the modality coding rules, and practice examples. These instructions were carefully reviewed by the experimenter and points of clarification were made. The practice examples were the transcriptions from the five partially inaudible tapes mentioned earlier that were excluded from the study.

Following training, a test of interrater reliability between the modality coders was performed. Thirty-two subject transcriptions were randomly chosen from a pool of 130 (65 subjects on two testing occassions) for this purpose. The interrater reliability coefficient between the

modality coders using Cohen's Kappa (Leach, 1979) was .92, thus warrenting the continuation of the modality coding on the rest of the subject transcriptions. Each modality coder then received 49 randomly chosen transcriptions from the remaining 98.

C H A P T E R IV

RESULTS

Hypothesis 1:

A subject's language behavior is characterized by a predominant preference of predicates in one sensory modality (referred to as a Primary Representational System) in Neuro Linguistic Programming terminology). In this study, a subject's PRS was operationally defined as the modality most frequently used, and in addition, the modality that occurred at a rate 20 percent higher than the next most frequently occurring modality.

Appendix E shows the predicate count and percentages for each modality and the PRS category for each subject for Times 1 and 2. As seen in Table 1, 55 of 65 subjects showed a modality preference at Time 1; 50 of 65 subjects showed a modality preference at Time 2. Thus, Hypothesis 1 is confirmed by the fact that a large majority of subjects showed a PRS at Times 1 and 2.

Table 1

Breakdown of Subjects by Modality Preference

Time 1			Time 2		
Modality Preference	Number of Ss	% of total Ss	Mod. Pref.	Number of Ss	% of total Ss
V	1	1.53 %	V	1	1.53 %
A	1	1.53 %	A	2	3.08 %
K	53	81.54 %	K	47	72.31 %
O	0	0.00 %	O	0	0.00 %
G	0	0.00 %	G	0	0.00 %
None	10	15.39 %	None	15	23.08 %
Total	65	99.99 %	Total	65	100.00 %

Table 1 presented data for subjects at the level of preferred representational systems. Calculation of PRSs is based on the subjects' percentages. More information about the average percentage of predicates used by subjects for each modality is presented in Table 2.

Table 2

Word Percentages by Modality for Times 1 and 2

Modality Preference	Time 1 %	Time 2 %
V	2.48 %	2.98 %
A	2.44 %	2.77 %
K	9.86 %	10.53 %
O	0.02 %	0.04 %
G	0.15 %	0.29 %
None	85.04 %	83.38 %
Total	100.00 %	Total 100.00 %

These data indicate that a large percentage of predicates were not codeable into a representational modality. Among those words that were codeable, a majority fell into the single category of kinesthetic. This dominance of the kinesthetic category at the level of individual words is also reflected in the very large number of subjects who showed a kinesthetic primary representational system as indicated in Table 1. This preference for a kinesthetic method of representing the world was tested by comparing the obtained distribution of PRSs to a distribution that is based on a model of PRSs being randomly distributed across the six possible categories (the five representational modalities plus a sixth category where no modality met the criterion to be considered a PRS). A Chi-Square Test was done to evaluate whether these two models (as seen in Table

3) were significantly different.

Table 3

Modality Occurrence for All Subjects

	Time 1						
	V	A	K	O	G	None	
Observed	1	1	53	0	0	10	= 65
By chance	10.8	10.8	10.8	10.8	10.8	10.8	= 65
	Time 2						
	V	A	K	O	G	None	
Observed	1	2	47	0	0	15	= 65
By chance	10.8	10.8	10.8	10.8	10.8	10.8	= 65

Results indicated significant differences with values of 65.8, df=5, ($p < .001$) for Time 1 and 59.0, df=5, ($p < .001$) for Time 2. Thus, subject modality preferences existed; with the kinesthetic modality occurring most frequently for both Time 1 and Time 2.

Hypothesis 2:

A subject's Primary Representational System will evidence temporal stability over a six week time interval.

Table 4 shows the number of subjects classified into PRS modality preference categories for the 65 subjects over Time 1 and Time 2.

Table 4

Primary Representational System (PRS) Stability

		Ss' PRS at Time 1						
		V	A	K	O	G	None	
Ss' PRS at Time 2	V	0	0	1	0	0	0	= 1
	A	0	0	2	0	0	0	= 2
	K	1	1	40	0	0	5	= 47
	O	0	0	0	0	0	0	= 0
	G	0	0	0	0	0	0	= 0
	None	0	0	10	0	0	5	= 15
		= 1	= 1	= 53	= 0	=0	=10	65

As can be seen in Table 4, of the 53 subjects who demonstrated a kinesthetic PRS at Time 1 (the subjects in column 3), 40 of them had a kinesthetic preference at Time 2, while 10 subjects showed no preference and 1 and 2 subjects showed a visual and auditory preference respectively. Hence, 75.5% (40/53) of the subjects showing a kinesthetic preference at Time 1 also showed that preference at Time 2. The base rate of kinesthetic preference at Time 1 was 53/65 or 81% and so if the same distribution of modality preferences was to occur at Time 2 with no connection to what happened at Time 1, we would expect 81% (N=43) of those 53 orginal kinesthetic-preferring subjects by chance to repeat a kinesthetic preference at Time 2. Thus, because of the generally high rate of subjects choosing a kinesthetic PRS, by chance we

would expect 43 out of 53 (81%) of the subjects to repeat a kinesthetic preference at Time 2 while only 40 subjects actually did. Despite the large percentage of subjects replicating a kinesthetic preference at both times, this does not provide evidence of stability. This can be statistically confirmed by calculating a Cohen's Kappa statistic (Leach, 1979). The Cohen's Kappa statistic assesses stability while taking into account very high or very low base rates of occurrences. When the Cohen's Kappa was calculated, Table 4 was collapsed into a 3 by 3 table. The three categories were kinesthetic, a combination of V, A, O, & G, and a none category. This was done because there were no subjects with either an olfactory or gustatory PRS and there were very low rates for the visual and auditory categories. When Cohen's Kappa was calculated a value of 0.18 was obtained. Thus, stability of PRS over time was not evidenced in this study and Hypothesis 2 is not supported.

Hypothesis 3:

(a) Subjects from four different populations will exhibit a Primary Representational System on the basis of criteria outlined in Hypothesis 1 above. (b) Differences in modality preference of PRSs will be found between males and females and between 30-50 year old mental health counselors and 18-23 year old college students. The four populations in this study were:

(1) male college students between tha ages of 18 and 23, (2) female college students between the ages of 18 and 23, (3) male mental health counselors between the ages of 30 and 50, and (4) female mental health counselors between the ages of 30 and 50.

Hypothesis (3a):

Subjects from four different populations will exhibit a Primary Representational System on the basis of criteria outlined in Hypothesis 1 above.

Table 5 shows the breakdown by modality preferences of the four groups in this study (female college students, male college students, female mental health counselors, and male mental health counselors).

Table 5

Breakdown of Groups by Modality Preference

Female College Students

Time 1			Time 2		
Modality Preference	Number of Ss	% of total subjects	Mod. Pref.	Number of Ss	% of total subjects
V	1	6.67 %	V	0	0.00 %
A	0	0.00 %	V	0	0.00 %
K	8	53.33 %	K	11	73.33 %
O	0	0.00 %	O	O	O.00 %
G	0	0.00 %	0	0	0.00 %
None	6	40.00 %	None	4	26.67 %
Total	15	100.00 %	Total	15	100.00 %

Male College Students

	Time 1			Time 2	
Modality Preference	Number of Ss	% of total Ss	Mod. Pref.	Number of Ss	% of total Ss
V	0	0.00 %	V	0	0.00 %
A	0	0.00 %	A	2	11.77 %
K	15	88.24 %	K	10	58.82 %
O	0	0.00 %	O	0	0.00 %
G	0	0.00 %	G	0	0.00 %
None	2	11.77 %	None	5	29.41 %
Total	17	100.01 %	Total	17	100.00 %

Female Mental Health Counselors

	Time 1			Time 2	
Modality Preference	Number of Ss	% of total Ss	Mod. Pref.	Number of Ss	% of total Ss
V	0	0.00 %	V	0	0.00 %
A	1	5.89 %	A	0	0.00 %
K	15	88.24 %	K	13	76.47 %
O	0	0.00 %	O	0	0.00 %
G	0	0.00 %	G	0	0.00 %
None	1	5.89 %	None	4	23.53 %
Total	17	100.02 %	Total	17	100.00 %

Male Mental Health Counselors

Time 1			Time 2		
Modality Preference	Number of Ss	% of total Ss	Mod. Pref.	Number of Ss	% of total Ss
V	0	0.00 %	V	1	6.25 %
A	0	0.00 %	A	0	0.00 %
K	15	93.75 %	K	13	81.25 %
O	0	0.00 %	O	0	0.00 %
G	0	0.00 %	G	0	0.00 %
None	1	6.25 %	None	2	12.50 %
Total	16	100.00 %	Total	16	100.00 %

As seen in Table 5, 9 of 15 and 11 of 15 female college students showed a modality preference at Times 1 and 2 respectively; 15 of 17 and 12 of 17 male college students showed a modality preference at Times 1 and 2 respectively; 16 of 17 and 13 of 17 female mental health counselors showed a modality preference at Times 1 and 2 respectively; and 15 of 17 and 14 of 17 male mental health counselors showed a modality preference at Times 1 and 2 respectively.

A Chi-Square Test was calculated to determine if there were differences between the four groups regarding group PRS preferences. As seen in Table 5, all groups evidenced kinesthetic PRS preferences. This preference for a kinesthetic method of representing the world was tested by comparing the obtained distribution of PRSs to a distribution that is based on a model of PRSs being randomly

distributed across the six possible categories (the five representational modalities plus a sixth category where no modality met the criterion to be considered a PRS). Results indicated significant differences with the following values for Times 1 and 2 respectively: female college students, 44.2 and 47.8; male college students, 52.0 and 53.5; female mental health counselors, 51.8 and 47.9; male mental health counselors, 53.7 and 48.9 (all ps <.001 with df=5). Thus, group modality preferences existed; with the kinesthetic modality occurring most frequently for all four groups for both Times 1 and 2. Thus, Hypothesis 3(a) is accepted.

Hypothesis 3(b):

Differences in modality preference of PRSs will be found between males and females and between 30-50 year old mental health counselors and 18-23 year old college students.

Sex differences. A Chi-Square Test was used to determine if there were differences between females and males as groups in PRS modality preferences. Table 6 shows the statistical data.

Table 6

Modality Occurrence for Female and Male Subjects

Time 1

PRS Modality

Group	V	A	K	O	G	None	
Males	0	0	30	0	0	3	= 33
Females	1	1	23	0	0	7	= 32

Time 2

PRS Modality

Group	V	A	K	O	G	None	
Males	1	2	23	0	0	7	= 33
Females	0	0	24	0	0	8	= 32

Results indicated no significant differences (s of 3.6 and 3.2, df=5, for Times 1 and 2 respectively) between males and females as groups regarding PRS modality preferences with both males and females as groups evidencing a preference for the kinesthetic modality over the visual, auditory, olfactory, and gustatory modalities.

In addition, a t-test using percentage data was calculated to determine if there were differences between the male and female groups in their modality preferences. Table 7 shows the statistical data.

Table 7

Sex Differences in Modality Preference

Modality Preference	Males	Females	t	p
V	2.48 %	2.98 %	1.25	n.s.
A	2.33 %	2.58 %	0.61	n.s.
K	9.64 %	10.86 %	1.38	n.s.
O	0.03 %	0.03 %	0.15	n.s.
G	0.23 %	0.17 %	0.67	n.s.
None	85.13 %	83.52 %	1.78	n.s.
	99.84 %	100.14 %		

Note: All probability values based on 63 degrees of freedom.

Results indicated no significant differences between males and females as groups regarding PRS modality preferences with the kinesthetic modality being preferred by both males and females over the other representational modalities.

Group differences. A Chi-Square Test was used to determine if there were differences between college students and mental health counselors as groups in PRS modality preferences. Table 8 shows the statistical data.

Table 8

Modality Occurrence for College Students & Mental Health C.

Time 1

	PRS Modality						
Group	V	A	K	O	G	None	
College Students	1	0	23	0	0	8	= 32
Mental Health C.	0	1	30	0	0	2	= 33

Time 2

	PRS Modality						
Group	V	A	K	O	G	None	
College Students	0	2	21	0	0	9	= 32
Mental Health C.	1	0	26	0	0	6	= 33

Results indicated no significant differences (s of 6.6 and 3.9, df=5, for Times 1 and 2 respectively) between college students and mental health counselors as groups regarding PRS modality preferences with both college students and mental health counselors evidencing a kinesthetic preference over the visual, auditory, olfactory, and gustatory modalities.

In addition, a *t*-test using percentage data was calculated to determine if there were differences between the college students and the mental health counselors as groups in their modality preferences. Table 9 shows the statistical data.

Table 9

Group Differences in Modality Preference

Modality Preference	Counselors	Students	t	p
V	2.72 %	2.74 %	0.05	n.s.
A	2.22 %	2.81 %	1.55	n.s.
K	10.10 %	10.39 %	0.32	n.s.
O	0.04 %	0.02 %	0.76	n.s.
G	0.18 %	0.23 %	0.57	n.s.
None	84.67 %	84.01 %	0.72	n.s.
	99.93 %	100.20 %		

Note: All probability values based on 63 degrees of freedom.

Results indicated no significant differences between the college students and the mental health counselors as groups regarding PRS modality preferences with the kinesthetic modality being preferred by both the college students and the mental health counselors over the other modalities.

Thus, Hypothesis 3(b) was not supported as there were no differences regarding modality preferences of PRSs between the males and females as well as no differences between the mental health counselors and the college students.

Other Results

Interrater agreement between modality coders

The interrater agreement between the two modality coders (those who categorized each predicate into either

visual, auditory, kinesthetic, olfactory, gustatory or none categories) was determined in several ways. First, an interrater reliability coefficient on word data was calculated between the two modality coders by using Cohen's Kappa (Leach, 1979). The predicate categorizations of coder 1 were compared with the predicate categorizations of coder 2 on 32 randomly selected subjects from Time 1 and Time 2. Cohen's Kappa was .92. This indicates a high rate of agreement at the level of individual predicates. The two modality coders evidenced a 97.5% interrater agreement when all word categories (V, A, K, O, G, and none) were analyzed. The two modality coders showed a 94.3% interrater agreement when only predicates with a sensory referent (V, A, K, O, and G) were analyzed. This analysis of sensory referrent predicates by themselves excluding predicates without a sensory based reference was done because the large occurrence rate of predicates without a sensory referent (82.6%) can artificially inflate the percentage agreement when all predicates are included in the calculations.

Following analysis of individual words, a percentage agreement on PRS category data between the two coders was calculated. The PRSs of the 32 subjects were determined for each coder using the 20% criterion rule (Hypothesis 1). The two coders had the same PRS category assignment on 30 of the 32 subjects for a 93.8% agreement rate. Cohen's Kappa was calculated to determine interrater agreement on the 32

subjects at the PRS level. When the Cohen's Kappa was calculated, the data was collapsed into a 3 by 3 table. The three categories were kinesthetic, a combination of V, A, O, & G, and a none category. This was done because there were no subjects with either an olfactory or gustatory PRS and there were very low rates for the visual and auditory categories. Cohen's Kappa was 0.83, indicating a high agreement between the two coders.

Comparison of Forms A & B

In this study, two sets of three questions (Forms A & B respectively) were used by the interviewers in counterbalanced order over Time 1 and Time 2. During Time 1, 20 subjects (15 students and 5 counselors) received Form A and 45 subjects (17 students and 28 counselors) received Form B. Test forms were reversed for Time 2. A *t*-test was used to determine if there were differences between the modality distribution of predicates used by subjects when tested with Form A and Form B. Table 10 shows the statistical data.

Table 10

Differences in Form A and Form B

Time 1

Modality Preference	% Form A	% Form B	t	p
V	2.38 %	2.58 %	0.44	n.s.
A	2.20 %	2.36 %	0.36	n.s.
K	10.17 %	9.99 %	0.19	n.s.
O	0.02 %	0.02 %	0.00	n.s.
G	0.22 %	0.11 %	1.17	n.s.
None	85.04 %	84.94 %	0.06	n.s.
Total	100.03 %	100.00 %		

Note: All probability values based on 63 degrees of freedom.

Time 2

Modality Preference	% Form A	% Form B	t	p
V	2.67 %	3.54 %	1.50	n.s.
A	2.53 %	2.94 %	0.79	n.s.
K	9.96 %	11.05 %	0.97	n.s.
O	0 %	0.11 %	3.67	.001 *
G	0.16 %	0.49 %	0.03	n.s.
None	84.65 %	81.88 %	2.27	.05
Total	99.97 %	100.01 %		

* see paragraph below for explanation

Results indicated significant differences at Time 2. Form A

had a higher score of predicates without a sensory referent and a lower score of olfactory predicates than Form B. When Forms A and B were compared at Time 2 on the rate of occurrence of olfactory-based predicates, a significant t value of 3.67 was obtained. On closer examination, however, Form A was found to have scores of 0 for the olfactory modality for all subjects (N=45). Form B had three subjects out of 20 with non-zero olfactory scores. Form A's mean and variance of 0 invalidates the t-test. Given the very low base rate of olfactory responses, the conclusion was reached that no statistically reliable difference exists between Forms A and B at Time 2 on the olfactory dimension. Forms A and B had some olfactory responses at Time 1 allowing a valid t-test in that case.

Comparison of Times 1 and 2

There was a six week time interval between the time when the subjects were initially tested and the time when the subjects were re-tested. Using the data from Table 1, a Chi-Square Test was used to determine if there were differences between Time 1 and Time 2 in subject modality preferences. Results indicated no significant differences (= 1.7, df=5).

Using the data in Table 2, a t-test was calculated to determine differences in word percentages by modality between Time 1 and Time 2 for all 65 subjects. The following t values and probability levels were obtained: V-

1.08, n.s.; A- O.94, n.s.; K- 0.31, n.s.; O- 0.33, n.s.; G- 1.50, n.s.; None- 1.08, n.s. Thus, no significant differences were found.

C H A P T E R V

DISCUSSION

Review of the Hypotheses

Hypothesis 1:

A subject's language behavior is characterized by a predominant preference of predicates in one sensory modality (referred to as a Primary Representational System in Neuro Linguistic Programming terminology). In this study, a subject's PRS was operationally defined as the modality most frequently used, and in addition, the modality that occurred at a rate 20 percent higher than the next most frequently occurring modality.

In this study, 55 of 65 (84.6%) of the subjects showed a sensory modality preference during Time 1 and 50 of 65 (76.9%) of the subjects showed a sensory modality preference during Time 2. Thus, Hypothesis 1 is supported with a large number of subjects evidencing a Primary Representational System. Of note, there was a significant preference for one modality compared to chance with 53 of 65 (81.5%) subjects during Time 1 and 47 of 65 subjects (72.3%) during Time 2 evidencing a kinesthetic PRS.

Hypothesis 2:

A subject's Primary Representational System will evidence temporal stability over a six week time

interval.

As mentioned above 53 of 65 (81.5%) subjects at Time 1 and 47 of 65 (72.3%) subjects at Time 2 evidenced kinesthetic PRSs. By chance we would expect 81.5% of the 53 (or 43) subjects that evidenced a kinesthetic preference at Time 1 to repeat at Time 2. However, only 40 of the 53 kinesthetic-preferrring subjects at Time 1 repeated their kinesthetic preference at Time 2. When Cohen's Kappa was calculated a value of 0.18 was obtained. Thus, stability of PRS over the six week time interval was not evidenced in this study and Hypothesis 2 was not supported.

Hypothesis 3:

(a) Subjects from four different populations will exhibit a Primary Representational System on the basis of criteria outlined in Hypothesis 1 above. (b) Differences in modality preference of PRSs will be found between males and females and between 30-50 year old mental health counselors and 18-23 year old college students. The four populations in this study were: (1) male college students between the ages of 18 and 23, (2) female college students between the ages of 18 and 23, (3) male mental health counselors between the ages of 30 and 50, and (4) female mental health counselors between the ages of 30 and 50.

Hypothesis 3(a):

Subjects from four different populations will exhibit a Primary Representational System on the basis of criteria outlined in Hypothesis 1 above.

As mentioned above, subjects did evidence PRSs. Respectively for Time 1 and Time 2, 9 of 15 (60%) and 11 of 15 (73.3%) female colleges students showed PRSs; 15 of 17 (88.2%) and 12 of 17 (70.6%) male college students showed PRSs; 16 of 17 (94.1%) and 13 of 17 (76.5%) female mental health counselors showed PRSs and; 15 of 17 (88.2%) and 14 of 17 (82.4%) male mental health counselors showed PRSs.

A Chi-Square Test was calculated to determine if there were differences between the four groups regarding group PRS differences. All groups evidenced kinesthetic PRS preferences for Times 1 and 2. This kinesthetic preference was tested by comparing the obtained distribution of PRSs to a distribution based on a model of PRSs being randomly distributed. Results indicated signficant values for all groups for Times 1 and 2. Thus, group modality preferences existed; with the kinesthetic modality occurring most frequently for all four groups for both Times 1 and 2. Thus, Hypothesis 3(a) is supported.

Hypothesis 3(b)

Differences in modality preference of PRSs will be found between males and females and between 30-50 year old mental health counselors and 18-23 year old college

students.

Sex differences. A Chi-Square Test was calculated to determine if there differences between males and females as groups in PRS modality preferences. Results indicated no significant differences with both sexes evidencing a preference for the kinesthetic modality. In addition, a *t*-test using percentage data was calculated to determine if there were differences between the male and female groups in their modality preferences. Results indicated no significant differences with both sexes showing a kinesthetic modality preference.

Group differences. A Chi-Square Test was used to determine if there were differences between college students and mental health counselors as groups in PRS modality preferences. Results indicated no significant differences with both college students and mental health counselors preferring the kinesthetic modality over the visual, auditory, olfactory, and gustatory modalities. A *t*-test using percentage data was calculated to determine if there were differences between the college students and the mental health counselors as groups in their modality preferences. Results indicated no significant differences with both college students and mental health counselors evidencing a kinesthetic preference.

Thus, Hypothesis 3(b) was not supported as there were

no differences between the males and females as well as no differences between the mental health counselors and the college students regarding modality preference of PRSs.

There were significant differences between the two test instruments (Form A and Form B). At Time 2, Form A evidenced a higher score of mode-free predicates and a lower score of olfactory predicates than Form B. There were no significant differences between the forms at Time 1.

Discussion

This study supports Bandler and Grinder's hypothesis that people exhibit a Primary Representational System as evidenced in predicate usage. Subjects in this study evidenced predominately kinesthetic PRSs which is similar to the results obtained by Birholtz (1981), Owens (1977), and Gumm et al. (1982) in their predicate analysis studies.

One possible explanation for this high kinesthetic modality preference is that the English language may have a high base rate of kinesthetic predicates. To verify this possibility, a predicate analysis of the 5,000 most often used English words in the Computational Analysis of Present-Day American English (Kucera & Francis, 1967) was undertaken following selection and coding criteria from Appendices C and D. Out of 1611 codable predicates, 82.2% were without a sensory modality reference, 10.0% were kinesthetic, 2.8% were auditory, 4.5% were visual, 0.1% were olfactory, and 0.4% were gustatory. These percentages were quite similar

to the modality word percentages for the subjects in this study which were None-84.2%, K-10.2%, A-2.6%, V-2.7%, O-0.03%, and G-0.2%. Thus, the high percentage use of kinesthetic predicates by subjects may be a reflection of the underlying high base rate occurrence of kinesthetic predicates in the English language.

The results of this study do not support NLP theory that people exhibit stable Primary Representational Systems as evidenced through predicate usage. Questions as to why the results were not supportive need to be raised. An initial area of inquiry is the methodology. Methodologically, this study was sound for the following reasons: (1) interrater reliablity between the blind coders was high- .92, (2) there was a sufficient number of subjects- 65, (3) methods used have been established in previous research. Thus, there appears to be no methodological errors that might account for the results of this study.

Another explanation is that NLP theory regarding predicate usage and Primary Representational Systems may be incorrect. Perhaps predicate usage does not measure PRSs. A more fundamental question raised is perhaps the basic tenet of NLP that people have Primary Representational Systems is incorrect. This study addressed only the issue of PRSs as evidenced through predicate usage.

Results from this study clearly indicate that PRSs, as evidenced through predicate usage, are not stable over time. This finding is in agreement with the reanalyzed data from Birholtz's (1981) study, the only other predicate reliability study. In this study and in Birholtz's (1981) study also, the high rate of kinesthetic PRSs occurring at Time 1 interfered with the stability calculations. In order to get a significant reliability coefficient at Time 2 when there is a high PRS occurrence rate of one modality at Time 1, there needs to be an extremely high reoccurrence rate of that same modality at Time 2 because the reoccurrence rate by chance is already fairly high.

There were no significant differences between males and females in this study regarding modality occurrences or preferences. Previous researchers in this area (Birholtz, 1981; Mattar, 1980; Owens, 1977; Shaw, 1977) have not reported the sex of the subjects with the exception of Gumm et al. (1982) whose subjects were all female.

Some authors (Bell, Weller, & Waldrop 1971; Garai & Scheinfeld, 1968; Kagan, 1971) allege that the sexes differ in their perception. If there are sex differences in perception, one might hypothesize a concomitant predisposition for one sensory modality to be primary over the other sensory modalities. Garai and Scheinfeld (1968, p. 193, in Maccoby and Jacklin, 1974), for example, postulate the occurrence of an innate "visual stimulus hunger" in boys

and an innate "auditory stimulus hunger" in girls. However, in their extensive review of the topic, Maccoby and Jacklin (1974, p. 35) conclude that "it has not been demonstrated that either sex is more 'visual' or more 'auditory' than the other." Maccoby and Jacklin (1974, p. 37) note that some studies indicate that newborn girls have greater touch sensitivity than newborn boys, but that most studies find no sex differences regarding touch. Maccoby and Jacklin (1974, p. 37) further note no sex differences in infants regarding the senses of taste and smell.

As noted earlier, there were significant differences between the two test instruments (Form A and Form B) at Time 2, but not at Time 1. Form A evidenced a higher score of predicates without a sensory modality reference and a lower score of olfactory predicates than Form B. As discussed in Chapter 4, Form A's mean and variance of 0 for olfactory-based predicates invalidates the t-test. It is not clear at this point why Form A had a higher score of predicates without a sensory referent than Form B.

Study Implications

Research

This study, as well as most previous research on Primary Representational Systems, has examined non-clinical populations. Paxton's (1980) study is the only reported investigation of clinical subjects. Paxton operationally

defined the PRS as the modality with the highest number of predicates. A post hoc analysis of her data indicates 13 subjects with kinesthetic PRSs, 27 subjects with auditory PRSs, 2 subjects with visual PRSs, and 6 subjects with no sensory modality preference. Employing the same 20 percent criterion to her data as used in this study, there are 5 subjects with a kinesthetic PRS, 16 subjects with an auditory PRS, 2 subjects with a visual PRS, and 25 subjects with no sensory modality preference. Paxton's results are similar to other PRS studies in that with a more stringent requirement for determining a PRS, the greater the number of subjects with no sensory modality preference. Unlike other predicate analysis investigations, the auditory modality was preferred more often than the other sensory modalities. Additional research is needed to determine whether this auditory preference exists in other clinical studies. The present study expanded the previous research domain which had consisted primarily of 18-25 year old college students by including mental health counselors aged 30-50. Future research is needed on non-college subjects, particularly with clinical populations.

The mental health counselors in this study were predominately kinesthetic in their PRS preferences. Whether this is true of other counselor populations is unknown. Further research regarding PRSs on the counselor population is recommended.

Therapy

The predicate analysis studies did not indicate a tendency for subjects to exhibit a PRS preference in one modality more often than other modalities for non-clinical populations. In the only clinical study, Paxton's (1980) subjects evidenced predominately auditory PRSs. To generalize and state that other clinical populations are auditory in PRS preferences is premature. Thus, recommendations for therapists to use language with predicates in one particular sensory modality cannot be made.

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APPENDICES

A P P E N D I X A

CONSENT TO ACT AS HUMAN SUBJECT FORM

UNIVERSITY OF MASSACHUSETTS

CONSENT TO ACT AS HUMAN SUBJECT

SUBJECT'S NAME:

(please print)

DATE:

DOCTORAL DISSERTATION EXPERIMENT OF DONALD E. RIDINGS FOR PARTIAL COMPLETION OF Ed. D. IN COUNSELING PSYCHOLOGY

I hereby consent to be a participant in the activity named above. An explanation of the procedures was provided. I understand the experimental purpose, results, etc., will be available following the completion of the second round of testing. I was assured that any inquiries concerning the procedures and/or investigations would be answered. I was assured that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice. I understand that once the audio tapes are transcribed, they will be erased. I further understand that my responses will be identified by code number only and that at no time will my name be used in conversation or in any written form.

Subject's Signature:

A P P E N D I X B

INTERVIEWER INSTRUCTIONS

PART 1 [used during first round of testing]

(To be read to each subject after the tape-recorer has been turned on) I WOULD LIKE TO THANK YOU FOR PARTICIPATING IN THIS STUDY. WOULD YOU PLEASE READ THIS CONSENT TO ACT AS A HUMAN SUBJECT FORM AND THEN SIGN IT. (pause)... THANK YOU. AS YOU KNOW, THERE ARE TWO SESSIONS, ONE THIS WEEK AND ONE IN SIX WEEKS. I WOULD LIKE TO EMPHASIZE THAT IT IS IMPORTANT THAT YOU PARTICIPATE IN BOTH SESSIONS. AS YOU HAVE BEEN PREVIOUSLY INFORMED, ALL DATA OBTAINED IN THIS STUDY WILL BE CONFIDENTIAL. YOU WILL BE IDENTIFIED ONLY BY YOUR CODE NUMBER. WHAT IS YOUR CODE NUMBER?... YOU ARE ABOUT TO BE ASKED THREE QUESTIONS ABOUT YOUR EXPERIENCE OF DIFFERENT SITUATIONS. ANSWER IN YOU OWN WORDS IN AS MUCH DETAIL ABOUT YOUR EXPERIENCE OF THAT SITUATION AS POSSIBLE. HERE IS THE FIRST QUESTION.

QUESTION 1. WHAT WAS ONE OF THE BEST EXPERIENCES YOU HAD WHEN YOU WERE IN ELEMENTARY SCHOOL? I WOULD LIKE AS MANY DETAILS AS POSSIBLE ABOUT YOUR EXPERIENCE OF THAT.

(If the subject's answer is too brief, ask one or more of the following probe questions:

(1) TELL ME MORE ABOUT THAT.

(2) ELABORATE ON THAT.

(3) WHAT ELSE MIGHT YOU ADD TO YOUR DESCRIPTION?

(4) IS THERE ANYTHING ELSE YOU MIGHT ADD ADD?

(If the subject is continuing to answer after five minutes, say, THAT IS FINE, I WANT TO GO TO THE NEXT QUESTION)

QUESTION 2. WHAT WAS ONE OF THE BEST EXPERIENCES YOU HAVE HAD WITHIN THE PAST MONTH? I WOULD LIKE AS MANY DETAILS AS POSSIBLE ABOUT YOUR EXPERIENCE OF THAT.

(Again, if the subject's answer is too brief, ask one or more of the above probe questions. If the subject is continuing to answer after five minutes, say, THAT IS FINE, I WANT TO GO TO THE NEXT QUESTION.)

QUESTION 3. WHAT WOULD BE ONE OF THE BEST THINGS THAT COULD POSSIBLY HAPPEN TO YOU WITHIN THE NEXT 10 YEARS? I WOULD LIKE AS MANY DETAILS AS POSSIBLE ABOUT WHAT YOUR EXPERIENCE OF THAT COULD BE.

(Again, if the subject's answer is too brief, ask one or more of the above probe questions. If the subject is continuing to answer after five minutes, say, THAT IS FINE, THANK YOU FOR ANSWERING THESE QUESTIONS. YOUR RESPONSES WILL BE KEPT CONFIDENTIAL. I WOULD LIKE TO MEET WITH YOU IN APPROXIMATELY SIX WEEKS TIME FOR THE SECOND ROUND OF TESTING. WHAT DAY AND TIME IS CONVENIENT FOR YOU? (set appointment) I WOULD LIKE TO REMIND YOU NOT TO DISCUSS THE EXPERIMENT WITH OTHERS SO AS NOT TO CONTAMINATE THE EXPERIMENT. THIS IS VERY IMPORTANT ... PLEASE DO NOT COMMUNICATE WHAT HAPPENED HERE TODAY TO OTHERS. THANK YOU. THE SESSION IS OVER.

INTERVIEWER INSTRUCTIONS

PART 2 [for second round of testing]

(to be read to each subject after the tape-recorder has been turned on) THANK YOU FOR ATTENDING THIS SECOND SESSION. I WANT TO MENTION AGAIN THAT YOUR RESPONSES WILL BE KEPT CONFIDENTIAL. WHAT IS YOUR CODE NUMBER?... YOU ARE ABOUT TO BE ASKED THREE NEW BUT SIMILAR QUESTIONS ABOUT EXPERIENCES OF DIFFERENT SITUATIONS. ANSWER IN YOUR OWN WORDS IN AS MUCH DETAIL ABOUT YOUR EXPERIENCE OF THAT SITUATION AS POSSIBLE. HERE IS THE FIRST QUESTION.

QUESTION 1. WHAT WAS ONE OF THE BEST EXPERIENCES YOU HAD WHEN YOU WERE A CHILD? I WOULD LIKE AS MANY DETAILS AS POSSIBLE ABOUT YOUR EXPERIENCE OF THAT.

(If the subject's answer is too brief, ask one or more of the following probe questions:

(1) TELL ME MORE ABOUT THAT.

(2) ELABORATE ON THAT.

(3) WHAT ELSE MIGHT YOU ADD TO YOUR DESCRIPTION?

(4) IS THERE ANYTHING ELSE YOU MIGHT ADD?

(If the subject is continuing to answer after five minutes, say, THAT IS FINE, I WANT TO GO TO THE NEXT QUESTION)

QUESTION 2. WHAT WAS ONE OF THE BEST EXPERIENCES YOU HAVE HAD RECENTLY? I WOULD LIKE AS MANY DETAILS AS POSSIBLE ABOUT YOUR EXPERIENCE OF THAT.

(Again, if the subject's answer is too brief, ask one or

more of the above probe questions. If the subject is continuing to answer after five minutes, say, THAT IS FINE, I WANT TO GO TO THE NEXT QUESTION.)

QUESTION 3. WHAT WOULD BE ONE OF THE BEST THINGS THAT COULD POSSIBLY HAPPEN TO YOU IN THE FUTURE? I WOULD LIKE AS MANY DETAILS ABOUT WHAT YOUR EXPERIENCE OF THAT WOULD BE.

(Again, if the subject's answer is too brief, ask one or more of the above probe questions. It the subject is continuing to answer after five minutes, say, THAT IS FINE, THANK YOU FOR ANSWERING THESE QUESTIONS. YOUR RESPONSES WILL BE KEPT CONFIDENTIAL. SINCE OTHER SUBJECTS HAVE NOT BEEN TESTED, DO NOT DISCUSS THE EXPERIMENT WITH OTHERS SO AS NOT TO CONTAMINATE THE EXPERIMENT. ALL TESTING WILL BE COMPLETED BY JUNE 1. A WRITTEN SUMARY OF THE EXPERIMENTAL PURPOSE AND RESULTS WILL BE AVAILABLE IN AUGUST AND CAN BE MAILED TO YOU IF YOU LIKE. WOULD YOU LIKE TO RECEIVE A SUMMARY? (If subject says "yes," ask for a mailing address.) THANK YOU FOR YOUR PARTICIPATION. THIS SESSION IS OVER.

A P P E N D I X C

PART-OF-SPEECH CODER INSTRUCTIONS

On the top of each transcription, note the subject code number and record it on the top of a blank word list sheet. Using the verbatim transcriptions, make a list of the verbs, adjectives, and adverbs following the Rules for Selecting Predicates listed below. Make a separate list of predicates for each subject. Use the following definitions (American Heritage Dictionary, 1973) to assist you:

verb- that part of speech that expresses existence, action, or occurrence.

adverb- a part of speech that comprises a class of words that modify a verb, adjective or other verb.

adjective- any of a class of words used to modify a noun or other substantive by limiting, qualifying, or specifying.

Rules for Selecting Predicates

The following rules are to be used in determining which predicates are to selected from each subject transcription.

Verbs

All transitive verbs are included e.g., I laid the baby on the bed. laid is a transitive verb

All intransitive verbs are included e.g., I turned quickly. turned is an intransitive verb.

Copulative verbs in the form to the verb "be" are not to be included. e.g., is, were, are, was- I was an officer. was is a copulative verb. Other copulative verbs commonly used

such as become, seem, smell, look, grow, feel, sound, lie, get, taste, appear, prove, remain, turn are used.

Auxiliary verbs paired with with the main verb as a verb phrase are coded. Examples are: forms of the verb be; do; tense indicators such as have, has, had, shall, will; mood indicators such as can, could, may, might, should and would. e.g., I did see the movie. did see is a verb phrase and was coded as one unit.

Adjectives

The following types of adjectives are omitted for selection:

Indefinite articles e.g., a, an, the

Demonstrative adjectives e.g., this, that, these and those

Indefinite adjectives e.g., each, any, some, either, etc.

Relative adjectives e.g., which, whose, what

Numerical adjective e.g., one, first, thousandth, etc.

Proper adjectives e.g., American, Italian

Possessive adjectives e.g., my, your, his, her, etc.

Intensifiers e.g., sure, pretty, so, etc.

The following types of adjectives are included for selection:

Predicate adjectives e.g., The tennis champion is handsome. handsome is a predicate adjective.

Appositive adjectives e.g., The house, drab and delapitated, burned. drab and delapitated are appositive adjectives.

Objective complements e.g., The potato salad made the children sick. sick is an objective complement.

All other types of adjectives are included.

Adverbs

The following types of adverbs are omitted from selection:

Interrogative adverbs e.g., where, when, why

Parenthetical adverbs e.g., however, still, indeed, anyhow, etc.

Expletive adverbs e.g., There were three apples in the dish. there is an expletive adverb.

Conjunctive adverbs e.g., I returned before the detective expected us. before is a conjunctive adverb.

Relative adverbs e.g., It was the town where I was born. where is a relative adverb.

Introductory adverbs e.g., well, now, why, then, etc. Well, I ran as fast as I could. well is an introductory adverb.

Time adverbs e.g., never, always, late I was late for the appointment. late is an adverb referring to time.

Number adverbs e.g., First, I ran over to the trees. first is an adverb referring to number.

Place adverbs e.g., My aunt arrived there by plane. there is an adverb referring to place.

Result and reason adverbs e.g., I had been late frequently, therefore, my work suffered. therefore is an adverb of result. I couldn't explain why I had been late so often. why is an adverb of reason.

Degree adverbs these include the comparative and superlative forms of the adverbs, e.g., very, more, less, most, almost, rather, too, real, really, all, good, just, so, ever

All other types of adverbs were included, including:

Adverbs referring to Manner e.g., I awaited anxiously for her to return. anxiously is an adverb of manner.

Verbals

Infinitives were included for selection, e.g., To fight was foolish. To fight is an infinitive.

Infinitive phrases were included for selection, e.g., It was a desire to serve humanity. to serve is an infinitive phrase.

Present and past participles were included for selection, e.g., Arriving early, I smiled with embarrassment. arriving is a present particlple.

Gerunds were included for selection, e.g., Eating too much was bad. eating is a gerund.

A P P E N D I X D

MODALITY CODER INSTRUCTIONS

As a modality coder, your primary responsibility is to classify each predicate (verb, adjective, or adverb) from the subject predicate word lists into one of the five sensory representational modalities of vision, audition, kinesthetics (body sensations), olfaction and gustation or into a sixth none category for those predicates without a sensory reference.

Interviews of research subjects were audiotaped and transcribed; then the predicates from the transcriptions were extracted and listed. Initially you will receive 32 subject transcriptions and a list of predicates extracted from each transcription. Once you have coded these, you will receive an additional 49 transcriptions and corresponding word lists for coding. To become familiar with the relevant concepts and the codification process, read the background material below (Bandler and Grinder, 1976, pp. 4-11). After reading the background material, you and the other modality coder will receive two practice exercises. Following each practice exercise, codifications will be discussed and any descrepancies clarified.

NLP Background Material

Input channels

There are three major input channels by which we, as human beings, receive information about the world around us - vision, audition, and kinesthetics (body sensations).

(The remaining two most commonly accepted sensory input channels - smell and taste - are, apparently, little utilized as ways of gaining information about the world. Each of these sensory input channels provides us with an ongoing stream of information which we use to organize our experience. Within each of these input channels, there are a number of specialized receptors which carry specific kinds of information. For example, neurophysiologists have distinguished chromatic (color) receptors within the eye - the cones located in the center or fovea of the eye - from the chromatic (non-color) receptors - the rods located in the periphery of the eye. Again, in the kinesthetic imput channel, specialized receptors for pressure, temperature, pain and deep senses (proprioceptors) have been shown to exist. The number of distinctions in each of the input channels is not limited by the number of specialized receptors in each of these channels. Combinations or recurring patterns of stimulation of one or more of these specialized receptors in each of the sensory channels provide information of a more complex nature. For example, the common experience of wetness can be broken down into a combination of several of the kinesthetically different, specialized receptors within the major receptors. Furthermore, the input channels may combine to provide information of an even more complex nature. For example, we receive the experience of texture through a combination of visual, kinesthetic and (in some cases) auditory stimulations.

For our purposes at this point, we need only point out that information received through one of the input channels may be stored or represented in a map or model which is different from that channel. Perhaps the most frequently occurring example of this is the ability that each of us has to represent visual information, say, in the form of natural language - that is, words, phrases, and sentences of our language. Probably as frequent, but not usually consciously recognized, is our ability to make pictures or images out of the information we receive through the auditory channel. As I sit here typing this sentence, I hear the crackling and hissing sound of logs burning in the fireplace behind me. Using this auditory information as input, I create the image of the logs burning. Thus, I create a visual representation from auditory input. If, at this point, you, the reader, were to pause and allow yourself to become aware of the sounds around you without shifting the focus of your eyes, you would find yourself able to create visual images for many of the sounds you detected.

Representational systems

Each of us, as a human being, has available a number of

different ways of representing our experience of the world. Following are some examples of the representational systems each of us can use to represent our experiences.

We have five recognized senses for making contact with the world - we see, we hear, we fee, we taste and we smell. In addition to these sensory systems, we have a language system which we use to represent our experiences. We may store our experience directly in the representational system most closely associated with that sensory channel. We may choose to close our eyes and creat a visual image of a red square shifting to green and then to blue, or a spiral wheel of silver and black slowly revolving counter-clockwise, or the image of some person we know well. Or, we may choose to close our eyes (or not) and to create a kinesthetic representation (a body sensation, a feeling), placing our hands against a wall and pushing as hard as we can, feeling the tightening of the muscles in our arms and shoulders, becoming aware of the texture of the floor beneath our feet. Or, we may choose to become aware of the prickling sensation of the heat of the flames of a fire burning, or of sensing the pressure of several light blankets covering our sighing bodies as we sink softly into our beds. Or we may choose to close our eyes (or not) and create an auditory (sound) representation - the patter of tinling raindrops, the crack of distant thunder and its following roll through the once-silent hills, the squeal of singing tires on a quiet country road, or the blast of a taxi horn through the deafening roars of a noisy city. Or we may close our eyes and create a gustatory (taste) represenation of the sour flavor of a lemon, or the sweetness of honey, or the saltiness of a stale potato chip. Or we may choose to close our eyes (or not) and create an olfactory (smell) representation of a fragrant rose, or rancid milk, or the pungent aroma of cheap perfume.

Some of you may have noticed that, while reading through the descriptions of the above paragraph, you actually experienced seeing a particular color or movement; feeling hardness, warmth, or roughness; hearing a specific sound; experiencing certain tastes or smells. You may have experienced all or only some of these sensations. Some of them were more detailed and immediate for you than others. For some of the descriptions you may had had no experience at all. These differences in your experiences are exactly what we are describing. Those of you who had a sharp, clear picture of some experience have a rich, highly developed, visual representational system. Those of you who were able to develop a strong feeling of weight, temperature, or texture have a refined, highly developed kinesthetic representational system. And so on with the other possible ways associated with our five senses that we, as humans, have of representing our experiences.

Notice that the descriptions in the last paragraph is missing something. Specifically, each of the descriptions in the paragraph before it about visual, kinesthetic, auditory, gustatory and olfactory experiences was not represented in those specific sensory systems, but rather in an altogether different system - a language system - the digital representational system. We described with words, phrases and sentences the experiences in the different representational systems. We selected these words carefully - for example, if we want to describe something in a visual representational system, we select words such as:

black...clear...spiral...image

If we want to describe something in an auditory system, we select words such as:

tinkling...silent...squeal...blast

This sentence is an example of the way that we represent our experience in the language. This ability which we have to represent our experiences in each of our different representational systems with words - that is, in the digital system - identifies one of the most useful characteristics of language representational systems - their universality. That is to say, by using our language representational systems, we are able to present our experience of any of the other representational systems. Since this is true, we refer to our language system as the digital system. We can use it to create a map of our world. When we use the sentence:

He showed me some vivid images.

we are creating a language map of our visual map of some experience which we have had. We may choose to create a language representation by combining different representational systems. When we use the sentence:

She reeled backwards, tipping over the screaming animal writhing with pain from bitter smoke choking the sunlight out.

we are using a language representation which presupposes a series of maps of our language, at least one from each of these five representational systems.

For example:

reel	presupposes	visual and kinesthetic maps;
backwards	presupposes	visual and kinesthetic maps;
tripping	presupposes	visual and kinesthetic maps;

screaming	presupposes	an auditory map;
writhing	presupposes	kinesthetic and visual maps;
pain	presupposes	a kinesthetic map;
bitter	presupposes	gustatory and olfactory maps.

Predicates

In describing his experience, the client makes choices (usually unconsciously) about which words best represent his experience. Among these words are a special set called predicates. Predicates are words used to describe the portions of a person's experience which correspond to the processes and relationships in that experience. Predicates appear as verbs, adjectives and adverbs in the sentences which the client uses to describe his experience. For example, in the following sentence, examples of each of these categories of predicates occur:

She saw the purple pajamas clearly.

The predicates in this sentence are:

verb: saw
adjective: purple
adverb: clearly

Exercise A

Below are four sentences and the predicates are identified on the right. After reading the Modality Coding Criteria below, determine whether each predicate is visual (V), auditory (A), kinesthetic (K), gustatory (G), olfactory (O), or none. Mark the predicate either V, A, K, G, O, or none. When finished, your categorizations will be checked and any necessary clarifications made.

He felt badly about the way she held the crawling baby.	verbs -felt, held adjective -crawling adverb -badly
The dazzling woman watched the silver car streak past the glittering display.	verbs -watched, streak adjectives -dazzling, silver, glittering
He called out loudly as he heard the squeal of the tires of the car in the quiet streets.	verbs -called, heard adjective -quiet adverb -loudly
The man touched the damp floor of the musty building.	verb -touched adjectives -damp, musty

Modality Coding Criteria

To determine whether each predicate is visual (V), auditory (A), kinesthetic (K), gustatory (G), olfactory (O), or none, use the following criteria:

Visual words: pertaining to seeing or sight; perceptible by the sense of light; visible; pertaining to the eyes

Auditory words: sounds, pertaining to music; noises; pertaining to hearing; pertaining to the sense of hearing; pertaining to ears

Kinesthetic words: any emotion; feeling or weight, temperature or texture; body sensation

Gustatory words: pertaining to sensations of taste; food based; flavor; pertaining to eating; tasting terms in a non-literal sense

Olfactory words: pertaining to the sense of smell; odor; pertaining to the nose

none words: having no references to the senses

To determine whether a predicate is V,A,K,G,O or none, decide what sense you need to verify that predicate. If it is not verified through one of the senses, then it is marked none. Also, some words can be verified in more than one sense and it is therefore important to check them in the context of the sentence. For example, "softly" may be either auditory or kinesthetic depending on its contextual usage. In the sentence, "She spoke softly," softly is an

auditory predicate; in the sentence, "He touched me softly, softly is a kinesthetic predicate.

When you find a predicate on the list that might reflect more than one modality, circle it. Then, after you have finished coding the words on the list, find the circled words in the accompanying transcriptions and determine the modality for each in the context of the sentence in which it appears. If the word still reflects more than one sense modality in your opinion, put an X through it as an indication for it not be scored. As mentioned, if a predicate does not have a reference to any sense modality, then it should be coded none.

Return to the above predicate examples and categorize them; when you are finished, your categorizations will be checked and reviewed.

Exercise B

Next you will receive five practice examples for you to code. Each practice example is an actual interview of a subject and thus representative of the coding you will be doing. After each practice example, your categorizations will be checked and necessary clarifications made.

A P P E N D I X E

SUBJECTS' MODALITY PERCENTAGES AND PRS PREFERENCES

Sub.	Time	None	K	A	V	O	G	PRS
Female Students								
1	1	84.2	14.3	0	1.5	0	0	K
	# of pred.	112	19	0	2	0	0	
	2	74.8	18.1	1.9	4.5	0	0.6	K
	# of pred.	116	28	3	7	0	1	
2	1	76.1	17.9	1.5	4.5	0	0	K
	# of pred.	51	12	1	3	0	0	
	2	75.6	16.1	7.6	0.6	0	0	K
	# of pred.	119.5	25.5	12	1	0	0	
3	1	78.3	17.8	2.6	1.3	0	0	K
	# of pred.	119	27	4	2	0	0	
	2	80.6	15.7	3.0	0.7	0	0	K
	# of pred.	108	21	4	1	0	0	
4	1	90.3	7.8	1.0	1.0	0	0	K
	# of pred.	93	8	1	1	0	0	
	2	85.4	13.5	1.1	0	0	0	K
	# of pred.	76	12	1	0	0	0	
5	1	83.4	7.8	6.2	2.6	0	0	None
	# of pred.	161	15	12	5	0	0	
	2	73.3	12.7	8.0	4.7	0.7	0.7	None
	# of pred.	110	19	12	7	1	1	
6	1	85.0	9.3	2.4	2.7	0	0.6	K
	# of pred.	142	15.5	4	4.5	0	1	
	2	76.0	12.8	8.4	2.8	0	0	None
	# of pred.	136	23	15	5	0	0	
7	1	87.2	4.3	2.1	6.7	0	0	None
	# of pred.	143	7	3.5	11	0	0	

	2	86.2	7.8	0	6.0	0	0	None
# of pred.		144	13	0	10	0	0	
8	1	83.4	11.3	0	5.7	0	0	K
# of pred.		42	6	0	3	0	0	
	2	89.0	11.0	0	0	0	0	K
# of pred.		65	8	0	0	0	0	
9	1	85.7	13.2	1.1	0	0	0	K
# of pred.		78	12	1	0	0	0	
	2	70.3	27.0	2.7	0	0	0	K
# of pred.		26	10	1	0	0	0	
10	1	89.4	4.1	4.1	2.4	0	0	None
# of pred.		110	5	5	3	0	0	
	2	84.7	9.4	2.4	2.4	0	1.2	K
# of pred.		72	8	2	2	0	1	
11	1	88.1	5.5	2.8	3.7	0	0	None
# of pred.		96	6	3	4	0	0	
	2	84.1	13.0	0	2.9	0	0	K
# of pred.		58	9	0	2	0	0	
12	1	83.4	9.0	2.1	5.5	0	0	K
# of pred.		121	13	3	8	0	0	
	2	80.9	12.4	5.6	1.1	0	0	K
# of pred.		72	11	5	1	0	0	
13	1	89.6	3.0	1.5	6.0	0	0	V
# of pred.		60	2	1	4	0	0	
	2	75.0	17.5	2.5	5.0	0	0	K
# of pred.		30	7	1	2	0	0	
14	1	81.3	7.7	4.4	6.6	0	0	None
# of pred.		74	7	4	6	0	0	
	2	91.4	5.7	2.9	0	0	0	K
# of pred.		32	2	1	0	0	0	
15	1	84.8	6.7	1.9	5.7	0	1.0	None
# of pred.		89	7	2	6	0	0	
	2	78.6	10.7	0	10.7	0	0	None
# of pred.		22	3	0	3	0	0	

Male
Students

		None	K	A	V	O	G	
1	1	89.3	7.5	0.8	2.4	0	0	K
# of pred.		112.5	9.5	1	3	0	0	
	2	82.7	7.4	3.5	5.6	0	0.7	MF
# of pred.		117.5	10.5	5	8	0	1	
2	1	84.1	9.3	2.8	3.7	0	0	K
# of pred.		90	10	3	4	0	0	
	2	78.4	13.9	3.2	2.6	0	1.9	K
# of pred.		121.5	21.5	5	4	0	3	
3	1	86.1	6.9	2.1	3.5	0	1.4	K
# of pred.		124	10	3	5	0	2	
	2	78.6	10.3	0.8	10.3	0	0	None
# of pred.		99	13	1	13	0	0	
4	1	87.2	9.0	2.6	1.3	0	0	K
# of pred.		68	7	2	1	0	0	
	2	91.7	6.7	0.8	0.8	0	0	K
# of pred.		116.5	8.5	1	1	0	0	
5	1	84.5	12.1	3.4	0	0	0	K
# of pred.		98	14	4	0	0	0	
	2	79.5	8.0	6.8	5.7	0	0	None
# of pred.		70	7	6	5	0	0	
6	1	89.3	7.1	1.4	2.1	0	0	K
# of pred.		62.5	5	1	1.5	0	0	
	2	86.0	8.1	1.2	2.3	0	2.3	K
# of pred.		74	7	1	2	0	2	
7	1	84.5	7.7	5.8	0.6	0	1.3	None
# of pred.		131	12	9	1	0	2	
	2	81.5	12.0	1.3	3.4	0.4	1.3	K
# of pred.		190	28	3	8	1	3	
8	1	85.5	12.7	1.8	0	0	0	K
# of pred.		47	7	1	0	0	0	
	2	92.2	7.8	0	0	0	0	K
# of pred.		106	9	0	0	0	0	

9	1	83.3	15.3	1.4	0	0	0	K
# of pred.		60	11	1	0	0	0	
	2	87.0	0	7.8	5.2	0	0	A
# of pred.		67	0	6	4	0	0	
10	1	92.1	4.5	1.1	2.2	0	0	K
# of pred.		82	4	1	2	0	0	
	2	91.1	6.7	2.2	0	0	0	K
# of pred.		41	3	1	0	0	0	
11	1	81.9	6.9	8.6	2.6	0	0	None
# of pred.		95	8	10	3	0	0	
	2	86.0	8.1	5.8	0	0	0	None
# of pred.		74	7	5	0	0	0	
12	1	84.8	8.9	4.2	2.1	0	0	K
# of pred.		162	17	8	4	0	0	
	2	90.0	3.6	2.7	3.6	0	0	None
# of pred.		99	4	3	4	0	0	
13	1	86.8	10.5	2.6	0	0	0	K
# of pred.		66	8	2	0	0	0	
	2	78.1	16.8	2.3	2.7	0	0	K
# of pred.		100	21.5	3	3.5	0	0	
14	1	79.8	12.6	2.5	5.1	0	0	K
# of pred.		79	12.5	2.5	5	0	0	
	2	85.7	12.4	1.9	0	0	0	K
# of pred.		90	13	2	0	0	0	
15	1	87.4	9.2	2.9	0.5	0	0	K
# of pred.		180	19	6	1	0	0	
	2	79.1	14.6	3.9	2.4	0	0	K
# of pred.		100.5	18.5	5	3	0	0	
16	1	80.7	18.2	0	1.1	0	0	K
# of pred.		71	16	0	1	0	0	
	2	87.5	3.1	7.8	1.6	0	0	A
# of pred.		56	2	5	1	0	0	
17	1	94.7	5.3	0	0	0	0	K
# of pred.		125	7	0	0	0	0	

	2	84.1	9.5	0	4.8	0	1.6	K
# of pred.		53	6	0	3	0	1	

Female Counselors

		None	K	A	V	O	G	
1	1	83.2	12.9	0	3.2	0	0.6	K
# of pred.		129	20	0	5	0	1	
	2	89.3	6.6	2.5	1.6	0	0	K
# of pred.		109	8	3	2	0	0	
2	1	88.1	9.3	0.8	1.7	0	0	K
# of pred.		312	33	3	6	0	0	
	2	85.1	7.2	4.4	3.3	0	0	None
# of pred.		154	13	8	6	0	0	
3	1	87.1	9.7	0.5	2.2	0	0.5	K
# of pred.		350	39	2	9	0	2	
	2	79.6	16.7	0.8	1.9	0	1.1	K
# of pred.		296	62	3	7	0	4	
4	1	85.9	8.5	2.8	2.8	0	0	K
# of pred.		122	12	4	4	0	0	
	2	80.0	10.6	2.9	6.5	0	0	K
# of pred.		136	18	5	11	0	0	
5	1	85.0	11.3	0	2.5	0	1.3	K
# of pred.		68	9	0	2	0	1	
	2	86.8	6.9	4.2	2.1	0	0	K
# of pred.		125	10	6	3	0	0	
6	1	79.5	12.2	5.8	2.6	0	0	K
# of pred.		124	19	9	4	0	0	
	2	84.0	10.6	0	4.3	0	0	K
# of pred.		79	10	1	4	0	0	
7	1	76.4	13.8	7.1	2.8	0	0	K
# of pred.		194	35	18	7	0	0	
	2	85.3	7.2	4.0	3.6	0	0	K
# of pred.		214	18	10	9	0	0	
8	1	86.8	9.6	1.8	0.9	0.9	0	K
# of pred.		99	11	2	1	1	0	

	2	85.4	11.2	2.2	1.1	0	0	K
# of pred.		76	10	2	1	0	0	
9	1	85.5	11.2	2.2	1.1	0	0	K
# of pred.		153	20	4	2	0	0	
	2	82.1	13.0	1.4	3.4	0	0	K
# of pred.		170	27	3	7	0	0	
10	1	84.7	4.6	8.4	2.3	0	0	A
# of pred.		111	6	11	3	0	0	
	2	86.4	6.8	3.7	3.1	0	0	K
# of pred.		165	13	7	6	0	0	
11	1	88.0	6.4	3.5	2.1	0	0	K
# of pred.		124	9	5	3	0	0	
	2	88.1	5.6	4.9	1.4	0	0	None
# of pred.		126	8	7	2	0	0	
12	1	76.5	20.4	1.0	2.0	0	0	K
# of pred.		75	20	1	2	0	0	
	2	79.8	17.3	1.2	1.8	0	0	K
# of pred.		67	14.5	1	1.5	0	0	
13	1	83.6	9.5	3.9	3.0	0	0	K
# of pred.		127	14.5	6	4.5	0	0	
	2	78.9	17.0	0.6	3.5	0	0	K
# of pred.		135	29	1	6	0	0	
14	1	87.2	10.4	0.8	1.6	0	0	K
# of pred.		109	13	1	2	0	0	
	2	82.5	8.0	2.9	5.8	0	0.7	None
# of pred.		113	11	4	8	0	1	
15	1	83.7	5.7	3.3	6.5	0	0.8	None
# of pred.		103	7	4	8	0	1	
	2	90.1	1.8	3.6	2.7	0	1.8	None
# of pred.		100	2	4	3	0	2	
16	1	86.0	12.2	1.9	0	0	0	K
# of pred.		92	13	2	0	0	0	
	2	83.9	11.5	1.1	3.4	0	0	K
# of pred.		73	10	1	3	0	0	

17	1	84.5	11.3	0	4.2	0	0	K
# of pred.		60	8	0	3	0	0	
	2	90.4	6.1	0.9	2.6	0	0	K
# of pred.		103	7	1	3	0	0	

Male
Counselors

		None	K	A	V	O	G	
1	1	83.0	11.9	2.0	2.8	0.4	0	K
# of pred.		210	30	5	7	1	0	
	2	81.9	5.6	2.8	9.7	0	0	V
# of pred.		59	4	2	7	0	0	
2	1	86.6	8.8	2.1	2.6	0	0	K
# of pred.		168	17	4	5	0	0	
	2	84.2	10.5	2.1	1.1	1.1	1.1	K
# of pred.		80	10	2	1	1	1	
3	1	91.3	6.7	0.7	1.3	0	0	K
# of pred.		137	10	1	2	0	0	
	2	84.5	12.4	2.1	1.0	0	0	K
# of pred.		82	12	2	1	0	0	
4	1	86.2	10.1	2.9	0.7	0	0	K
# of pred.		119	14	4	1	0	0	
	2	83.7	8.9	3.5	4.0	0	0	K
# of pred.		169	18	7	8	0	0	
5	1	80.6	11.3	3.2	4.8	0	0	K
# of pred.		100	14	4	6	0	0	
	2	85.8	8.5	1.1	4.5	0	0	K
# of pred.		75.5	7.5	1	4	0	0	
6	1	91.8	7.1	0	1.0	0	0	K
# of pred.		90	7	0	1	0	0	
	2	88.7	9.9	1.4	0	0	0	K
# of pred.		63	7	1	0	0	0	
7	1	81.0	15.9	1.6	1.6	0	0	K
# of pred.		102	20	2	2	0	0	
	2	84.5	13.1	0	2.4	0	0	K
# of pred.		35.5	5.5	0	1	0	0	

8	1	87.3	7.7	1.7	3.3	0	0	K
# of pred.		210.5	18.5	4	8	0	0	
	2	87.5	9.0	2.8	0.7	0	0	K
# of pred.		185.5	19	6	1.5	0	0	
9	1	87.2	9.0	2.6	1.3	0	0	K
# of pred.		136	14	4	2	0	0	
	2	92.3	3.3	3.3	1.1	0	0	None
# of pred.		84	3	3	1	0	0	
10	1	76.7	14.4	1.1	7.8	0	0	K
# of pred.		69	13	1	7	0	0	
	2	92.3	2.6	2.6	2.6	0	0	None
# of pred.		36	1	1	1	0	0	
11	1	87.4	6.3	0.9	3.6	0	1.8	K
# of pred.		97	7	1	4	0	2	
	2	81.6	10.4	3.3	4.2	0	0.5	K
# of pred.		173	22	7	9	0	1	
12	1	91.2	4.4	1.1	3.3	0	0	None
# of pred.		83	4	1	3	0	0	
	2	94.6	4.3	1.1	0	0	0	K
# of pred.		175	8	2	0	0	0	
13	1	73.6	22.2	2.8	1.4	0	0	K
# of pred.		53	16	2	1	0	0	
	2	83.2	11.6	3.1	2.1	0	0	K
# of pred.		79	11	3	2	0	0	
14	1	80.3	13.3	2.7	3.7	0	0	K
# of pred.		151	25	5	7	0	0	
	2	74.7	17.1	3.8	3.8	0	0.6	K
# of pred.		118	27	6	6	0	1	
15	1	85.0	13.8	1.3	0	0	0	K
# of pred.		68	11	1	0	0	0	
	2	74.8	17.4	0	7.0	0	0.9	K
# of pred.		86	20	0	8	0	1	
16	1	90.0	8.0	2.0	0	0	0	K
# of pred.		90	8	2	0	0	0	

	2	89.8	8.0	0	2.3	0	0	K
# of pred.		79	7	0	2	0	0	