

A DESCRIPTIVE ANALYSIS OF PERCEPTUAL
MODALITY LEARNING STYLES IN
OLDER ADULTS

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PREFACE

Under the direction of Dr. Wayne B. James, Associate Professor, School of Occupational and Adult Education, Oklahoma State University, this study was conducted concurrently by six other graduate students. These students included Joe Nix, Jack Akins, Bill Russell, Walter Lucas, Linda Rice, and Evelyn Stewart. The studies were completed by working closely with Dr. Russell L. French of the University of Tennessee and Dr. Clarence Cherry of the Tennessee Air National Guard.

Some of the studies contained similar material because of the close association this group of graduate students maintained during preparation of the research and data collection. Yet, these studies do address different research purposes, examine different populations, and present different measurement analyses.

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CHAPTER I

INTRODUCTION

Within the past two decades much has been written about the concept of older adults and learning. Some research has emphasized that sensory capabilities have so declined at this point in life that learning is difficult to measure (Fry, 1967). According to Meyer (1977) researchers in fields of adult education each year produce meaningful evidence to substantiate their belief that perceptual learning in older adulthood continues.

Havighurst (1972) reported that learning is necessary throughout life because of continuous changes and resultant needs with the aging process. Old age, even early old age, may begin with a shock, no matter how carefully people believe themselves to be conditioned to its onset. Some people prepare plans for their old age and are better able than others to find remedies when aging becomes apparent in the late 50's or early 60's. The chief concerns of older adults have to do with both disengagement and re-engagement. They may welcome withdrawal from work, family, and community responsibility, or they may hate both with withdrawal itself and the feeling it gives them of being excluded from most of the affairs of life that provided satisfaction. Whatever their attitude, they know that they must face the hard realities of cutting ties. Successful adjustment to old age requires that the individual redesign his or her life, expanding personal interests or finding

new ones and, if possible, discovering outlets for thoughts and needs for companionship.

Once the learning potential of older adults is recognized and accepted, researchers examine the particular reasons for adults undertaking learning projects in later life. Writings generally support the concept that most older adults who voluntarily undertake a learning project do so more in the hope of solving a problem than with the intention of learning a subject. Knowles (1978) stated:

The adult comes into an educational activity largely because he is experiencing some inadequacy in coping with current life problems. He wants to apply tomorrow what he learns today, so his time perspective is one of immediacy of application. Therefore, he enters into education with a problem-centered orientation to learning (p. 58).

The question of how older adults learn is a subject of current research and has as yet to be explored fully. Coolican (1974) reported that practice, reading, and discussion are the three methods most commonly used in learning projects. Listening and observation are used but not as frequently. The most frequently used forms of learning are active, involving the learner directly. The least commonly used techniques are passive--watching someone else do something.

In the development of identification and measurement models for determining how older adults learn, researchers take into account the adult's impairments and modify standard instruments to facilitate the learning experience. Longitudinal research shows clearly that the ability to learn is not limited to any particular age group (Carter, 1982). However, older adults require more time to complete learning tasks and generally do not perform as well as younger people under conditions requiring speed test completion within present time periods (Kimmel, 1980).

As people grow older, they do change--not in ability to learn, but in physical state, in attention, in motivation, and in ways of viewing experience.

Perhaps the most devastating impairment which occurs as a natural part of aging is hearing loss. The loss of hearing with age becomes evident in most individuals at age 50 (Carter, 1982). This loss is first noticed in the higher sound frequencies and individuals experience a general inability to distinguish speech patterns from background noise. Consonant sounds (such as c, sh, f, s, sh, and z) are typically difficult for older adults to hear (Papalia and Olds, 1978).

Another impairment confronting older adults is loss of visual acuity. As one grows older, the lens of the eye loses its ability to focus. Also, a decline in the eye's ability to adapt to darkness tends to inhibit reading and driving an automobile at night (Carter, 1982).

With the increasing lifespan comes additional physical and emotional impairment. The task then of the adult researcher is to consider such handicaps and adapt the measurement methods to correctly evaluate learning styles of older adults. Carter (1981) wrote that facilitating learning situations for older persons with slower reaction time, as a result of natural aging, may include the following:

1. Researchers should avoid unrealistic time pressures to complete learning tasks.
2. Researchers should present relatively brief tasks.
3. Researchers should develop positive attitude in learner's ability to respond.
4. Researchers should provide feedback on progress with each new learning experience.
5. Researchers should provide rest breaks and well-ventilated rooms (p. 25).

Learning style assessment among adults has been examined through many approaches. In reviewing the various modalities adults utilize in learning, French (1975) developed a conceptual framework for the seven learning styles in perceptual modality: print, aural, interactive, visual, haptic, kinesthetic, and olfactory. This study used these learning styles as a base for the determination of dominant learning styles among older adults.

Background of the Problem

With French's (1975) conceptualized model used as a framework, Gilley (1975) tested a sample of third grade students to measure six perceptual modality elements. One of Gilley's recommendations was that his study be continued to include a larger sample with subjects of different age groups, socioeconomic, ethnic, and geographic backgrounds.

Following Gilley's recommendation, Cherry (1981) measured strengths and weaknesses of individual learning styles among an adult population. He stated that, before the studies of French (1975) and Gilley (1975), problems with procedures and instruments had been identified in determining learning styles. First, the validity of subjective surveys was questionable. Next, the objective measures were complex and time consuming. Finally, the systems were generally applied to a narrow population in age and background. Cherry added the olfactory element in his study to extend and further validate the Gilley study. In addition, Cherry tested an adult population to measure the perceptual modality elements individual learning styles. The modifications made were consistent with Gilley's recommendations and were made following consultation with French and Gilley.

The French (1975), Gilley (1975), and Cherry (1981) research was continued, through additional studies, to develop larger samples and further assess the learning styles of adults. Subjects at various levels of development were selected and tested to determine their personal learning styles. Efforts were made to include different age groups of adult learners in the tested populations, but the older adult group had not been examined as a separate group of the population.

Statement of the Problem

A specific problem has existed in the lack of data for older adults in perceptual modality learning styles. At the present time there is no available data on correlations of preferred perceptual modality learning styles and observed learning styles.

Purpose of the Study

This study examined perceptual modality learning styles in older adults. Cherry's (1981) system of perceptual style measurement was examined for modification to a population of older adults. The same learning style elements French (1975) conceptualized and the preliminary study Gilley (1975) developed were also reviewed for the use with older adults. Next, the work of Cherry was expanded from a study of various ages of adults to an examination of older adults in particular. The same survey of self-report system for measuring perceptual modality elements used by Cherry was incorporated into this study. A relationship in the survey and learning style assessment was examined to validate the measurement approach. Specific questions posed in this investigation were:

1. Do older adults utilize the perceptual elements identified by MMPALT II in individual learning?
2. Can the variations in perceptual modality of older adults be measured?
3. Are there dominant patterns of learning styles among older adults?
4. Do older adult learners' self-assessments of their perceptual modalities of learning style show positive correlations with empirical measurements of the same styles?
5. Are there significant differences in perceptual modality learning styles among older adult subgroups of age, sex, educational level, marital status, learning location, and particular administration order of measured instruments?

Significance of the Study

In the rapidly expanding field of lifelong learning, researchers have begun to exert much time into determining the learning potential, performance variables, and memory functions of older adults. To add to these research findings, this study examined modern stimulus-response learning through the utilization of a recent cognitive framework.

Undoubtedly, the common denominator observed among people is that all behavior is learned and influenced by experience. Postman (1972) reported.

Learning is a cumulative process. The more knowledge and skills an individual acquires, the more likely it becomes that his new learning will be shaped by his past experiences and activities. An adult rarely, if ever, learns anything completely new; however, unfamiliar the task that confronts him, the information and habits he has built up in the past will be his point of departure. Thus, transfer of training from old to new situations is part and parcel of most, if not all, learning. In this sense the study of transfer is coextensive with investigation of learning. However, it is only when the conditions

of prior training are brought under experimental control that the contributions of transfer can be precisely evaluated (Postman, 1972, p. 1019).

Some research published over the past few years indicated that older adults do not learn as well as young people and that memory declines as a function of increasing age (Best and Stern, 1976). A number of theories and hypotheses have been advanced to account for the performance decrements found among older adults. Some observers have suggested that the cumulative effects of interference, lack of motivation, and a range of perceptual changes which are related to inadequate registration of stimulus events result in inefficient retention (Carp, Peterson, and Roelfs, 1974).

Through the examination of perceptual measurement procedures, this study added to research in learning style elements and identified perceptual style relationships within an older adult population. As new data, this study can be added to the existing knowledge about individual differences to create a more complete foundation, expand the knowledge of researchers and teachers, and improve learning for older adults.

Limitations of the Study

The limitations of this study were as follows:

1. The use of volunteer subjects precluded generalizing about populations selected on a random basis.
2. The sample size precluded generalizing about total populations of older adults.
3. The testing locations precluded generalizing about populations tested in various other locations.

Assumptions

Assumptions for the study were developed to determine and measure individual learner differences. The following assumptions identified concepts pertinent to the particular population under examination.

1. Self-awareness of individual learning styles among older adults influenced the learning process.
2. The MMPALT II objectively measured individual differences in perceptual modality of learning styles.
3. Responses to the PMPS reflected each older adult subject's subjective opinion of his or her own perceptual modality learning style.
4. This study focused on individual learning styles of older adults, not groups; therefore, the use of volunteer subjects did not distort the findings.

Definition of Terms

The following terms were germane to the study and are identified here as central concepts to the analysis:

Achievement refers to the quality and quantity of accomplishment through experience, degree of self-direction and self-motivation, and general level of maturity.

Adult is a person over 18 years of age.

Learner is a person engaged in or expressing an interest in the acquisition of new skills or knowledge.

Learning Style refers to individual differences in relating to or interacting with the environment for the purpose of learning.

Perceptual Modality of Learning Style is defined as the approach which an individual learner uses in acquiring information and knowledge from the world about him or her through the five senses. In this study, the seven perceptual style elements identified by French (1975) and researched by Gilley (1975) and Cherry (1981) were the basis for investigation. These seven perceptual style elements are:

Print (P) refers to acquiring information primarily through the printed word.

Aural (A) refers to acquiring information primarily through listening.

Visual (V) refers to acquiring information primarily through seeing pictures, images, objects, and activities.

Interactive (I) refers to acquiring information primarily through discussion and talking to others.

Haptic (H) refers to acquiring information primarily through touching and/or holding.

Kinesthetic (K) refers to gathering information primarily through performance or engaging in body movements.

Olfactory (O) refers to gathering information primarily through the sense of smell.

Multi-Modal Paired Associates Learning Test II (MMPALT II) is a seven-element paired associates learning test designed to rank order the perceptual modality strengths and weaknesses of each subject through objective measurement.

Perceptual Modality Preference Survey (PMPS) is a 42 item questionnaire designed to survey each subject's intuitive perception of his or her perceptual learning style and report those styles in rank order.

Older Adult is a person over the age of 60 years.

Organization of the Study

Chapter I identified the investigation undertaken, set forth the purposes of the investigation, stated the significance of the investigation, listed the limitations of the study, reported the assumptions developed for this sample, and defined the terms used in this model. Chapter II included a review of the professional and related literature used, with special segments on research conducted in older adult learning, learning styles, memory, intelligence, and education. Chapter III outlined procedures used in sections of the model. It included sections on the methods of selecting subjects, test instruments used, methods of administering tests, and collection/treatment of data. Chapter IV identified the individual findings of the study. Subsections of MMPALT II results, PMPS results, individual subject correlations, group correlations, and subgroup differences were included in this chapter. Chapter V summarized findings of the study, provided conclusions, and suggested recommendations.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of the review of literature is to identify concept and theory development of adult learning. The development of studies about learning in older adulthood is a relatively recent occurrence in the field of educational research, but within the past two decades a plethora of works has been published to permit extensive study into the learning process of the older learner. Today, there is still some disagreement over the scope of learning in later life, for administrators and educators have not yet fully agreed on the older adults' potential. Sections in the review of literature include research in older adult learning, learning styles, adult memory, intelligence and education.

A review of the literature revealed that the development of older adult learning style research has been that a cross-discipline study from experimental psychology to developmental psychology. Some psychologists have stated that their primary task is to explain the nature of intellectual abilities as they differentiate with age. But other behavioral researchers delineate the conditions of intellectual development for older adults so that individual differences can be noted and a situation can be established for maximum achievement in learning.

The search of the literature also revealed that such research has an additional function of providing the academic community and other appropriate areas with data transformed into practical models. It is this segment of the field that is of particular pertinence to this study; that is, a focus on the educational implications of learning in older adulthood. Through books and journals, researchers have presented findings about learning in older adults as a means to improve the teaching-learning process.

As evidenced by the nature of the field, older adult learning research is a composite of many influences and theoretical bases. Studies in learning in older adulthood have been conducted in such scientific disciplines as biology, medicine, anthropology, sociology, and psychology. The writings and research of individuals from these related fields are included in older adult learning theory.

The reader should keep in mind that the individuals who are included in this review of literature were selected because their contributions represent the knowledge, theory, or study development that evolved during the time under discussion. The task of including all individuals' contributions in areas of research, teaching, or writings is too great an undertaking for the purposes and scope of this review of literature.

An analysis of human behavior as a chronologically defined state of life was initiated by Hall in the early 1900's. Until that time investigations had centered on phenomena of childhood and adolescence, with little attention being paid to the nature of old age. With the publication of Senescence, The Last Half of Life (Hall, 1922) came research in age related variables and their effects on performance

among older adults. In his book Hall (1922) suggested that senescence be examined as a distinct condition or period of life through the use of introspective methodology, literature reviews, and anecdotal records.

Miles (1933) was one of the first psychologists dealing with the process of aging through experimental analysis and correlation with scientists of other related disciplines. Miles recognized the biological-physiological decrements sustained by the aging individual over time but submitted that the effects do not represent a constant in aging. On the contrary, he stated the direction and nature of the effects are a function of one's experiences. If one has positive experiences, then one's behavior is more resistant to biological-physiological deterioration which is also a function of one's behavior.

Since World War II there has been enormous increase in the number of articles appearing in the major journals that deal with aging; these periodicals include Educational Gerontology, Gerontologist, Geriatrics, Journal of Genetic Psychology, Journal of Gerontology, and Lifelong Learning. The purpose of these publications is to foster professionalism and disseminate information on research findings related to educational gerontology. Publication of full-scale professional journals emphasizes the growing acceptance of aging studies as a maturing field of study (Riegel, 1973).

Research in Learning

Recently, there has been a large amount of research developed on the psychology of adult learning, and much of that research is now being centered on learning in older adulthood. Postman (1964) reported that learning often occurs through serial and paired-associate word

lists and performance increments can be observed during subsequent testing of older adult learners.

To test the learning set hypothesis, Monge (1969) conducted a paired associate study in which 40 females served as subjects. Twenty aged 60-69 and 20 aged 30-39 were randomly assigned to either a slow paced or a fast paced condition. Specifically, the study was designed to determine age related performance comparisons in speed of response and in focusing attention upon the learning tasks. Data indicated that the older adults learned best in the stimulus-response condition when they had time to acclimate themselves to a learning set.

Monge asserted that the elderly are automatically anxious in an experimental situation and that this condition partially accounts for poorer performance in learning tasks, such as more omission errors in fast paced tasks. As a result such research has provided evidence to substantiate the concept that serial and paired associate learning in older adults is related to pacing variable.

In a systematic study of performance increments, Canestrari (1963) demonstrated that self pacing is related to better performance in the aged than is experimental pacing. This study compared a sample of 30 males of age range 60-69 (mean age of 65.4) and 30 males of age 17-35 (mean age of 23.9). Each subject learned all of the three paired associate lists of six pairs under all three conditions, which involved presentation rates of 1.5 and three seconds for the paced conditions and a self-paced condition in which the subject could use as much study and response time as desired.

Results indicated that the aged group did realize better performance under self-paced conditions. A significant decrease in errors

of omission were reported in the aged group; however their performance was below that of the younger group for all three conditions. The author suggested that the pacing variable and the older adult's inability to respond within the time limits of fast paced conditions account for the variance in performance.

Learning performance scores are undoubtedly related to the total context in which the subjects are tested. An aspect of this situation has been investigated by Howell (1975) who suggested that older subjects in a typically contrived laboratory setting are confronted with task materials and procedures meaningless and unfamiliar to them. Her hypothesis was that performance decrements are, to a certain degree, a function of these environmental conditions.

Her study consisted of 48 persons of mean age 28.39 and 48 persons of mean age 68.52 who were given a variety of perceptual recognition tests that varied in degree of familiarity and meaningfulness. Meaningfulness was defined in terms of the stimulus materials' anticipated relevance--relevant in the sense that the stimulus items has practical application in real life situations. Familiarity was defined in terms of frequency of exposure to similar materials.

The results were consistent with the hypothesis and were interpreted to suggest that factors of familiarity are important for elderly subjects. In short, Howell reported that the older subject has more ability than performance scores reflect and can therefore perform well on highly complex tasks presented in a familiar setting.

Research in Learning Styles

French (1975) classified learning styles into four different modes:

perceptual, cognitive, social, and emotional. In the perceptual mode he listed elements to identify individual learning style differences. These elements include print, aural, interactive, visual, haptic, kinesthetic, and olfactory. French (1975) stated that these elements could serve as a foundation for future research and improved knowledge about learning styles among adults.

Barbe and Milton (1981) found that visual learning styles were most dominant in a population they examined. They also stated that the next most dominant learning style was auditory. Finally, kinesthetic learning style was third in frequent modality strength.

In researching individual learning styles through contract learning Dunn and Dunn (1972) reported the significance of print and visual learning styles among adult learners. These researchers used self-report measurement systems. This approach has not yet received attention in validation to identify learner preferences and as a result is not as accurate in measurement as approaches which account for strengths and weaknesses in learning styles.

Cherry (1981) utilized all seven elements in his perceptual modality study. His results indicated that the visual learning style was most dominant among the population measured, with haptic being the second most dominant and followed by print learning style in the third position. Cherry's research is a foundation study for perceptual modality learning styles and does include all seven objective measurements through the use of the revised MMPALT.

The seven elements of this study have been utilized in previous research and the terms have been applied to a variety of behavioral skills. Visual learning is one of the most extensively researched

areas, but much of the time researchers focused on cognitive processes, not perceptual strengths and weaknesses. The seven selected style elements manifest themselves to varying degrees, and researchers continue to utilize the elements to measure adult learning styles.

Research in Adult Education

The storage of incoming stimuli and subsequent retrieval of what-ever has been stored has been a dominant field of human learning research since the 1950's. Mandler (1967) suggested that all stored information is available but that only a portion of it is accessible at any given time.

Moenster (1972) conducted a study to determine if the reported decrements in learning ability with age are due to learning or memory variables. The subjects were 192 females aged 20-94. They were divided into five age groups of 20-29, 30-39, 40-54, 55-69, 70-94 years. Each subject was given a meaningful story of several paragraphs in length to read. Immediately following the reading, each subject completed a 20-item multiple-choice test which served as the measure of learning. Following 10 minutes of either related or unrelated tasks, subjects were given the same 20-question test which served as a measure of memory.

Results showed that age effect was significant for learning and memory. Moenster (1972) interpreted these findings as reaffirming the concept that memory performance decrements are a function of learning deficits with age.

Arenburg (1977) reported a study on the effects of auditory cues on retention of nonverbal (geometric design) material in two groups of male subjects, one of mean age 18.0 and the other of mean age 65.5. He

hypothesized that recall would improve as a function of auditory augmentation and that the old would benefit more from augmentation than would the young. In the visual condition, each of the nine geometric designs was displayed for 12 seconds, and 15 seconds later the subject was asked to reproduce the design. In the auditory augmentation condition the subject listened to a description of the design's salient features in addition to watching the display of the design. Two sets of designs were used. All subjects were presented with the first set under the visual condition. Then, for the second set, half the subjects in each group were tested in the visual condition and the other half in the auditory condition.

Results were interpreted as supportive of both hypotheses. Arenburg (1977, p. 28) suggested that the description of the designs provided "both a rehearsable form of the design and additional retrieval cues." He also suggested that impairment in retrieval is a partial function of inadequate encoding of retrieval cues at input.

Lawrence (1967) designed an experiment to test strategies related to age deficits in recall. Thirty subjects of mean age 75 served in Experiment I and 28 in Experiment II. The first experiment tested the hypothesis that if subjects were given category names for the words in the test lists they could rehearse them prior to the test and get the benefits of this organizational procedure which would be reflected in facilitated recall. Results did not support the hypothesis. It was suggested that this was due to the two second presentation rate, wherein rehearsal time was almost eliminated.

The second experiment involved cue at recall, in which the subjects were given cue cards prior to the recall test. Results indicated no

specific differences between the two groups' scores. The author interpreted these findings consistent with the hypothesis that asserts the memory deficit is related to an impairment in retrieval.

Aging and Intelligence

An issue pervading gerontology literature is the loss of intelligence with age. Thorndike (1962) reported that a decline in intelligence is fairly uniform to about 45 to 50 years of age and amounts to a drop of approximately one percent per year. He also stated that age is not a significant factor in learning and that no one under the age of 45 should restrain himself from learning for fear that he is too old to learn.

Wechsler (1958) constructed tests of adult intelligence that became the instrument of choice for most investigators studying the problems of decline in intelligence with age. Some of these tests required problem solving or reasoning skills, whereas others relied heavily on one's information store and experiential background. Wechsler found that results from the tests of verbal ability did not indicate significant differences among age groups; however those tests which demanded reasoning ability yielded significant age differences. He did point out that correlations (.40-.50) between age and intelligence are low, and, therefore, age itself accounts for only about 20-25 percent of the variance.

Shortly following the work by Wechsler, Cattell (1963) classified the two basic types of intelligence as fluid which is independent of educational effects, and crystallized which refers to what had been learned or accumulated through experience.

Cattell (1971) provided evidence that the two types of intelligence are reflected differently in growth curves over the years. He found that a rapid decline in fluid ability among older adults indicated their difficulty in acquiring new concepts or in adapting to situations not previously experienced. But he did not theorize an invariant decline in fluid intelligence for every individual, since deterioration varies with the health state of the individual.

Friend and Zubek (1958) used 484 volunteer subjects of ages 12-80 to measure critical thinking skills. Their test consisted of 99 questions, nearly all of which involved problems of an every day or practical nature; no time limit was required. The test measured five sub-abilities of critical thinking described as inference, recognition of assumptions, deduction, interpretation, and evaluation of assumptions. Their results indicated that critical thinking develops rapidly after the teen years, peaks out in the mid 20's, and stabilizes through the mid-30's. Poor performance among elderly subjects was interpreted as their lowered objectivity and a tendency to answer questions in absolutes, rather than to consider alternatives.

Older adult learners are affected by a wide range of conditions, such as health and financial status. Continuing education provides the resources to improve the input for a specific aspect of learning depending, to a large extent, on the ingenuity and materials of the adult educator. Gournard and Hulicka (1977) stated that older learners in general need assistance in organizing information for learning and recall. One successful method to accomplish this is through instructions on how to organize material. Additional suggestions they made for enhancing the learning performance of older adults include the

following:

1. Design learning conditions which incorporate the use of the elderly's long history of experience, so that novel materials can be related to old to result in organization, leading in turn to better understanding.
2. Proceed from simple tasks, or those that are familiar, to more complex tasks, always allowing sufficient time for older learners to process input and emit output.
3. Arrange conditions so that attention is focused and maintained on a single, well-defined bit of information, in view of the increased susceptibility with age to distraction by irrelevant activities and materials.
4. Emphasize learning tasks that require abilities which are more resistant to decline, such as verbal abilities, and de-emphasize tasks that requires highly abstract processing.
5. Provide stimulus materials that have distinguishing characteristics (bold type, large print) to help the older adult learner to discriminate between stimuli that are similar.
6. Maintain an informal atmosphere to reduce tension (Gournard and Hulicka, 1977, p. 418).

According to Meyer (1977), andragogy is the art and science of helping the older person learn, as contrasted to pedagogy, the art and science of teaching children. Noting the distinctions while at the same time bearing in mind the relationship between the effects in both processes is useful, since they lie along a continuum.

In short, pedagogy assumes that a student is moving through the process of learning phenomena toward maturation, at which point andragogy enters and assumes the learner has already arrived. Andragogy is based on assumptions that older learners are more concerned with solutions or approaches to immediate, rather than to long-range, problems. They enter a learning experience with wide, diversified histories,

thereby having a particular set to learn. They are, in general, independent and self-directed.

Meyer (1977) reported that the T-group model provides a viable delivery strategy for the andragogical approach to adult learning. Some of the advantages are that the adult many times feels less anxious when working with a cohort group sharing similar interests. The older learners mutually share a variety of experiences and traditional lectures are supplemented by student participation. For example, courses in retirement training have used andragogy to provide mutual exchange of information, experience, and feelings.

Although opportunities for continuing one's education are present, some older adults do not participate for a variety of reasons. Webber (1963) suggested that lack of participation in continuing education activities could be a function of society's role expectations. In addition, lack of participation and interest could be related to their needs not having been satisfied.

Graney and Hays (1976) reported that in a study of subjects aged 62 plus relatively high interest, as compared to earlier studies in higher education, was expressed. A significant amount of interest by a large group of people was indicated in courses in the liberal arts and in nature, followed by interest in arts and crafts kinds of activities. Their results were consistent with other findings that interest is related to prior educational achievement. For the number of persons interested in taking college classes, the authors reported that the most important barriers were information and costs and, for disinterested subjects, negative attitudes toward themselves.

Knowlton (1977) stated that "Elderhostels", institutions of higher

learning for the older learner, are becoming a popular method of older adult education. Most of the participants live in college dormitories and engage in the typical activities of a full-time student, including taking courses from the regular faculty. The "Elderhostel" plan assumes that a major problem in the aging process is found in the stereotype, held by both the elderly themselves and the general public, of the older persons as dependent and otherwise non-productive. One strategy to neutralize the effects of this condition is to get them on campus and involved in its atmosphere of intellectual stimulation. Knowlton (1977) reported that since its inception in 1975 the program has been judged by participants and educators as highly successful. The author stated that this plan is viewed as a more attractive form of continuing education, since it: (a) provides an opportunity for a brief change of environment characterized by a refreshing kind of excitement; (b) provides a compacted time span more functional than attending class one period per week over several months; (c) provides regular college courses at a relatively low cost, as opposed to courses offered in other environments.

One researcher has suggested that a substantial number of older persons should be encouraged to either begin new careers or take up another career so that both society and the individual can benefit through the utilization of their residual potential, which usually dissipates at or near retirement (Sheppard, 1976). He stated that a vehicle to handle that situation is career education designed mainly for the training or retraining of older persons to work in positions of service to others. Sheppard reported career education encompasses vocational education specifically which is directed at increasing the

older adults' interest in continued working, so that they may take part in necessary training in skills development to once again become productive members of society.

Summary

The interpretations of data derived from older adult testing studies point to the concept that older subjects experience some decrement in cognitive skill. But these same investigators recommend further examination into learning styles of older adults.

Certain variables have been taken into consideration by researchers and motivational determinants would alter test score performance. The testee's attitude toward being tested as well as anxiety may reflect performance variance for the elderly. The question of relevance has also been considered by researchers. Sorting cards or assembling blocks under timed conditions might be viewed as irrelevant to intelligent behavior. Also, fatigue is a critical variable affecting the performance of older persons. Finally, health status must be taken into consideration when comparing older subjects in relatively poor health to younger age groups who are in relatively better health.

Variance in performance may be directly attributed to learning memory, intelligence and education. Research in older adult learning suggests that enormous complexities confront investigators in perceptual skill tasks. But perceptual stimulation is evident among the older adult, and researchers agree studies in the perceptual process of older adults will be viable targets for future research designs.

CHAPTER III

METHODOLOGY

The procedures for the collection of data for this study included systematic processes of identification, measurement, and analysis. Individual sections of selection of subjects, instrumentation, testing procedures, testing schedules, collection of data and summary are reported in this chapter.

Selection of Subjects

A goal in selecting subjects was to obtain a study population of older adult learners with a variety of educational attainment, marital status, age, and sex. Potential subjects were sought from three sources in Midwest City, Oklahoma: Autumn House Retirement Center, Hillcrest Baptist Church, and Rose State College. These sites were selected because of large numbers of older adults who take part in learning activities at the respective sites. Approximately 90 individuals received verbal invitations to have their perceptual learning styles measured.

Names and addresses of older adults were received from administrators at a church, a retirement center, and a junior college--all located in Midwest City, Oklahoma. Verbal invitations were extended to the participants to make up the sample. The limited geographic

range constituted a very small segment of the total population, but for a descriptive analysis this geographic sample provided the beginning data to develop conclusions about older adult learners.

Of the invitations submitted to the sample, 50 older adults chose to volunteer to be test subjects. Even though the study was small in terms of subject matter, the 50 volunteers made up a varied population of older adults in age, educational attainment, marital and employment status. Due to the limited professional experience of the participants, there was some question as to the older adult's ability to evaluate objectively the effectiveness of their own individual learning styles. As a preference survey, the PMPS measured only the choices selected by participants.

Since the testing centers varied with the participants being tested, the physical setting might have affected individuals in different ways. Care was taken to provide comparable testing center settings, but test score influences could have been attributed to personal setting location in the room, i.e. someone with poor eyesight may have been too far from the screen.

Instrumentation

For the purpose of this study, two testing instruments were administered to the subjects to determine perceptual modality in older adults. MMPALT II and the Perceptual Modality Preference Survey (PMPS) were utilized for measuring each subject's perceptual modality learning style. Permission was given by Russell L. French by letter for the

researcher to use the two instruments. See Appendix A for a copy of the letter.

MMPALT II

This instrument identified the relative strengths of each of the seven elements of perceptual learning styles of subjects: print, aural, interactive, visual, haptic, kinesthetic, and olfactory.

The test consisted of 10 pairs of stimulus and response members for each element. The subjects were presented with all 10 pairs of stimulus and response members for each element. Then they were presented with only the stimulus member of each associated pair in a different order from that used in the initial presentation and asked to recall the correct response member. The seven scores (one for each element test) for each subject were arranged from high to low to produce a rank ordering of the elements of the subject's perceptual learning style. See Appendix B for a copy of the scripts and procedures for the MMPALT II.

PMPS

The objective of the survey was to assess the subject's strengths and weaknesses in each of the seven perceptual learning styles. The questionnaire contained 42 response items. Each perceptual style element was contrasted with each of the other style elements twice and in reverse order. See Appendix C for a copy of the PMPS.

Testing Procedures

Each individual subject was administered: the PMPS, MMPALT II, and a data sheet which included the subject's identification number, name, age, years of education (16 to 16), sex, and marital status. See Appendix D for a copy of the data sheet.

MMPALT II

The seven elements of the MMPALT II are presented below with the process utilized to administer it. See copies of MMPALT II response sheets in Appendix E.

Print. Each subject viewed pairs of printed trigrams (nonsense words) and common nouns on a screen and were required to recall the appropriate common noun after again viewing the trigrams. The method of presentation was with the use of 35mm slide project and individual slides.

The slides were prepared with the trigram and the common noun placed side by side on the slide. Each word was typed in the lower case letters and with the standard type. When the slides were projected, the color and light utilized assured consistency. The type face of each slide was black and the background was blue, thus producing a contrasting appearance that aided the reading of the word pairs.

The slides were arranged in one carousel slide tray. They were arranged in the order of Cherry's 10 pairs and projected simultaneously. To facilitate the recall presentation, duplicate trigram slides were prepared and projected following the showing of the 10 pairs. These slides were arranged in a different order as determined by a table of

random numbers. At the point of viewing the stimulus trigram, the subjects would recall the common noun paired with that trigram and with the response on the answer sheet.

When the stimulus-response pairs were presented to participants, a consistent spacing of five to seven seconds was maintained. But, in giving the subjects adequate time to record responses, that time was adjusted to approximately 10 seconds between stimulus presentation and response recording.

Aural. Each subject listened to spoken trigram and common noun pairs and recalled the appropriate common noun when hearing the trigram repeated. As with the printed element, the subjects would record their response after hearing the trigram stimulus. The 10 pairs of words used were chosen from the MMPALT II utilized by Cherry (1981).

Visual. Each subject viewed pairs of abstract symbols and common object pictures in this measurement element. The subject then recorded the name of the appropriate common object after again seeing the abstract symbol.

For the viewing of the pairs, 35mm slides were prepared with the pictures Cherry (1981) used in his study. A red background with black drawings was utilized to produce the pictures. Duplicate slides of the abstract symbols were produced for the recall measurement.

These slides were arranged in the slide carousel using a random arrangement and procedures were followed as in the print measurement.

Interactive. Through questioning and discussing, the subjects were measured in the learning style element of interaction. Each subject was seated at the same level and face to face with the evaluator.

The pairs of nonsense words and common nouns were read to the subjects and then the nonsense words were repeated in a random arrangement as stimulus words.

A different form of recording, from the three previous elements, was administered: the subject would state the response orally and the evaluator recorded the response on the answer sheet. The purpose of the varied approach was to concentrate on the elements of interaction only.

Haptic. The procedures for measuring the haptic learning style were similar to interaction in that the subject sat facing the evaluator but different in that the subject was blindfolded. Since the purpose of this measurement was to determine a subject's ability to learn by touch or grasp, the use of sight was eliminated by the blindfold.

Pairs of stimulus/response pairs of objects were placed in the hands of subjects. After seven seconds the pairs of items were taken back and the process was repeated for all 10 pairs. Stimulus only items were then handed the subject and the response was recorded by the evaluator on the answer sheet.

Kinesthetic. To determine learning by body movement, the evaluator stood behind the subjects and moved the subjects through the paired movements. Following the completion of the 10 pairs of movements, the evaluator then moved the subject through the stimulus movements and recorded the response on the answer sheet.

For this study, modifications were made to this element so that older adult subjects could participate without performing strenuous physical activity. Such substitutions were requested by French and the

modified movements were approved to eliminate subjects having to get on hands/knees and to stand on one leg. Instead of having the older adult subjects kneel to a position of being on hands and knees, a modification was made to have subjects touch the back of their left heel with their right foot. In addition, subjects were also instructed to raise both legs, alternately. This movement was substituted for having the subjects stand on one leg.

Olfactory. For measuring the element of smell, the evaluator instructed the subject to sit across the table from him and again place the blindfold over the eyes. A series of 10 pairs of aromas was given to the subjects to smell with one vial in each pair containing an abstract aroma and the other vial containing a common aroma.

Following the administration of the 10 pairs of stimulus/response aromas, the evaluator handed the subject the abstract aromas, had the subject smell the aroma, and asked the subject to name the response aroma. The results were then recorded by the evaluator on the answer sheet.

PMPS

To eliminate first-test, second-test interaction bias in any group results, half of the subjects completed the PMPS as their first activity, and half completed the PMPS as their last activity. A subject responded to each statement by choosing one of four alternatives: Always, Usually, Seldom, or Never. To counteract any conflicting responses and evaluate both style elements in each, responses are scored with positive (accepting the statement) and negative (rejecting the statement) values.

The survey forms were used as answer sheets for the PMPS. See Appendix F for a copy of the scoring sheet and demonstration of the PMPS scoring system.

The scores of the various style elements were then arranged from high to low to produce a strongest (preferred) to weakest rank ordering of the subject assessment of his or her own learning style. This procedure is based on the Likert method of summated ratings.

Testing Schedules

For the learning style measurement process, subjects were scheduled through five stations. At Station #1 the subjects completed three group conducted measurements and the PMPS questionnaire. The three MMPALT II elements measured at Station #1 were print, aural, and visual. At Stations #2 - #5 subjects completed four individually conducted evaluation processes:

Station #2	Interactive Test
Station #3	Haptic Test
Station #4	Kinesthetic Test
Station #5	Olfactory Test

Specific instructions for each station are presented in Appendix B.

Collection of Data

The information for the study was obtained from the measurement process which was completed by 50 volunteer subjects at three different learning locations between October 1 and November 1, 1983. The complete population of 50 older adults was used for data collection analysis.

The measurement instruments utilized were the PMPS and the MMPALT II and were used to assess perceived and observed learning style correlations. To eliminate test bias, one half of the subjects were administered the PMPS before the MMPALT II and one half were administered the MMPALT II before the PMPS. The collected data were presented by tables, figures, and discussion of findings of learning styles.

All data were processed in the Oklahoma State University Computer Center. The computer products included data for each individual and computations of data for the various groups of subjects.

Individual Data

Data analyzed and reported for each subject included rank orderings of perceptual style elements obtained on both instruments and a correlation of the two sets of scores using Spearman's rank order correlation coefficient applied to the two rankings. The Spearman's correlation formula included a correction for ties. The general criterion for evaluation of significance, was used to categorize the correlation coefficients:

Correlation:	Relationship:
00 to $\pm .20$	Negligible
$\pm .20$ to $\pm .40$	Low or Slight
$\pm .40$ to $\pm .60$	Moderate
$\pm .60$ to $\pm .80$	Substantial or marked
$\pm .80$ to ± 1.00	High to very high (Best, 1959, p. 77).

Specific attention also was given to the first and second highest ranked styles for each subject on each measurement.

Group Data

For the subgroups identified--age, sex, marital status, learning location, years of education, and particular administration of test instruments--data was examined and reported for rank orders and correlations of the two sets of scores: perceived and observed perceptual style elements. The Spearman's correlation statistical test was applied to the learning style elements for relationship analysis. In addition an analysis of variance (ANOVA) was conducted to determine significant differences among the subgroups.

Summary

This study involved using two testing instruments--the PMPS and MMPALT II--to determine the perceptual learning styles of older adults.

Fifty subjects were processed through the two measurements at three different locations. Measurements at these locations were under controlled conditions and guided by specific directions. Those directions dictated the presentations of stimulus-response pairs and administration of recall tests in the MMPALT II measurements and the PMPS.

The subject measurement data was computer processed to produce rank order and correlations. Chapter IV of this study presents an analysis of that data.

CHAPTER IV

ANALYSIS OF DATA

Introduction

The data for this study, which investigated perceived and observed learning styles among older adults, are based on the responses of 50 subjects who completed the measurement process: the two measurement instruments--PMPS and MMPALT II--were administered to each volunteer subject for learning style analysis. The testing process was conducted at three different learning locations between October 1 and November 1, 1983.

The purpose of this study was accomplished by the correlation of data collected from both individual subjects and from the grouping of subjects into categories. This analysis included data for the subjects' scores, ranks, and correlations. Utilizing Spearman's correlation coefficient, the Oklahoma State University Computer Center provided data analysis for the sample individuals and groups.

A further analysis was required to determine if significant differences existed between subgroups within the group categories. An analysis of variance (ANOVA) was used to determine significant differences between the subgroups in age, sex, marital status, years of education, learning location, and the particular administration order of test instruments.

The research questions and the purpose of this study form the basis for the analysis and discussion of the data. This chapter contains seven sections: (1) Demographic Characteristics; (2) MMPALT II Results; (3) PMPS Results; (4) Individual Correlations; (5) Group Correlations; (6) Subgroup Differences, and (7) Research Questions.

Demographic Characteristics

A summary of the demographic information on the subject population is presented in Table I. There were 50 volunteer subjects in the study with a sex composition of 38 females and 12 males. The subjects ranged in age from 61 to 84. In marital status, eight subjects were divorced; 17 were married; two were single; and 23 were widowed. The indicated educational levels were as follows: under 12 years of education-19 subjects; 12 years of education-19 subjects; some college-six subjects; four years of college-six subjects. The population included 16 subjects tested at a church; 20 tested at a college; and 14 subjects who completed the PMPS before being tested with the MMPALT II was 25, and the number of subjects who completed the PMPS after being tested with the MMPALT II was 25. Characteristics of age, sex, marital status, and years of education with numbers of subjects and percentages for each subgroup are presented in Appendix G

MMPALT II Results

The variation of perceptual style elements in the older adult population was addressed to reveal dominant learning patterns among the subjects. The perceptual style rank-order strengths of subjects as measured by MMPALT II are presented in Table II. Information from these

TABLE I
DEMOGRAPHIC CHARACTERISTICS

Characteristic	N	Percentage
Age		
60-64	7	14
65-69	13	26
70-74	15	30
75-79	9	18
80-84	6	12
Sex		
Male	38	76
Female	12	24
Marital Status		
Married	17	34
Divorced	8	16
Widowed	23	46
Single	2	04
Years of Education		
Under 12 years	19	38
12 years	19	38
Some College	6	12
Four years of college	6	12
N=50		

TABLE II
 PERCEPTUAL STYLE RANK-ORDER STRENGTHS
 DEMONSTRATED BY OLDER ADULTS
 ON THE MMPALT II

Rank Order	<u>ELEMENT</u>						
	Print N	Aural N	Interactive N	Visual N	Haptic N	Kines- thetic N	Olfac- tory N
1	7	0	12	19	4	1	0
1.5	2	3	5	4	3	1	0
2	6	7	4	6	2	3	0
2.5	3	2	4	3	2	2	0
3	4	12	4	6	6	3	3
3.5	3	5	5	2	4	1	1
4	6	3	5	2	3	4	0
4.5	5	4	3	1	6	3	2
5	2	4	0	3	3	6	5
5.5	3	4	4	2	6	7	7
6	4	2	1	0	6	12	10
6.5	2	1	1	0	4	2	8
7	4	3	2	2	1	5	14

tables includes the following:

1. This population covered 85 of the 91 (93 percent) potential rank order positions.
2. The highest ranked styles from the MMPALT II were visual and interactive.
3. The full, seven point, rank-order range was used for three of the seven perceptual style elements: print, haptic, and kinesthetic.
4. Sixty-one percent of the available rank-order range was used for the olfactory style element.

The subjects (50 older adults) demonstrated rank-order variability on the MMPALT II. The olfactory element was not strong in this older adult population, but the five point range of rank order does indicate variability within the subject population.

Variability was also demonstrated by the 50 older adult subjects on MMPALT II scores and PMPS scores. A summary of MMPALT II scores with range, spread, mean, and median listed for the scores of each style element is provided in Table III.

For the MMPALT II scores, the following information is presented in Table III.

1. The visual style element demonstrated the widest range (0-9); the largest spread (10); and the highest mean (4.74) and median (5.44).
2. The olfactory style element demonstrated the most narrow range (0-4); the smallest spread (5); and the lowest mean (1.22), and median (1.62).

PMPS Results

PMPS scores, by categories, with range, spread, mean and median

TABLE III
SUMMARY OF MMPALT II SCORES FOR 50 OLDER ADULTS

Style	0 N	1 N	2 N	3 N	4 N	5 N	6 N	7 N	8 N	9 N	10 N	Range	Spread	Mean	Median
Print	9	5	6	9	5	9	3	3	1	0	0	0-8	(9)	3.12	3.56
Aural	6	6	6	9	9	9	5	0	0	0	0	0-6	(7)	3.12	3.78
Inter- active	2	3	10	9	12	5	4	4	2	0	0	0-8	(9)	3.74	4.90
Visual	3	4	4	4	6	9	6	6	6	2	0	0-9	(10)	4.74	5.44
Haptic	2	12	14	7	7	6	1	0	1	0	0	0-8	(8)	2.66	2.79
Kines- thetic	8	12	12	7	6	2	1	2	0	0	0	0-7	(8)	2.22	2.42
Olfac- tory	17	13	13	6	1	0	0	0	0	0	0	0-4	(5)	1.22	1.62

listed for the total score of each style element are presented in Table IV. For ease of reading the PMPS scores are arranged through an arbitrarily grouping of the scores into seven categories. An examination of Table IV reveals the following perceptions:

1. Of the 49 available score positions, 34 (69 percent) were used by the subject population.
2. The most preferred style element, indicated by the highest mean (+9.24) and median (-8.25) was print.
3. The least preferred style element indicated by lowest mean (-12.68) and median (-13.50), was olfactory.

Individual Subject Correlations

The research questions of this study address the utilization of perceptual elements by older adults in individual learning. The data on Table V reveal individual subject correlations between perceived learning styles and observed learning styles for the 50 subjects. See Appendix H for individual subjects, scores, ranks, and correlations. Of the seven perceptual elements investigated, meaningful correlations ($\pm .60$ to ± 1.00) were recorded for 15 subjects; non-meaningful correlations ($\pm .1$ to $\pm .59$) were recorded for 35 subjects.

An examination of Table V reveals the following information:

1. Only five subjects (10 percent) received high to very high correlations ($\pm .80$ - ± 1.00) between the rank orders of their responses to the PMPS and their performance on the MMPALT II.
2. Only 11 subjects (22 percent) demonstrated a marked or substantial correlation ($\pm .60$ - $\pm .79$) between rank orders of the responses on the PMPS and the performance on the MMPALT II.

TABLE IV
SUMMARY OF PMPS SCORES FOR 50 OLDER ADULTS

Style	<u>Subject Distribution by Score Categories</u>							Range	Spread	Mean	Median
	(-36-28)	(-27-17)	(-16-6)	(-5+5)	(+6+16)	(+17+27)	(+28+36)				
Print	0	0	5	14	18	11	2	-14 +33	(48)	9.24	8.25
Aural	0	0	4	23	23	0	0	-12 +15	(24)	3.38	5.50
Inter- active	0	0	2	26	20	2	0	-12 +26	(39)	4.62	4.67
Visual	0	0	9	17	21	3	0	-15 +19	(35)	3.34	5.50
Haptic	2	2	4	26	14	1	1	-23 +29	(62)	.48	1.67
Kines- thetic	0	2	18	22	15	1	2	-20 +34	(55)	1.6	.67
Olfac- tory	8	13	10	15	4	0	0	-32 +14	(47)	-12.68	-13.50

TABLE V
INDIVIDUAL CORRELATIONS OF MMPALT II
AND PMPS SCORES

Subject Number	Correlation
1	.45
2	.29
3	.83
4	.47
5	.59
6	.46
7	-.66
8	.56
9	-.16
10	.67
11	.05
12	.53
13	.24
14	.56
15	.28
16	.61
17	-.07
18	.10
19	-.17
20	-.74
21	.63
22	.87
23	-.29
24	.76
25	.60
26	.52
27	.06
28	.03
29	-.07
30	-.24

TABLE V (Continued)

Subject Number	Correlation
31	-.20
32	-.41
33	.31
34	-.39
35	.68
36	.53
37	.76
38	.17
39	.06
40	.17
41	.76
42	.40
43	.85
44	.82
45	.13
46	.70
47	.71
48	.39
49	.80
50	.96

3. Thirty-four subjects (68 percent) demonstrated low, slight, or negligible correlations ($\pm .01 - \pm .59$) between the two rank orders.

In summary, it can be concluded that there were no meaningful correlations between the PMPS and the MMPALT II rank orders for individual subjects.

Group Correlations

For comparisons of correlations within designated demographic groups, the subjects were classified into age, sex, marital status, education, learning location, and the particular sequence of the administration of PMPS. The correlations of the 20 subgroup categories are summarized in Table VI. An examination of that table reveals the following information.

1. In age, only the subgroup category of aged 75-79 demonstrated high to very high correlations ($\pm .80 - \pm 1.00$).
2. In sex, females demonstrated high to very high correlations.
3. In marital status, only married subjects demonstrated high to very high correlations.
4. In education, the subgroups of under 12 years of education and four years of college demonstrated high to very high correlations.
5. In learning location, only the church subjects demonstrated high to very high correlations.
6. In sequence of PMPS administration, the subjects who completed the PMPS before taking the MMPALT II demonstrated high to very high correlations.

TABLE VI
SUMMARY OF SUBJECT GROUP RANKS, SCORES, AND CORRELATIONS

Subject Group	Measure-ment	Print		Aural		Inter-active		<u>MMPALT II ELEMENTS</u>				Kines-thetic		Olfac-tory		Total Score	Corre-lation
		R*	S*	R	S	R	S	Visual	Haptic	R	S	R	S	R	S		
<u>Age</u>																	
60-64	PMPS	3	(43)	4	(27)	1	(50)	6	(3)	2	(48)	5	(4)	7	(-99)	76	.36
	MMPALT II	2	(29)	5	(18)	3	(23)	1	(41)	4	(19)	6	(16)	7	(12)	158	
65-69	PMPS	1	(99)	2	(41)	3	(39)	4.5	(38)	6	(-29)	4.5	(38)	7	(-160)	66	.58
	MMPALT II	4	(41)	3	(43)	2	(49)	1	(76)	6	(37)	5	(40)	7	(22)	308	
70-74	PMPS	1	(111)	4	(20)	2	(83)	3	(44)	6	(-30)	5	(11)	7	(-126)	113	.71
	MMPALT II	4	(30)	3	(40)	2	(46)	1	(58)	5	(26)	6	(22)	7	(12)	232	
75-79	PMPS	1	(112)	5	(34)	3	(47)	2	(73)	4	(41)	6	(-6)	7	(-135)	166	.82
	MMPALT II	3	(44)	4	(42)	1	(53)	2	(45)	5	(39)	6	(30)	7	(8)	261	
80-84	PMPS	1	(97)	2	(47)	4	(12)	5	(9)	6	(-4)	3	(33)	7	(-102)	92	-.11
	MMPALT II	5	(12)	3.5	(13)	2	(16)	1	(17)	3.5	(13)	7	(4)	6	(7)	82	
<u>Sex</u>																	
Female	PMPS	1	(423)	4	(128)	2	(168)	3	(133)	6	(-25)	5	(87)	7	(-507)	417	.82
	MMPALT II	3	(115)	4	(112)	2	(129)	1	(173)	5	(91)	6	(84)	7	(40)	745	
Male	PMPS	4	(39)	3	(41)	1	(63)	5	(34)	2	(51)	6	(-7)	7	(-115)	106	.61
	MMPALT II	5	(41)	3	(44)	2	(58)	1	(64)	4	(43)	6	(28)	7	(21)	299	

TABLE VI (Continued)

Subject Group	Measure-ment	Print		Aural		Inter-active		MMPALT II ELEMENTS				Total Score	Corre-lation	
		R*	S*	R	S	R	S	Visual		Haptic				Kines-thetic
<u>Marital Status</u>														
Divorced	PMPs	1 (54)	5 (12)	2.5(28)	2.5 (28)	4 (-19)	4 (22)	7 (89)	36					.64
	MMPALT II	4 (26)	3 (31)	1.5(39)	1.5 (39)	5 (23)	6 (21)	7 (8)	187					
Married	PMPs	1 (127)	4 (45)	2 (110)	3 (73)	5 (42)	6 (7)	7 (-261)	43					.86
	MMPALT II	3 (65)	4 (55)	2 (66)	1 (89)	5 (49)	6 (43)	7 (17)	384					
Single	PMPs	1 (21)	4.5(6)	4.5(6)	3 (14)	2 (15)	6 (-1)	7 (-22)	39					.74
	MMPALT II	1.5(12)	3.5(9)	3.5(9)	1.5 (12)	5 (7)	6.5 (3)	6.5(3)	55					
Widow	PMPs	1 (260)	2 (106)	3 (87)	4.5 (52)	6 (-12)	4.5 (52)	7 (-250)	295					.34
	MMPALT II	5 (53)	3 (61)	2 (97)	1 (97)	4 (55)	6 (45)	7 (33)	415					
<u>Education</u>														
Under 12 years	PMPs	4 (73)	6 (45)	1 (87)	3 (79)	2 (80)	5 (53)	7 (-152)	265					.86
	MMPALT	5 (42)	4 (43)	1 (77)	2 (76)	3 (48)	6 (37)	7 (18)	341					
12 years	PMPs	1 (198)	4 (61)	3 (95)	5 (23)	6 (-64)	2 (101)	7 (-305)	109					.32
	MMPALT	3 (68)	4 (66)	2 (70)	1 (99)	5 (53)	6 (47)	7 (28)	431					
Some College	PMPs	1 (107)	2 (47)	3 (28)	4 (24)	5 (-18)	6 (-59)	7 (-95)	34					.67
	MMPALT II	3 (15)	2 (21)	4.5(14)	1 (32)	6 (13)	4.5 (14)	7 (8)	117					
4 years of Coll.	PMPs	1 (84)	5 (16)	4 (21)	2 (41)	3 (28)	6 (=15)	7 (-70)	105					.88
	MMPALT	1 (31)	3.5(26)	3.5(26)	2 (30)	5 (20)	6 (14)	7 (7)	154					

TABLE VI (Continued)

Subject Group	Measure- ment	Print		Aural		Inter- active		MMPALT II ELEMENTS		Kines- thetic		Olfac- tory		Total Score	Corre- lation		
		R*	S*	R	S	R	S	Visual	Haptic	R	S	R	S				
<u>Learning Site</u>																	
Church	PMPs	1	(122)	4	(48)	2	(99)	3	(86)	5	(16)	6	(-4)	7	(-243)	124	.89
	MMPALT II	2	(70)	4	(51)	3	(67)	1	(87)	5	(42)	6	(36)	7	(22)	375	
College	PMPs	1	(134)	5	(48)	2	(82)	4	(63)	3	(72)	6	(-14)	7	(-154)	251	.46
	MMPALT II	5	(64)	3	(81)	2	(90)	1	(104)	4	(65)	6	(61)	7	(29)	494	
Retire. Center	PMPs	1	(205)	3	(73)	4	(50)	5	(18)	6	(-62)	2	(98)	7	(-225)	158	-.11
	MMPALT II	5	(22)	4	(24)	2	(30)	1	(46)	3	(27)	6	(15)	7	(10)	174	
<u>PMPs Administered</u>																	
First	PMPs	1	(216)	4	(77)	2	(150)	3	(83)	5	(56)	6	(25)	7	(-278)	329	.86
	MMPALT II	3	(80)	4	(77)	2	(102)	1	(134)	5	(67)	6	(58)	7	(30)	548	
Last	PMPs	1	(246)	2	(92)	4	(81)	3	(84)	6	(-30)	5	(55)	7	(-344)	184	.64
	MMPALT II	4	(76)	3	(79)	2	(85)	1	(103)	5	(67)	6	(54)	7	(31)	495	

R = Rank, S=Score

Subgroup Differences

An analysis of variance procedure was conducted by the Computer Center at Oklahoma State University to determine if significant differences existed within the subgroup categories of each group. For all groups, the analysis of variance procedure found that there were no significant differences in the subgroup categories of this study. A summary of the analysis of variance results for the six groups tested for variance at .05 alpha level is presented in Table VII.

Research Question One

Responses from the 50 volunteer subjects were used to determine if older adults utilize the perceptual elements identified by MMPALT II in individual learning. The response assessments were correlated with individual and subject group categories.

An analysis of the MMPALT II scores for seven style elements investigated is presented in Table III. From that table, the following information has been constructed.

1. The print style element was utilized by 41 subjects (82 percent) with a score range of 1-8.
2. The aural style element was utilized by 44 subjects (88 percent) with a score range of 1-6.
3. The interactive style element was utilized by 48 subjects (96 percent) with a score range of 1-8.
4. The visual style element was utilized by 47 subjects (94 percent) with a score range of 1-9.

TABLE VII
ANALYSIS OF VARIANCE SUMMARIES FOR SUBGROUPS

Source	D.F.	S.S	M.S.	F
Marital Status				
Between Groups	3	203.40	67.80	
Within Groups	<u>346</u>	<u>44,802.03</u>	<u>129.49</u>	.52*
Total	349	45,005.43		
Education				
Between Groups	3	241.63	80.54	.62*
Within Groups	<u>346</u>	<u>44,763.80</u>	129.38	
Total	349	45,005.43		
Age				
Between Groups	4	269.91	67.48	.52*
Within Groups	<u>345</u>	<u>44,735.52</u>	129.67	
Total	349	45,005.43		
Sex				
Between Groups	1	67.82	67.82	.52*
Within Groups	<u>348</u>	<u>44,937.61</u>		
Total	349	45,005.43		
Learning Location				
Between Groups	2	256.61	128.31	.99*
Within Groups	<u>347</u>	<u>44,148.82</u>	128.96	
Total	349	45,005.43		
PMPS Administration				
Between Groups	1	24.18	24.18	.19*
Within Groups	<u>348</u>	<u>44,981.25</u>	129.26	
Total	349	45,005.43		

*Not significantly different at the .05 level

5. The haptic style element was utilized by 48 subjects (96 percent) with a score range of 1-8.

6. The kinesthetic style element was utilized by 42 subjects (84 percent) with a score range of 1-7.

7. The olfactory style element was utilized by 33 subjects (66 percent) with a score range of 1-4.

Using the data from Table III, the researcher concluded that older adults do utilize perceptual elements identified by MMPALT II in individual learning. The assumption may be made that the perceptual modality style elements are influences on the older adult's learning experience.

Research Question Two

The variations in perceptual modality learning styles for this older adult population were measured by the PMPS and MMPALT II instruments. The findings for the collective variation of total scores for the subject population on both the PMPS and the MMPALT II instruments are presented in Figure 1. The subjects varied in PMPS scores from 462 (print style elements) to -598 (olfactory style element). On the MMPALT II the subjects varied from 337 (visual style element) to 61 (olfactory style element).

Individual variations have been presented on Tables III and IV. The 50 subjects' scores ranged from -34 to +34 on the PMPS and from 0-9 on the MMPALT II.

Research Question Three

Dominant patterns of learning styles among older adults are presented on Table II. Rank order strength was established with the utilization of this data and the following facts have been prepared:

1. Seven subjects (14 percent) demonstrated rank order dominance on the print style element.
2. No subjects demonstrated rank order dominance on the aural style element.
3. Twelve subjects (24 percent) demonstrated rank order dominance on the interactive style element.
4. Nineteen subjects (38 percent) demonstrated rank order dominance on the visual style element.
5. Four subjects (8 percent) demonstrated rank order dominance on the haptic style element.
6. One subject (2 percent) demonstrated rank order dominance on the kinesthetic style element.
7. No subjects demonstrated rank order dominance on the olfactory style element.

It can be concluded that, for this population, dominant patterns of perceptual learning styles occurred on five of the seven elements. The visual style occurred in rank order dominance most frequently with interactive style occurring as the second most frequent dominant pattern.

Research Question Four

Older adult learners' self-assessments of the perceptual modalities

of learning style were correlated with empirical measurements of the same styles to determine if positive correlations existed within this sample. Thirty-eight subjects (76 percent) did in fact demonstrate positive correlation, as indicated on information from Table V.

The amount of positive correlation must be considered for an accurate answer to the research question.

1. Five subjects (10 percent) demonstrated high to very high positive correlations (+.80 - +1.00).

2. Ten subjects (20 percent) demonstrated marked or substantial correlations (+.60 - +.79).

3. Nine subjects (18 percent) demonstrated moderate correlations (+.40 - +.59).

4. Four subjects (8 percent) demonstrated low or slight correlations (+.20 - +.39).

5. Ten subjects (20 percent) demonstrated negligible correlations (+.01 - +.19).

Based upon the above data which reveals that only 15 subjects (30 percent) demonstrated marked-substantial correlation or high to very high correlations, a conclusion may be made that, for this population, positive correlation of perceived learning styles and observed learning styles was negligible.

Research Question Five

Following the assessment of correlations in subject groups an analyses of variance was conducted to determine if significant differences existed between subgroup categories. The ANOVA results, as provided by the OSU Computer Center, indicated that no significant differences

existed in the subgroups. ANOVA information is presented on Table VII.

As a means of follow-up to the statistical analysis for significant differences, a Scheffe's test for variable difference was administered by the Computer Center, but the test agreed with the ANOVA results that the means of the subgroup category were not significantly different. Thus, the conclusion may be drawn that for the subgroup categories of age, sex, educational level, marital status, and administration of PMPS no significant differences existed within the groups.

Summary

Individually and collectively, the most frequently measured primary style on the MMPALT II was visual and the second most frequently measured strength was interactive. Individually and collectively, the most frequently expressed preferences on the PMPS were print, interactive, and aural.

The relationships of measured strengths (MMPALT II) to expressed preferences (PMPS) are presented in Figure I, constructed from the total scores of the population. Visual was the highest MMPALT II score (537) and print was the highest PMPS score (462). Olfactory was the lowest score on both the MMPALT II (61) and PMPS (-598).

A major focus of this study was the measurement of preferred learning styles compared to the measurement of actual learning styles. Individual correlations between the PMPS and MMPALT II were negligible; however experience with learning style instruction would influence correlations between perceived learning style and actual style strengths.

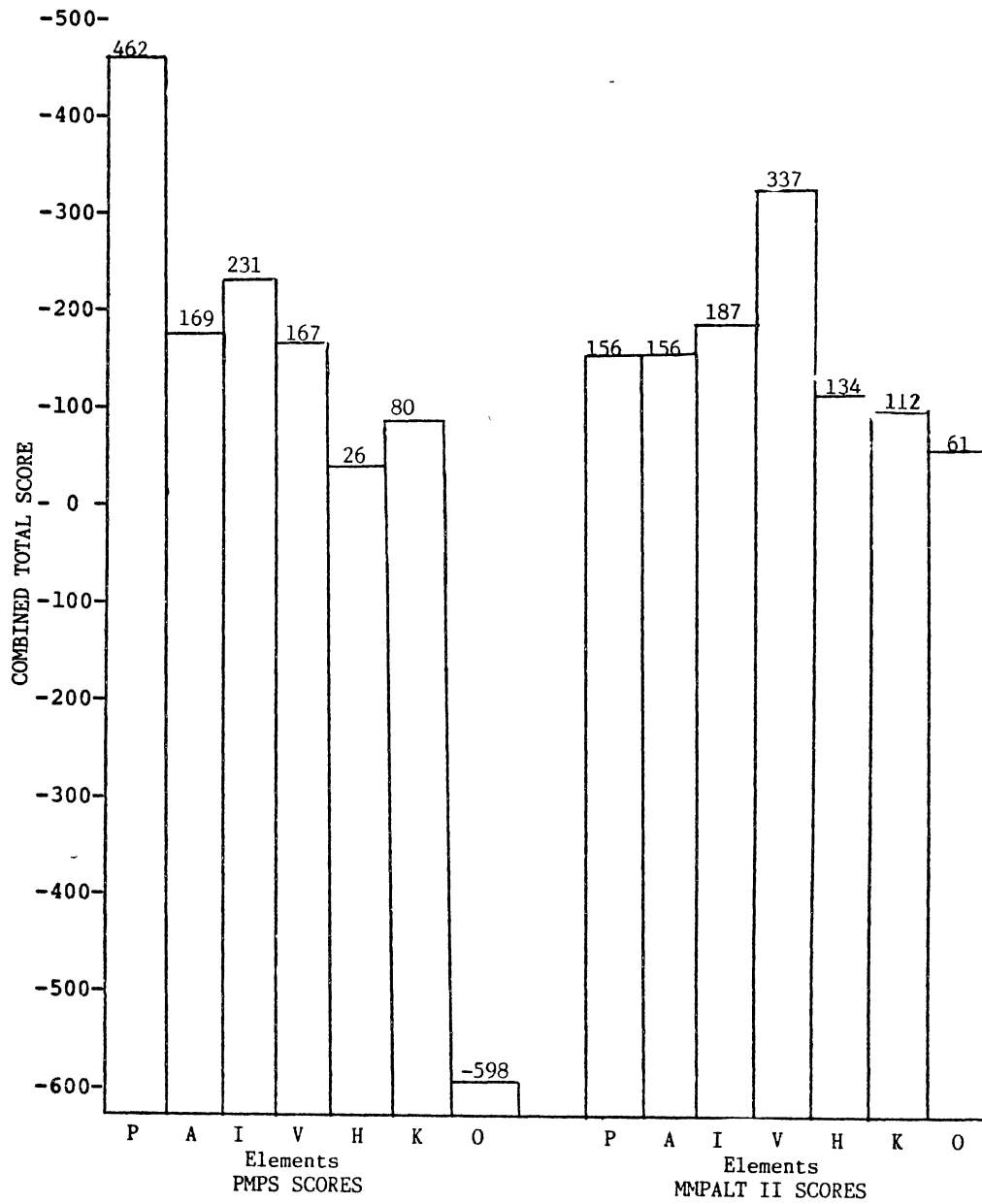


Figure 1. Total Scores for Subject Population

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The results of this study are presented in this chapter. The chapter is divided into three sections: (1) Summary; (2) Conclusions; and (3) Recommendations.

Summary

The concept of individual learning style measurement developed from this researcher's desire to compare perceived and observed perceptual learning styles with an older adult population. The central goal of this study was to assess the learning styles of the individual older adult. The key to fulfilling the goal was the documentation and analysis of the correlations of rank orders/scores received from the subjects' completion of the measurement instruments: PMPS and MMPALT II.

The purpose of this study was to examine perceptual modality learning styles in older adults. The research questions were designed to determine if older adults utilize perceptual elements in individual learning, if the variations in perceptual modality can be measured, if there are dominant patterns of learning styles among older adults, if older adults' self-assessments of their perceptual modality learning styles show positive correlation with empirical measurements of the same styles, and if there are significant differences in the

subgroups of age, sex, educational level, learning locations, marital status, and order of administration of the measurement instruments.

Conclusions

The following conclusions were drawn based upon the findings of the study:

1. Older adults do utilize perceptual elements identified by MMPALT II in individual learning.
2. The variations in perceptual modality of older adults can be measured.
3. There are dominant patterns of learning styles among older adults.
4. The older adult learners self-assessments of their perceptual modality learning styles do not show positive correlation with empirical measurements of the same styles.
5. Significant differences do not exist in the subcategories of marital status, age, sex, educational level, learning location, and order of administration of PMPS.

Recommendations

The results of this project have implications for both practice and future research. These recommendations are as follows:

Practice

The results of this project should be examined for use in developing learning programs for older adults. Implications for learning locations such as colleges, churches, and retirement centers could be

developed into learning style assessment processes.

The conclusions could be utilized by facilitators who plan curriculum or educational activities as a guide to determine the learning styles of older adults.

Future Research

The recommendations for future research are as follows:

1. The present project dealt with perceived and observed perceptual modality learning style correlations. Future research could concentrate on cognitive, social, or emotional modalities or on relationships between elements in the perceptual modality and other modalities.

2. Additional research conducted at different settings should be undertaken to compare findings of learning location influence.

3. Larger samples could be collected to compare findings to the results of this project.

4. Additional studies conducted after the lapse of time could determine if a shift in learning style occurs.

5. Further in-depth studies could explore the comparisons of young, middle-age, and older adults' learning styles.

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APPENDIXES

APPENDIX A

LETTER OF PERMISSION TO USE

MMPALT II AND PMPS



Robert L. McElrath
COMMISSIONER

TENNESSEE
STATE DEPARTMENT OF EDUCATION
100 CORDELL HULL BUILDING
NASHVILLE 37219

November 23, 1983

Dr. Wayne James
Occupational and Adult Education
406 Classroom Building
Oklahoma State University
Stillwater, Oklahoma 74074

Dear Wayne:

I am writing to confirm that you have permission of the authors of The MMPACT-II Learning Style Test, to administer the tests, and use the results in a series of doctoral dissertations to be conducted at Oklahoma State University. We are pleased that you are furthering our research. We shall look forward to obtaining the results of your research.

Cordially,

A handwritten signature in cursive script that reads "Russ French".

Russell L. French

For the Authors: Russell L. French and Edwin Cherry

RLF:clh

APPENDIX B
SCRIPTS AND PROCEDURES
FOR THE MMPALT II

OUTLINE FOR INTRODUCING THE CONCEPT OF LEARNING STYLES

NOTE: The purpose of this introduction is to stimulate each subject's interest and enthusiasm toward learning more about their own individual uniqueness as a learner. Therefore, do not use excessive detail, and adjust presentation to the subject's apparent needs.

1. Develop the following points.

- Each person in the world is different from all others.
- One of the differences in each of us is how we learn.
- Those differences might be in how we receive, process, store, retrieve, or use new knowledge or information.
- One concept of how we receive knowledge and information includes seven learning styles

(Briefly explain each):

Print
Aural
Interactive
Visual
Haptic
Kinesthetic
Olfactory

- Each person should learn more about his/her own learning styles.
- By using our best style we can learn better.
- By knowing our weaknesses we can improve on them.

2. Allow and encourage subject questions and discussion.

3. Proceed to measurement procedures introduction.

Coordinators

OUTLINE FOR MEASUREMENT PROCEDURES

INTRODUCTION

1. Explain the measurement (testing) procedures.

YOU ARE ABOUT TO BE MEASURED TO DETERMINE YOUR STRONGEST LEARNING STYLE OR STYLES. SOMETIME AFTER THE MEASUREMENTS ARE COMPLETED, YOU WILL RECEIVE A REPORT IDENTIFYING YOUR STRENGTHS AND WEAKNESSES AS A LEARNER. THIS INFORMATION CAN HELP YOU IN FUTURE LEARNING SITUATIONS.

THE MEASUREMENTS WILL BE CONDUCTED AT FIVE DIFFERENT LOCATIONS. THREE TESTS (PRINT, AURAL, VISUAL) WILL BE CONDUCTED HERE. AFTER FINISHING HERE, YOU WILL BE SENT TO EACH OF FOUR OTHER STATIONS WHERE (people, teachers, etc.) WILL HELP YOU TAKE THE TESTS.

BEFORE DOING ANYTHING FURTHER WE NEED TO DIVIDE YOU INTO GROUPS TO MAKE IT EASIER TO DIRECT YOU TO TEST STATIONS. (Divide subjects into groups of 4 or more as planned for in station organization).

IN EACH OF THE 7 TESTS, YOU WILL FIRST BE PRESENTED 10 PAIRS OF THINGS: WORDS, PICTURES, AROMAS, OBJECTS, ETC. THE FIRST THING PRESENTED TO YOU IN EACH PAIR IS CALLED THE STIMULUS, THE SECOND THE RESPONSE. (Show demonstration pairs and point out stimulus member and response member.) AFTER ALL 10 PAIRS HAVE BEEN PRESENTED TO YOU, THE EVALUATOR WILL THEN PRESENT YOU ONLY THE STIMULUS MEMBER OF EACH PAIR IN A DIFFERENT ORDER THAN YOU EXAMINED THEM ORIGINALLY. YOUR TASK WILL BE TO IDENTIFY FROM MEMORY THE RESPONSE MEMBER WITH WHICH EACH STIMULUS MEMBER WAS ORIGINALLY PAIRED. (demonstrate this test procedure.)

REMEMBER, THERE IS NO PASSING OR FAILING ANY OF THE TESTS. WE ARE SIMPLY TRYING TO FIND YOUR STRENGTHS AND WEAKNESSES SO YOU CAN BECOME BETTER ABLE TO BUILD ON THE STRENGTHS AND IMPROVE IN WEAK AREAS.

SPECIFIC PROCEDURES FOR EACH TEST WILL BE GIVEN TO YOU BY THE EVALUATOR AT EACH STATION.

DO YOU HAVE ANY QUESTIONS?

ROLE OF THE COORDINATOR

1. Coordinate total testing process.
2. Introduce learning style concepts and test procedures.
3. Conduct print, aural and visual tests at Station #1.
4. Coordinate movement of subjects, groups and individuals from station to station.
5. Assist "lost" subjects.
6. Keep subjects moving from station to station. This may mean changing original schedule and traffic plan, if some evaluators consistently finish before others.
7. Minimize noise and distractions in testing area(s).
8. Collect response sheets from each station.
9. Coordinate preparation of reports on individual students.
10. Coordinate dissemination of test information.

ADMINISTERING THE MMPALT-II

I. Evaluators

The MMPALT-II requires a minimum of five test administrators. These five administrators are deployed as indicated below:

- Evaluator #1: a) Introduces test and test procedures.
 b) Administers print, aural and visual group test.
 (At least two of the other evaluators assist in the group testing.)
 c) Serves as coordinator for testing of individuals by evaluators 2, 3, 4, 5.

Evaluator #2: Administers the interactive test.

Evaluator #3: Administers the haptic test.

Evaluator #4: Administers the kinesthetic test.

Evaluator #5: Administers the olfactory test.

NOTE: Administration of the individual tests is smoothest when two (2) evaluators are assigned to each individual station.

II. Stations

Five stations are required for testing. They should be quiet rooms or areas free from noise and distraction. No two stations should be placed in the same room. The five stations will be used as follows:

- Station #1 a) Introduction to the testing procedures,
 b) Group test administration (print, aural, visual),
 c) Coordinating point for subjects.

Station #2: Interactive test

Station #3: Haptic test

Station #4: Kinesthetic test

Station #5: Olfactory test

Stations should be set up by the test administrators before test time in accordance with directions for each test to insure a smooth test procedure.

III. Organization of Subjects

- A. As many as 40 subjects can be introduced to the testing process and administered the group tests (print, aural, visual) at one time in Station #1. However, it is preferable to have smaller groups.
- B. After completing the introduction and group testing at Station #1, organize subjects into groups of four and schedule the groups to begin testing in individual test stations (2-5) at one hour intervals.

NOTE: If multiple sets of tests and evaluators are used in individual test stations, groups can be enlarged accordingly.

- C. Administration of each test requires no more than 15 minutes. At 15 minute intervals, subjects swap stations until each person in a group of four has completed the four individual tests (interactive, haptic, kinesthetic, olfactory). Subjects need to be told at each station by the evaluator where to go next. A coordinator should be available to direct lost or misdirected subjects. - -
- D. Each set of test materials contains explicit directions for organizing the test station and administering that particular test.

STATION #1
INTRODUCTION AND GROUP TESTS
(PRINT, AURAL, VISUAL)

REQUIREMENTS:

PEOPLE: 2 trained evaluators

EQUIPMENT: 1 35 mm Kodak Carousel Slide projector
1 projection screen
1 audiotape cassette recorder

MMPLAT-II MATERIALS: Tray of slides (Print, Visual Tests)
Audio-cassette (Aural Test)
Demonstration materials: wooden block and baseball,
two vials, blindfold
Pencils
Response Sheets: Print, Aural, Visual

PROCEDURES:

- A. INTRODUCTION: 1) Welcome subjects
2) Introduce concept of learning styles
3) Explain and demonstrate measurement procedures
4) Organize test groups (groups of 4)
5) Respond to Questions
- B. PRINT TEST: 1) Be sure subjects can all see screen clearly
2) Distribute response sheets (face down) and pencils
3) Give directions and show sample pair
4) Display stimulus/response pairs at 7 second intervals
5) Instruct subjects to turn response sheets over and pick up pencils
6) Announce number of response and display each stimulus slide for 10 seconds. (For example: "Number one (wait 10 seconds), Number two (wait 10 seconds) etc...")
7) Collect response sheets

NOTE: Pairings and sequence of stimulus/response pairs should be as follows:

Sample: hez/sister

- | | |
|--------------|--------------|
| 1) biv/cat | 6) cyc/horse |
| 2) ceq/party | 7) koy/rain |
| 3) puq/name | 8) wuq/robin |
| 4) dup/bed | 9) lez/paper |
| 5) xib/box | 10) nyh/coat |

Sequence for stimulus only display:

- | | |
|--------|---------|
| 1) dup | 6) nyh |
| 2) cyc | 7) ceq |
| 3) koy | 8) lez |
| 4) biv | 9) puq |
| 5) xib | 10) wuq |

- C. AURAL TEST:**
- 1) Be sure subjects can all hear audiotape well.
 - 2) Distribute response sheets face down.
 - 3) Give directions for the test and demonstrate stimulus/response pair.
 - 4) Play audiotape containing stimulus/response pairs.
 - 5) Instruct subjects to turn response sheets over and prepare to respond.
 - 6) Play audiotape containing stimulus member only (2nd section of audiocassette).

NOTE: Pairings and sequence of stimulus/response pairs should be as follows:

- | | |
|---------------|---------------|
| 1) vom/apple | 6) poh/leg |
| 2) und/baby | 7) omp/bread |
| 3) tud/kitten | 8) mog/table |
| 4) sul/shoe | 9) kiv/rabbit |
| 5) roz/duck | 10) jus/bird |

Sequence for stimulus only presentation:

- | | |
|--------|---------|
| 1) poh | 6) mog |
| 2) omp | 7) und |
| 3) jus | 8) sul |
| 4) vom | 9) kiv |
| 5) tud | 10) roz |

- D. VISUAL TEST:**
- 1) Be sure subjects can all see the screen well.
 - 2) Distribute response sheets (face down).
 - 3) Give directions and show sample pair.

- 4) Display stimulus/response pairs at 7 second intervals.
- 5) Instruct subjects to turn response sheets over and prepare to respond.
- 6) Announce number of response and display each stimulus member for 10 seconds. (For example: "Number one (ten seconds), etc...")
- 7) Collect answer sheets and pencils.

NOTE: Pairing and sequence of stimulus/response pairs should be as follows:

- | | |
|---------------------|------------------------------|
| 1) square/tree | 6) star/boat |
| 2) circle/hat | 7) oval/flower |
| 3) triangle/chair | 8) asterisk/umbrella |
| 4) rectangle/boot | 9) diamond/scissors |
| 5) plus sign/window | 10) infinity sign/eyeglasses |

Sequence for stimulus only display:

- | | |
|------------------|--------------|
| 1) asterisk | 6) oval |
| 2) circle | 7) diamond |
| 3) plus sign | 8) square |
| 4) rectangle | 9) star |
| 5) infinity sign | 10) triangle |

- DISMISSAL: 1) Be sure subjects have their group assignments.
2) Direct subject groups to next location(s).

STATION #2

INTERACTIVE TEST

REQUIREMENTS:

- PEOPLE: 1-2 trained evaluators
- EQUIPMENT: This document and response sheets.

PROCEDURES:

1. Seat subject where he/she is at the same level and face to face with primary evaluator. If a secondary evaluator is used, he/she should sit to one side and prepare to score the responses. Scoring must be accomplished without distracting or prompting the subject.
2. Try to put the subject at ease, but do not waste too much time in pleasantries.
3. Assure subject that procedures are identical to those already encountered in the group tests and give him/her directions for the test:

EVALUATOR: IN A MOMENT YOU WILL BE BLINDFOLDED, THEN YOU WILL BE GIVEN TEN PAIRS OF WORDS. EACH PAIR CONTAINS A NONSENSE WORD AND A COMMON WORD. AFTER PRESENTING EACH PAIR, I SHALL GIVE YOU AN OPPORTUNITY TO TALK ABOUT HOW YOU INTEND TO REMEMBER THIS PAIRING. AFTER ALL TEN PAIRS OF WORDS HAVE BEEN PRESENTED AND YOU HAVE COMMENTED ON EACH, I SHALL PRESENT YOU ONLY THE STIMULUS OR NONSENSE WORDS AND ASK YOU TO SUPPLY THE COMMON WORD WHICH WAS PAIRED WITH EACH. DO YOU UNDERSTAND THE PROCEDURE?

4. Present stimulus/response pairs using the following script:

THE NONSENSE WORD IN THIS PAIR IS (STIMULUS), AND THE COMMON WORD IS (RESPONSE). PLEASE REPEAT BOTH WORDS.

(Repeat as necessary until subject can say both words.)

How will you remember this pair of words? (you may need to prompt the subject to be sure that he/she will verbalize these words)

(Allow ten (10) seconds for subject to respond to question.)
(Do not comment on subject's reply.)

NOTE: Pairings and sequence of stimulus/response pairs should be as follows:

- | | |
|------------------|--------------|
| 1) zed/wind | 6) pex/floor |
| 2) fai/tooth | 7) chi/egg |
| 3) ces/ball | 8) jec/dog |
| 4) hez/Christmas | 9) toz/milk |
| 5) sci/fire | 10) zon/toy |

5. Present stimulus words and ask the subject to state response words. Use the following script:

THE NONSENSE WORD IS (STIMULUS). WHAT WAS (STIMULUS) PAIRED WITH?

(Allow 10 seconds for the response.)

NOTE: Sequence for stimulus only presentation:

- | | |
|--------|---------|
| 1) hez | 6) jec |
| 2) zed | 7) toz |
| 3) sci | 8) ces |
| 4) chi | 9) pex |
| 5) fai | 10) zon |

6. Primary or secondary evaluator completes scoring without reporting results to subject.
7. Be sure subject's correct name or number is on the score sheet.
8. Instruct subject to move to his/her next station or return to the coordinator for reassignment.

STATION #3

HAPTIC TEST

REQUIREMENTS:

- PEOPLE: 1-2 trained evaluators
- EQUIPMENT: Small desk or table
Box of 20 stimulus/response items
Blindfold
Response sheets

PROCEDURES:

1. Arrange items on table and cover before subject enters.
2. Seat subject across table from primary evaluator. If a secondary evaluator is used, he/she should sit to one side and prepare to score the responses. Scoring must be accomplished without distracting or prompting the subject.
3. Try to put the subject at ease, but do not waste too much time on pleasantries.
4. Assure subject that procedures are the same as for all of the other tests and give him/her directions as follows:

EVALUATOR: IN A MOMENT YOU WILL BE BLINDFOLDED. THEN I SHALL PRESENT YOU WITH TEN PAIRS OF ITEMS. EACH PAIR CONTAINS A NONSENSE ITEM AND A COMMON ITEM. NONE OF THE ITEMS WILL HURT YOU NOR FEEL TERRIBLE TO YOU. I SHALL ALWAYS PLACE THE NONSENSE ITEM OF EACH PAIR IN YOUR LEFT HAND, AND THE COMMON ITEM IN YOUR RIGHT HAND. FEEL THE TWO ITEMS IN EACH PAIR CAREFULLY SO THAT YOU WILL BE ABLE TO REMEMBER WHAT THINGS ARE ASSOCIATED WITH EACH OTHER. I WILL MAKE SURE THAT YOU CAN IDENTIFY THE COMMON ITEM. AFTER ALL TEN PAIRS HAVE BEEN PRESENTED, I SHALL PRESENT YOU ONLY THE STIMULUS OR NONSENSE TIMES AND ASK YOU TO IDENTIFY THE COMMON ITEM WHICH WAS PAIRED WITH EACH. DO YOU UNDERSTAND THE PROCEDURE?

5. Blindfold subject and uncover items on the table.
6. Place stimulus member of each pair in subject's left hand; then place corresponding response item in subject's right hand. Allow the subject 7 seconds to handle both objects, then take them from him/her and repeat the procedure with the next pair of items. Be sure subject can identify the common item. He/she will have to name it later.
7. After presenting all ten stimulus/response pairs, instruct the subject that the test is about to begin.
8. Place each stimulus member in the subjects left hand and ask him/her to identify the paired response item:
PLEASE NAME OR DESCRIBE THE OBJECT WITH WHICH THIS ITEM WAS PAIRED?

(Allow ten (10) seconds for the subject to reply. Do not comment on the subject's reply.)

9. Score is kept without reporting results to the subject.

NOTE: Pairings and sequence of stimulus/response pairs should be as follows:

- | | |
|------------------------------|------------------------------|
| 1) carpet/lightbulb | 6) bushing/key ring |
| 2) rock/pencil | 7) metal tube/scissors |
| 3) table leg/tennis ball | 8) odd shaped wood/yo yo |
| 4) hose coupling/paint brush | 9) plastic golf ball/padlock |
| 5) wood rectangle/table fork | 10) door knob/drinking glass |

Sequence for stimulus only presentation:

- | | |
|--------------------|-------------------|
| 1) carpet | 6) wood rectangle |
| 2) golf ball | 7) rock |
| 3) odd shaped wood | 8) door knob |
| 4) bushing | 9) metal tube |
| 5) table leg | 10) hose coupling |

10. Be sure that subject's correct name or number is on response sheet.
11. Instruct subject to move to his/her next station or to return to coordinator for reassignment.

STATION #4
KINESTHETIC TEST

REQUIREMENTS:

PEOPLE: 1-2 Trained evaluators

EQUIPMENT: This document
blindfold
response sheet

PROCEDURES:

1. Seat subject for a few minutes while explaining test. If a secondary evaluator is used, he/she should sit to one side and prepare to score the responses. Scoring must be accomplished without distracting or prompting the subject.
2. Try to put the subject at ease, but do not waste too much time on pleasantries.
3. Assure subject that procedures are the same as for all other tests and give him/her directions as follows:

EVALUATOR: THIS TEST INVOLVES BODY MOVEMENT: THERE WILL BE LIMITED SPOKEN DIRECTIONS DURING THIS PROCEDURE. FROM THIS (IDENTIFY) STARTING POINT, I'LL GUIDE AND DIRECT YOU THROUGH TEN PAIRS OF BODY MOVEMENTS. YOU WILL BE BLINDFOLDED: THEREFORE I'LL STAY CLOSE BY YOU TO KEEP YOU STEADY AND PREVENT ANY ACCIDENTS. AFTER WE HAVE COMPLETED THE TEN PAIRS OF MOVEMENTS, I'LL GUIDE AND DIRECT YOU THROUGH THE FIRST MOVEMENT OF EACH PAIR. YOU ARE TO RESPOND BY PERFORMING OR DESCRIBING THE MOVEMENT WITH WHICH THE FIRST MOVEMENT WAS PAIRED. DO YOU UNDERSTAND THE PROCEDURE?

4. Blindfold the subject;
5. Move subject through the 10 stimulus/response pairs. As necessary, use the following spoken directions:

THE FIRST MOVEMENT IS (STIMULUS). IT IS PAIRED WITH (RESPONSE)

Start each movement by gently placing your hands on the subject's shoulders. The various movements will require gentle movement of the subject's arms and legs. This must be accomplished without alarming the subject in any way. As necessary, you may use additional verbal directions, but those directions must not detract from the actual movements.

6. Move the subject through the various stimulus movements and allow 10 seconds for the subject to respond by performing or describing the paired movements. It may be necessary to say:

THIS MOVEMENT IS (STIMULUS). WHAT WAS IT PAIRED WITH?

7. Score responses without reporting results to the subject.
8. Be sure that the subject's correct name or number is on the response sheet.
9. Instruct subject to move to his/her next station or to return to coordinator for reassignment.

NOTE: Pairings and sequence pairs should be as follows:

<u>STIMULUS</u>	<u>RESPONSE</u>
1) Move diagonally across room and back	1) Place hands on knees
2) Touch back of left heel with right foot	2) Raise both hands into air
3) Rotate left arm	3) Bow at waist
4) Place hands on hips	4) Raise both legs, alternate
5) Wrap left arm over head	5) Walk in circle
6) Clasp hands above head and then lower to sides	6) Take two steps forward and then return
7) Twist body with arm movements	7) Clasp hands in front of body
8) With right arm, draw a circle in the air	8) Stand with legs spread apart
9) Cross arms over head	9) Clasp hands behind neck
10) Place left hand over mouth	10) Stand at attention (rigid body position)

Sequence for stimulus only presentation:

1) Touch back of left heel with right foot	6) Move diagonally across room and return
2) Put left hand over mouth	7) Clasp hands above head and then lower to sides
3) With right arm, draw circle in air	8) Wrap left arm over head
4) Cross arms over head	9) Twist body with arm movements
5) Place hands on hips	10) Rotate left arm

STATION #5
OLFACTORY TEST

REQUIREMENTS:

PEOPLE: 1-2 trained evaluators

EQUIPMENT: Small desk or table
Aroma vials or bottles (20)
Blindfold
Response sheets

PROCEDURES:

1. Arrange aroma bottles on table and cover.
2. Seat subject across table from primary evaluator. If a secondary evaluator is used, he/she should sit to one side and prepare to score the responses. Scoring must be accomplished without distracting or prompting the subject.
3. Try to put the subject at ease, but do not waste too much time on pleasantries.
4. Assure subject that procedures are the same as for all other tests and give him/her directions as follows:

EVALUATOR: FOR THIS TEST YOU WILL BE BLINDFOLDED AND GIVEN BOTTLES CONTAINING DIFFERENT AROMAS. FIRST, YOU WILL BE PRESENTED WITH PAIRS OF AROMAS. THE FIRST BOTTLE OF EACH PAIR CONTAINS AN ABSTRACT AROMA WHICH WILL NOT BE IDENTIFIED. THE SECOND BOTTLE CONTAINS A COMMON AROMA, AND I WILL IDENTIFY IT FOR YOU. YOUR TASK IS TO REMEMBER WHICH PAIRS OF AROMAS GO TOGETHER. AFTER EXAMINING ALL TEN PAIRS, YOU WILL BE GIVEN THE BOTTLE CONTAINING THE FIRST AROMA IN EACH PAIR. YOU ARE TO IDENTIFY THE NAME OF THE AROMA WITH WHICH IT WAS PAIRED. DO YOU UNDERSTAND THE PROCEDURE?

5. Blindfold the subject.
6. Present the stimulus/response pairs as follows:

THIS IS THE FIRST AROMA OF THIS PAIR. (Give bottle to subject; help him/her lift it to nose.) THIS IS THE SECOND AROMA OF THIS PAIR (Same procedure).

Allow the subject 7 seconds to examine each pair of aromas.

7. Present subject with stimulus member bottle of each pair and allow him/her 10 seconds to identify the appropriate response aroma. It may be necessary to say:

THIS ONE OF THE ABSTRACT AROMAS; WHAT WAS IT PAIRED WITH?

8. Score responses without reporting results to the subject.
9. Be sure subject's correct name or number is on the response sheet.
10. Instruct subject to move to his/her next station or to return to coordinator for reassignment.

NOTE: Pairings and sequence of stimulus/response pairs should be as follows:

- | | |
|--------------|----------------------|
| 1) Walnut | 11) Peppermint |
| 2) Vanilla | 12) Strawberry |
| 3) Almond | 13) Orange |
| 4) Sherry | 14) Butter |
| 5) Pineapple | 15) Chocolate |
| 6) Brandy | 16) Coconut |
| 7) Nutmeg | 17) Anise (licorice) |
| 8) Banana | 18) Cloves |
| 9) Maple | 19) Lemon |
| 10) Rootbeer | 20) Cinnamon |

Sequence for stimulus only presentation:

- | | |
|-----------------|--------------------|
| 1) Vanilla (#2) | 6) Almond (#3) |
| 2) Sherry (#4) | 7) Pineapple (#5) |
| 3) Maple (#9) | 8) Nutmeg (#7) |
| 4) Banana (#8) | 9) Brandy (#6) |
| 5) Walnut (#1) | 10) Rootbeer (#10) |

APPENDIX C

PERCEPTUAL MODALITY PREFERENCE SURVEY

PERCEPTUAL MODALITY PREFERENCE SURVEY

This survey is designed to help you identify your style of learning. It specifically deals with how you best receive new information or knowledge. The results of this survey will help you plan your future learning experiences.

You will be responding to forty-two statements concerning how you learn best. This is not a test; there are no right or wrong answers. When making your responses, you should consider your past learning experiences and your own intuitions about your learning style.

The response choices are: ALWAYS, USUALLY, SELDOM, and NEVER. The always response indicates that the statement is a strong representation of your learning style preference. If the statement is a good way for you to learn, but not your most preferred, you should mark "usually." If the statement indicates a way you can learn, but you would prefer other methods, mark your response as "seldom." The never response indicates that you reject that statement as a way for you to learn.

The construction of the survey requires that you respond to all statements in the order presented. Therefore, do not omit responses or skip statements.

If you are using the machine scored response sheet, mark column 1 for always, column 2 for usually, column 3 for seldom, and column 4 for never.

- | 1 | 2 | 3 | 4 | 5 |
|--------|---------|--------|-------|-------------|
| ALWAYS | USUALLY | SELDOM | NEVER | DO NOT MARK |
1. I can learn better by reading than by listening.
 2. I can learn better by listening than by talking with others.
 3. I can learn better by talking with others than by looking at things like movies and slides.
 4. I can learn better by looking at things like movies and slides than by touching or holding objects.
 5. I can learn better by touching or holding objects than by physically participating in activities such as sports or games.
 6. I can learn better by physically participating in activities such as sports and games than by smelling things.
 7. I can learn better by smelling things than by reading.
 8. I can learn better by reading than by talking with others.
 9. I can learn better by talking with others than by touching or holding objects.
 10. I can learn better by touching or holding objects than by smelling things.
 11. I can learn better by smelling things than by listening.
 12. I can learn better by listening than by looking at things like movies and slides.
 13. I can learn better by looking at things like movies and slides than by physically participating in activities such as sports and games.
 14. I can learn better by physically participating in activities such as sports and games than by reading.
 15. I can learn better by reading than by looking at things like movies and slides.
 16. I can learn better by looking at things like movies and slides than by smelling things.
 17. I can learn better by smelling things than by talking with others.
 18. I can learn better by talking with others than by physically participating in activities such as sports and games.
 19. I can learn better by physically participating in activities such as sports and games than by listening.
 20. I can learn better by listening than by touching or holding objects.

1	2	3	4	5
Always	Usually	Seldom	Never	Do Not Mark

21. I can learn better by touching or holding objects than by reading.
22. I can learn better by reading than by smelling things.
23. I can learn better by smelling things than by physically participating in activities such as sports and games.
24. I can learn better by physically participating in activities such as sports and games than by touching or holding objects.
25. I can learn better by touching or holding objects than by looking at things like movies and slides.
26. I can learn better by looking at things like movies and slides than by talking with others.
27. I can learn better by talking with others than by listening.
28. I can learn better by listening than by reading.
29. I can learn better by reading than by physically participating in activities such as sports and games.
30. I can learn better by physically participating in activities such as sports and games than by looking at things like movies and slides.
31. I can learn better by looking at things like movies and slides than by listening.
32. I can learn better by listening than by smelling things.
33. I can learn better by smelling things than by touching or holding objects.
34. I can learn better by touching or holding objects than by talking with others.
35. I can learn better by talking with others than by reading.
36. I can learn by reading than by touching or holding objects.
37. I can learn better by touching or holding objects than by listening.
38. I can learn better by listening than by physically participating in activities such as sports and games.
39. I can learn better by physically participating in activities such as sports and games than by talking with others.
40. I can learn better by talking with others than by smelling things.
41. I can learn better by smelling things than by looking at things like movies and slides.
42. I can learn better by looking at things like movies and slides than by reading.

APPENDIX D

PARTICIPANTS' DATA SHEET

PARTICIPANTS' DATA SHEET

Name _____

Age _____

Sex _____

Marital Status _____

Education _____

Number of years of Public School Completed _____

Number of years of College Completed _____

APPENDIX E

MMPALT II RESPONSE SHEETS

RESPONSE SHEET A
PRINT
LEARNING STYLE

SUBJECT NAME/NUMBER: _____

NONSENSE WORD
NUMBER:

COMMON WORD:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

RESPONSE SHEET B
AURAL
LEARNING STYLE

SUBJECT NAME/NUMBER: _____

NONSENSE WORD
NUMBER:

COMMON WORD:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

RESPONSE SHEET C
VISUAL
LEARNING STYLE

SUBJECT NAME/NUMBER: _____

SYMBOL NUMBER:	PICTURE:
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____
8.	_____
9.	_____
10.	_____

TOTAL CORRECT: _____

RESPONSE SHEET
INTERACTIVE D
LEARNING STYLE

SUBJECT NAME/NUMBER: _____

NONSENSE WORD:	COMMON WORD:	SUBJECT CORRECT	RESPONSE INCORRECT
hez	_____		
zed	_____		
sci	_____		
chi	_____		
fai	_____		
jec	_____		
toz	_____		
ces	_____		
pex	_____		
zon	_____		

TOTAL CORRECT: _____

RESPONSE SHEET E
HAPTIC
LEARNING STYLE
SUBJECT NAME/NUMBER: _____

STIMULUS MEMBER:	RESPONSE MEMBER:	SUBJECT CORRECT	RESPONSE INCORRECT
PIECE OF CARPET	LIGHT BULB		
PLASTIC GOLF BALL	PADLOCK		
ODD SHAPED PIECE OF WOOD	YO YO		
BUSHING	KEY RING		
TABLE LEG	TENNIS BALL		
WOODEN RECTANGLE	TABLE FORK		
ROCK	PENCIL		
DOOR KNOB	DRINKING GLASS		
METAL TUBE	SCISSORS		
HOSE COUPLING	PAINT BRUSH		

TOTAL CORRECT: _____

RESPONSE SHEET F
KINESTHETIC
LEARNING STYLE
SUBJECT NAME/NUMBER: _____

STIMULUS MEMBER:	RESPONSE MEMBER:	SUBJECT CORRECT	RESPONSE INCORRECT
TOUCH LEFT HEEL WITH RIGHT FOOT	RAISE HANDS IN AIR		
PUT LEFT HAND OVER MOUTH	STAND AT ATTENTION		
DRAW CIRCLE IN AIR	STAND WITH LEGS APART		
CROSS ARMS OVER CHEST	CLASP HANDS BEHIND NECK		
PLACE HANDS ON HIPS	RAISE BOTH LEGS		
MOVE DIAGONALLY AND RETURN	PLACE HANDS ON KNEES		
CLASP HANDS ABOVE HEAD	TAKE TWO STEPS/RETURN		
WRAP LEFT ARM ABOVE HEAD	WALK IN STEPS/RETURN		
TWIST BODY	CLASP HANDS/FRONT OF BODY		
ROTATE LEFT ARM	BOW AT WAIST		

TOTAL CORRECT: _____

RESPONSE SHEET G
 OLFATORY
 LEARNING STYLE
 SUBJECT NAME/NUMBER: _____

STIMULUS NUMBER:	RESPONSE AROMA:	SUBJECT CORRECT	RESPONSE INCORRECT
2	STRAWBERRY		
4	BUTTER		
9	LEMÓN		
8	OIL OF CLOVES		
1	PEPPERMINT		
3	ORANGE (OIL)		
5	CHOCOLATE		
7	LICORICE		
6	COCONUT		
10	CINNAMON		
TOTAL CORRECT:		_____	

RESPONSE SHEET H
 PARTICIPANT'S INITIAL REPORT
 SUBJECT NUMBER: _____

The individual survey tests have been scored, and your results on the MMPALT are as follows.

LEARNING STYLE	SCORE	RANK ORDER
PRINT	_____	_____
AURAL	_____	_____
INTERACTIVE	_____	_____
VISUAL	_____	_____
HAPTIC	_____	_____
KINESTHETIC	_____	_____
OLFATORY	_____	_____

If these results are a true reflection of your strengths as a learner, the style ranked #1 is your best method for studying and learning. Therefore, you might consider using that style as much as possible, and, at the same time, improve your skills in the other styles. Example: If aural is #1, you can learn best by listening. If print is #7, try to improve your reading skills.

Comments:

APPENDIX F

PMPS SCORING SHEET AND DEMONSTRATION
OF SCORING SYSTEM

WORKSHEET FOR HAND-SCORING
PERCEPTUAL MODALITY SURVEY

Print:	Aural:	Interactive:
A 1 28	I 2 27	V 3 26
I 8 35	V 12 31	H 9 34
V 15 42	H 20 37	K 18 39
H 36 21	K 38 19	O 40 17
K 29 14	O 32 11	P 35 8
O 22 ___ 7 ___ =	P 28 ___ 1 ___ =	A 27 ___ 2 ___ =

Visual:	Haptic:	Kinesthetic:
H 4 25	K 5 24	O 6 23
K 13 30	O 10 33	P 14 29
O 16 41	P 21 36	A 19 38
P 42 15	A 37 20	I 39 18
A 31 12	I 34 9	V 30 13
I 26 ___ 3 ___ =	V 25 ___ 4 ___ =	H 24 ___ 5 ___ =

Survey Results:	MMPALT Results:
Style:	Score: Rank:
Print	Score: Rank:
Aural	Score: Rank:
Interactive	Score: Rank:
Visual	Score: Rank:
Haptic	Score: Rank:
Kinesthetic	Score: Rank:
Olfactory	Score: Rank:

Primary Position: Always +4, Usually +2, Seldom -2, Never -4

Secondary Position: Always -2, Usually -1, Seldom +1, Never +2

Directions:

For an "Always" response, score +4 for the first (accepted) element contained in the statement, and score -2 for the final (rejected) element in the statement.

For a "Usually" response, score +2 for the first (partially accepted) element listed in the statement, and score -1 for the final (partially rejected) element in the statement.

For a "Seldom" response, score -2 for the first (partially rejected) element listed in the statement, and score +1 for the final (partially accepted) element in the statement.

For a "Never" response, score -4 for the first (rejected) element listed in the statement, and score +2 for the final (accepted) element in the statement.

Sample Statements:

Number 1: I learn better by reading than by listening.

Number 28: I learn better by listening than by reading.

Sample Responses:

Number 1: Always (X) Usually () Seldom () Never ()

Number 28: Always () Usually () Seldom () Never ()

Sample Scoring:

	Print	Aural	Interactive	Visual	Haptic...
Number 1:	+4	-2	0	0	0
Number 28:	+1	-2	0	0	0
<hr/>					
Total	+5	-4	0	0	0

Figure 1. Explanation and Demonstration of PMPS Scoring System

APPENDIX G
DEMOGRAPHIC CHARACTERISTICS
OF SUBJECTS

SUBJECT NUMBER	AGE	SEX	MARITAL STATUS	YEARS OF EDUCATION	LEARNING LOCATION	PMPS ADMINISTERED
1	64	M	Married	12	College	First
2	61	F	Married	9	College	First
3	80	F	Widow	9	College	First
4	71	F	Married	16	College	First
5	65	F	Divorced	7	College	First
6	79	M	Married	13	College	Last
7	64	M	Married	10	College	Last
8	79	F	Widow	12	College	Last
9	66	F	Widow	14	College	Last
10	75	M	Widow	7	College	First
11	68	F	Widow	12	College	First
12	77	F	Divorced	16	College	First
13	65	F	Widow	12	College	First
14	70	M	Divorced	10	College	First
15	77	F	Married	16	College	First
16	62	M	Married	14	College	Last
17	76	F	Divorced	12	College	Last
18	81	F	Single	16	College	Last
19	72	F	Widow	11	College	Last
20	66	M	Divorced	12	College	Last
21	73	M	Widow	8	Church	First
22	64	F	Married	16	Church	First
23	61	F	Widow	12	Church	First
24	65	F	Widow	12	Church	First
25	75	F	Married	10	Church	First
26	69	F	Divorced	12	Retirement Center	First
27	71	F	Widow	12	Retirement Center	First
28	78	F	Widow	10	Retirement Center	First
29	73	F	Widow	13	Retirement Center	First
30	75	F	Widow	8	Retirement Center	First
31	81	F	Widow	12	Retirement Center	First
32	80	F	Widow	7	Retirement Center	Last
33	71	F	Widow	12	Retirement Center	Last
34	69	F	Widow	10	Retirement Center	Last
35	72	F	Widow	8	Retirement Center	Last
36	84	F	Widow	14	Retirement Center	Last
37	68	F	Divorced	12	Retirement Center	Last
38	75	F	Widow	8	Retirement Center	Last
39	73	F	Widow	12	Retirement Center	Last
40	67	M	Married	12	Church	Last
41	65	F	Married	12	Church	Last
42	80	F	Widow	12	Church	Last
43	65	M	Married	12	Church	Last
44	65	F	Married	12	Church	Last
45	77	M	Married	8	Church	Last
46	76	F	Married	10	Church	First
47	62	F	Single	16	Church	First
48	74	F	Divorced	7	Church	Last
49	70	F	Married	9	Church	First
50	70	M	Married	14	Church	Last

APPENDIX H

INDIVIDUAL SUBJECT RANKS, SCORES
AND CORRELATIONS

Subject Number	Measure- ment	MMPALT II ELEMENTS										Total Score	Correl- ation				
		Print		Aural		Inter- active		Visual		Haptic				Kines- thetic		Olfac- tory	
		R	S	R	S	R	S	R	S	R	S			R	S	R	S
1	PMPS	2	(14)	5	(6)	1	(15)	6	(-15)	4	(8)	3	(9)	7	(-26)	(11)	.45
	MMPALT	3.5	(2)	6	(0)	1	(5)	2	(3)	3.5	(2)	6	(0)	6	(0)	(12)	
2	PMPS	6	(-14)	5	(-8)	2	(14)	4	(-5)	1	(29)	3	(11)	7	(-22)	(5)	.29
	MMPALT	4	(2)	7	(0)	2	(4)	1	(8)	5.5	(1)	3	(3)	5.5	(1)	(19)	
3	PMPS	2	(13)	3.5	(8)	5	(-4)	1	(17)	7	(-18)	3.5	(8)	6	(-16)	(8)	.83
	MMPALT	2	(3)	3.5	(2)	3.5	(2)	1	(5)	5.5	(1)	5.5	(1)	7	(0)	(14)	
4	PMPS	1	(33)	4	(6)	2	(16)	3	(7)	5	(-2)	6	(-15)	7	(-31)	(14)	.47
	MMPALT	4	(3)	1.5	(6)	4	(3)	1.5	(6)	6.5	(2)	4	(3)	6.5	(2)	(25)	
5	PMPS	7	(-7)	4.5	(0)	4.5	(0)	1	(15)	3	(1)	6	(-4)	2	(4)	(9)	.59
	MMPALT	6	(0)	4	(3)	2.5	(4)	1	(7)	2.5	(4)	6	(0)	6	(0)	(18)	
6	PMPS	3	(6)	5	(-4)	3	(6)	1	(7)	6.5	(-8)	3	(6)	6.5	(-8)	(5)	.46
	MMPALT	6.5	(1)	3.5	(4)	2	(6)	1	(7)	3.5	(4)	5	(2)	6.5	(1)	(25)	
7	PMPS	5.5	(0)	3.5	(4)	1	(8)	7	(-7)	5.5	(0)	3.5	(4)	2	(5)	(14)	-.66
	MMPALT	3	(3)	7	(1)	5.5	(2)	3	(3)	1	(5)	3	(3)	5.5	(2)	(19)	
8	PMPS	4	(4)	2	(13)	1	(18)	3	(5)	5	(-1)	6	(-7)	7	(-21)	(11)	.56
	MMPALT	1	(7)	2	(6)	4.5	(4)	3	(5)	6	(2)	4.5	(4)	7	(0)	(28)	
9	PMPS	1	(22)	2	(10)	4	(4)	3	(5)	5	(-2)	6	(-12)	7	(-19)	(8)	-.16
	MMPALT	7	(0)	3	(4)	4.5	(3)	1	(8)	6	(1)	2	(6)	4.5	(3)	(14)	
10	PMPS	6.5	(-4)	2	(6)	4	(3)	3	(4)	1	(12)	6.5	(-4)	5	(-2)	(15)	.67
	MMPALT	7	(0)	3	(5)	1	(7)	3	(5)	3	(5)	5	(4)	6	(2)	(28)	

Subject Number	Measurement	MMPALT II ELEMENTS										Total Score	Correlation				
		Print		Aural		Inter-active		Visual		Haptic				Kinesthetic		Olfactory	
		R	S	R	S	R	S	R	S	R	S			R	S	R	S
11	PMPS	6	(-6)	4	(0)	1	(10)	7	(-10)	3	(2)	5	(-4)	2	(9)	(7)	.05
	MMPALT	4	(4)	2.5	(5)	1	(7)	2.5	(5)	7	(0)	6	(1)	5	(2)	(24)	
12	PMPS	2	(6)	6	(-3)	4	(1)	5	(0)	1	(16)	7	(-4)	3	(4)	(20)	.53
	MMPALT	1.5	(5)	3.5	(4)	3.5	(4)	5.5	(2)	1.5	(5)	5.5	(2)	7	(1)	(23)	
13	PMPS	1	(14)	3.5	(5)	7	(1)	2	(7)	5.5	(2)	5.5	(2)	3.5	(5)	(36)	.24
	MMPALT	5	(4)	4	(5)	7	(2)	1	(8)	3	(6)	2	(7)	6	(3)	(35)	
14	PMPS	7	(-10)	4	(3)	1	(11)	2.5	(6)	2.5	(6)	5	(-1)	6	(-3)	(12)	.56
	MMPALT	4.5	(5)	3	(6)	1	(8)	2	(7)	6.5	(2)	4.5	(5)	6.5	(2)	(35)	
15	PMPS	2	(11)	6.5	(-4)	5	(-3)	1	(13)	3	(4)	4	(0)	6.5	(-4)	(17)	.28
	MMPALT	6	(3)	4.5	(4)	1	(7)	2.5	(5)	2.5	(5)	4.5	(4)	7	(0)	(28)	
16	PMPS	2	(8)	4	(6)	5	(-3)	1	(19)	3	(7)	6	(-7)	7	(-13)	(17)	.61
	MMPALT	3	(5)	2	(6)	7	(1)	1	(7)	5.5	(3)	4	(4)	5.5	(3)	(29)	
17	PMPS	1	(27)	4	(0)	3	(3)	2	(7)	5.5	(-4)	5.5	(-4)	7	(-28)	(1)	-.07
	MMPALT	4.5	(4)	2	(5)	2	(5)	7	(0)	4.5	(4)	2	(5)	6	(1)	(24)	
18	PMPS	2	(7)	4.5	(4)	7	(1)	3	(6)	4.5	(4)	1	(13)	6	(2)	(37)	.10
	MMPALT	1	(6)	2	(5)	3.5	(4)	5	(3)	3.5	(4)	7	(1)	6	(2)	(25)	
19	PMPS	2	(6)	4	(0)	6.5	(-12)	6.5	(-12)	3	(4)	5	(-2)	1	(10)	(-6)	-.17
	MMPALT	4	(4)	1.5	(5)	4	(4)	4	(4)	1.5	(5)	6	(3)	7	(1)	(26)	
20	PMPS	2	(4)	5	(-4)	7	(-7)	6	(-6)	1	(12)	4	(-3)	3	(0)	(-4)	-.74
	MMPALT	6	(3)	3	(5)	1	(8)	2	(6)	4	(4)	6	(3)	6	(3)	(32)	

Subject Number	Measurement	MMPALT II ELEMENTS										Total Score	Correlation				
		Print		Aural		Inter-active		Visual		Haptic				Kines-thetic		Olfac-tory	
		R	S	R	S	R	S	R	S	R	S			R	S	R	S
21	PMPS	4 (3)	3 (5)	2 (11)	1 (15)	5 (-2)	6 (-5)	7 (-8)	(19)	.63							
	MMPALT	3 (5)	6.5 (2)	1 (7)	2 (6)	4 (4)	6.5 (2)	5 (3)	(29)								
22	PMPS	1 (13)	2 (11)	5 (1)	3 (7)	6 (-5)	4 (5)	7 (-17)	(25)	.87							
	MMPALT	1 (8)	3.5 (3)	3.5 (3)	2 (5)	6.5 (1)	5 (2)	6.5 (1)	(23)								
23	PMPS	2 (8)	3 (6)	1 (10)	6.5 (-4)	4.5 (-2)	6.5 (-4)	4.5 (-2)	(12)	-.29							
	MMPALT	5.5 (3)	3 (4)	5.5 (3)	1 (6)	3 (4)	7 (2)	3 (4)	(26)								
24	PMPS	1 (17)	6 (-5)	3 (6)	2 (8)	4 (1)	5 (0)	7 (-15)	(12)	.76							
	MMPALT	2 (5)	7 (1)	3.5 (4)	1 (8)	6 (2)	3.5 (4)	5 (3)	(27)								
25	PMPS	1 (4)	4 (0)	4 (0)	2 (1)	4 (0)	7 (-8)	6 (-3)	(-6)	.60							
	MMPALT	3 (5)	5.5 (4)	1 (6)	3 (5)	3 (5)	5.5 (4)	7 (0)	(29)								
26	PMPS	2 (20)	3 (13)	4 (3)	5 (-11)	6.5 (-31)	1 (34)	6.5 (-31)	(-3)	.52							
	MMPALT	4 (2)	2.5 (3)	5.5 (1)	1 (8)	5.5 (1)	2.5 (3)	7 (0)	(18)								
27	PMPS	2 (22)	5.5 (-4)	3.5 (-3)	3.5 (-3)	5.5 (-4)	1 (29)	7 (-15)	(22)	.06							
	MMPALT	2 (7)	3 (6)	4 (4)	1 (9)	5.5 (2)	7 (1)	5.5 (2)	(31)								
28	PMPS	1.5 (11)	5.5 (6)	1.5 (11)	4 (7)	5.5 (6)	3 (9)	7 (-17)	(33)	.03							
	MMPALT	2.5 (1)	5.5 (0)	5.5 (0)	2.5 (1)	1 (2)	5.5 (0)	5.5 (0)	(4)								
29	PMPS	1 (16)	3 (6)	2 (9)	6 (-7)	4 (5)	7 (-20)	5 (-6)	(14)	-.07							
	MMPALT	5 (1)	5 (1)	3 (2)	1 (5)	2 (3)	5 (1)	7 (0)	(13)								
30	PMPS	5 (2)	7 (-3)	6 (-1)	4 (6)	3 (7)	2 (8)	1 (14)	(33)	-.24							
	MMPALT	5.5 (1)	3 (2)	1 (3)	7 (0)	3 (2)	5.5 (1)	3 (2)	(11)								

Subject Number	Measurement	MMPALT II ELEMENTS												Total Score	Correlation		
		Print		Aural		Inter-active		Visual		Haptic		Kinesthetic				Olfactory	
		R	S	R	S	R	S	R	S	R	S	R	S			R	S
31	PMPS	1	(27)	2	(10)	3.5	(6)	6	(-7)	3.5	(0)	5	(4)	7	(-32)	(12)	-.20
	MMPALT	7	(0)	5	(1)	2.5	(2)	5	(1)	1	(3)	2.5	(2)	5	(1)	(10)	
32	PMPS	1	(22)	4.5	(1)	6	(-2)	4.5	(1)	2	(10)	3	(12)	7	(-12)	(38)	-.41
	MMPALT	6	(0)	6	(0)	1	(4)	3.5	(2)	2	(3)	6	(0)	3.5	(2)	(11)	
33	PMPS	1	(25)	6	(-12)	2.5	(7)	2.5	(7)	7	(-14)	4	(-2)	5	(-4)	(7)	.13
	MMPALT	4	(2)	1	(4)	4	(2)	1	(7)	4	(2)	6	(1)	7	(0)	(18)	
34	PMPS	1	(20)	3	(6)	5.5	(-4)	4	(0)	5.5	(-4)	2	(12)	7	(-25)	(5)	-.39
	MMPALT	7	(0)	5	(1)	1.5	(3)	5	(1)	5	(1)	1.5	(3)	3	(2)	(10)	
35	PMPS	5	(3)	3	(10)	1	(14)	6	(-2)	4	(9)	2	(12)	7	(-6)	(40)	.68
	MMPALT	5.5	(0)	5.5	(0)	1.5	(2)	5.5	(0)	1.5	(2)	3	(1)	5.5	(0)	(5)	
36	PMPS	1	(25)	2	(15)	3	(8)	4	(-10)	5	(-15)	6	(-17)	7	(-18)	(12)	.53
	MMPALT	3.5	(1)	1.5	(2)	6	(0)	1.5	(2)	3.5	(1)	6	(0)	6	(0)	(6)	
37	PMPS	4	(6)	2	(11)	3	(10)	1	(14)	6	(-20)	5	(-3)	7	(-29)	(-11)	.76
	MMPALT	2	(4)	4.5	(2)	3	(3)	1	(5)	4.5	(2)	6	(1)	7	(0)	(17)	
38	PMPS	4	(3)	3	(6)	6	(-5)	1	(10)	2	(9)	5	(-1)	7	(-13)	(9)	.17
	MMPALT	1	(3)	6	(0)	2	(2)	3.5	(1)	3.5	(1)	6	(0)	6	(0)	(7)	
39	PMPS	4	(4)	3	(8)	5	(-3)	2	(13)	7	(-32)	1	(21)	6	(-31)	(-20)	.06
	MMPALT	7	(0)	3	(2)	3	(2)	1	(4)	3	(2)	5.5	(1)	5.5	(1)	(12)	
40	PMPS	5.5	(-2)	7	(-6)	2.5	(4)	2.5	(4)	4	(0)	5.5	(-2)	1	(12)	(10)	.17
	MMPALT	2.5	(5)	4.5	(3)	2.5	(5)	1	(6)	4.5	(3)	7	(1)	6	(2)	(25)	

Subject Number	Measurement	MMPALT II ELEMENTS								Total Score	Correlation						
		Print		Aural		Inter-active		Visual				Haptic		Kines-thetic		Olfac-tory	
		R*	S	R	S	R	S	R	S			R	S	R	S	R	S
41	PMPS	1	(19)	5	(-2)	2	(9)	3	(8)	6	(-15)	4	(7)	7	(-22)	(4)	.76
	MMPALT	2.5	(5)	4.5	(3)	2.5	(5)	1	(8)	4.5	(3)	6	(2)	7	(1)	(27)	
42	PMPS	4	(3)	2	(9)	4	(3)	6	(2)	4	(3)	1	(13)	7	(-26)	(7)	.40
	MMPALT	4.5	(2)	3	(3)	1.5	(4)	1.5	(4)	6	(1)	7	(0)	4.5	(2)	(16)	
43	PMPS	6	(-14)	2	(13)	3	(3)	4	(1)	1	(21)	5	(-1)	7	(-29)	(-6)	.85
	MMPALT	4.5	(3)	2	(5)	4.5	(3)	3	(4)	1	(8)	6.5	(2)	6.5	(2)	(27)	
44	PMPS	2	(6)	5.5	(0)	5.5	(0)	4	(3)	3	(4)	1	(12)	7	(-20)	(5)	.82
	MMPALT	2	(6)	3	(3)	6.5	(1)	4.5	(2)	4.5	(2)	1	(7)	6.5	(1)	(22)	
45	PMPS	3	(4)	5	(-2)	1	(8)	6	(-4)	4	(0)	2	(6)	7	(-12)	(0)	.13
	MMPALT	4.5	(2)	3	(3)	2	(4)	1	(7)	4.5	(2)	6	(1)	7	(0)	(19)	
46	PMPS	1	(8)	3.5	(5)	5.5	(2)	2	(7)	3.5	(5)	5.5	(2)	7	(-14)	(-15)	.70
	MMPALT	1	(5)	5.5	(1)	3	(3)	2	(4)	5.5	(1)	4	(2)	7	(0)	(16)	
47	PMPS	1	(14)	5	(2)	4	(5)	3	(8)	2	(11)	6	(-14)	7	(-24)	(2)	.71
	MMPALT	2	(6)	4	(4)	3	(5)	1	(9)	5	(3)	6	(2)	7	(1)	(30)	
48	PMPS	1	(8)	7	(-8)	2.5	(7)	4	(3)	5	(1)	2.5	(7)	6	(-6)	(12)	.39
	MMPALT	3.5	(3)	3.5	(3)	1	(6)	2	(4)	6.5	(1)	5	(2)	6.5	(1)	(20)	
49	PMPS	4	(1)	3	(6)	1	(26)	2	(17)	5	(-1)	6	(-13)	7	(-26)	(10)	.80
	MMPALT	6.5	(0)	3	(5)	1.5	(6)	1.5	(6)	5	(1)	4	(2)	6.5	(0)	(20)	
50	PMPS	1	(30)	2	(14)	4	(4)	3	(10)	5	(-5)	6	(-9)	7	(-31)	(13)	.96
	MMPALT	1	(7)	2	(4)	4	(2)	3	(3)	6	(1)	6	(1)	6	(1)	(19)	

VITA

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Doctor of Education

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IN OLDER ADULTS

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