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Mobility as an Element of Learning Styles: The Effect its Inclusion or Exculsion has on Student Performance in the Standardized Testing Environment

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MOBILITY AS AN ELEMENT OF LEARNING STYLES:
THE EFFECT ITS INCLUSION OR EXCLUSION HAS ON
STUDENT PERFORMANCE IN THE
STANDARDIZED TESTING ENVIRONMENT

by


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Abstract

The purpose of this study was to investigate the relationship between mobility and the standardized testing environment. The project focused on nine students who had a pronounced need for movement while learning and/or being tested. The study was conducted to determine whether the achievement scores of these nine students would be influenced by the denial or availability of movement while they were administered a standardized reading test. Twenty-one second grade students were the subjects. Two forms of Level B of the Gates-MacGinitie Reading Test were used. All subjects were tested in a traditional environment with no movement allowed. The same subjects were then tested at a later time in a mobile environment with movement and change of location permitted. The Wilcoxon Matched-Pairs Signed-Rank Test was used as the statistical base. Results showed a .05 significance. Of the nine mobile students, six scored equally as well or better when placed in a mobile testing environment.

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gratitude. Mr. Leslie's support, encouragement, and thoughtfulness will be long remembered with a special fondness and appreciation.

This project is dedicated to my son Michael. It was through my observations of him as a test subject three years ago that I first became interested in the subject of mobility. That interest has never waned, but has only been enhanced due to the brevity of research in this area. It is my hope that this thesis will serve as a source of enlightenment and insight as other researchers in the future explore the question of mobility and the implications it offers for the educators of tomorrow.

Table of Contents

	Page
Abstract	i
Acknowledgements	ii
Chapter	
I. INTRODUCTION	1
Definition of learning styles	4
Significance and perspective of Dunn and Dunn	6
Purpose	10
Chapter	
II. REVIEW OF RELATED LITERATURE	12
Learning styles research and reading	16
Mobility and the underachieving reader	20
Mobility and self-concept	21
Learning styles findings and the future	22
Mobility as a need of varying degrees	23
Mobility and achievement results	28
Chapter	
III. STATEMENT OF PROCEDURES	33
Introduction and purpose	33
Subjects and setting of the study	33
Initiation of the project	34
Identification of the mobile students	35
Administration of the reading test	36
Chapter	
IV. RESULTS AND CONCLUSIONS	38
Chapter	
V. RECOMMENDATIONS FOR FUTURE STUDY	43

INTRODUCTION

For thousands of years educators have been making assumptions about the learning styles of their students. It would seem that many early teachers felt that they faced a class of auditory learners since they adopted a lecture mode of presenting their views and sharing their wisdom.

A few decades ago tactile materials suddenly increased in popularity and educators felt pleased that they were more clearly addressing the needs of the student who needed to touch and feel in order to learn. Today the bright colors, rapid movements, and large letters on the Sesame Street television program are geared to the visual learner.

Even children presume to know the learning styles of their peers or siblings. The little girl who is playing "teacher" lines up her dolls in their chairs and writes the alphabet on her blackboard. She is hypothesizing that her "class" is composed of visual learners who need an environment with a formal design.

Perhaps a young boy who is constructing a model ship is becoming more and more confused. He goes to his older brother who quickly surmises that the youngster's main difficulty lies in his inability to master the visual instructions. The older brother takes the small hands and fingers of his sibling and

gently leads him through the next steps of the manipulative processes required. This older brother/teacher deduced that his "student" must need the tactile or the experiential approach to learning.

Through the years teen-agers have felt the need to master the steps in the latest dance that has become popular. It is quite natural to see two teen-age girls struggling to learn these steps by repetitive practices with each other. While no one watches, the two close friends begin the record and gradually help each other to master the patterns of the dance. Each teen is assuming that her best friend is a kinesthetic learner -- that she learns best and most easily by actually doing, by performing the task involved.

Another illustration of our perceptions concerning learning styles may be embodied in the relationship of mother and young child. The mother eagerly points to common objects and says the appropriate word. She is making the assumption that with repetition her child will learn through his auditory and visual modes and will gradually increase his vocabulary.

In infancy, of course, the youngster's choices of channels are limited. However, as he matures his mother/first teacher will observe him closely as he learns and she will make decisions, perhaps subconsciously, which will lead her interaction with him in a definite direction -- one in which his learning strengths are

used optimally. Hopefully, as her child grows she will gear her activities with him in such a way that maximizes his particular and unique strengths -- whether they be visual, auditory, kinesthetic, or tactile.

From these examples we can see that learning styles and the assumptions we make about them have been a part of the educational world and the everyday world for quite a long time. Our learning styles are uniquely our own and contribute to the evolution of our being -- of our becoming a mature and ever-changing individual. Our learning styles reflect and celebrate our uniqueness as a people.

Even though learning styles may be thought of in common, everyday terms and examples such as the ones just offered, there needs to be a more detailed explanation of learning styles and their implications. A more comprehensive examination seems appropriate if educators are to maximize the benefits that might be gained through the acknowledgement and manipulation of differing learning styles in our classrooms.

As with most concepts that are by nature somewhat abstract, the researcher can easily find definitions which vary greatly and which demonstrate wide, and at times, startlingly different perceptions. However, it is clear that the interest and research centering around learning styles have grown quickly and dramatically

in recent years. Keefe (1982) makes the following observation:

School programs and research in learning styles and brain behavior have mushroomed in the past decade. Concepts discussed only by clinical psychologists and neuroscientists a few years ago are now the focus of major efforts to better understand learning and to improve schools. (p. v.)

Of course, this acceleration of interest in learning styles has been most evident in the relatively large number of educators and researchers who saw in this "new" field opportunities for exciting and innovative projects and conclusions. It naturally followed that each of these individuals or teams of researchers brought their own unique perspectives to the meaning and implications of learning styles.

DEFINITION OF LEARNING STYLES

Finding consistencies in these perspectives might be a logical starting point in our perusal of differing definitions of learning styles. Two researchers who share similar viewpoints are Keefe (1982) and Gregorc (1979). Keefe (1982) states that "learning styles are characteristic cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (p. 44).

In their definitions both Keefe and Gregorc include the

learner's traits or characteristics, and both mention the learner's environment as part of the total picture of learning styles.

Gregorc (1979) contributes his viewpoint in this way: "Learning style consists of distinctive, observable behaviors that provide clues to the functioning of people's minds and how they relate to the world" (p. 234).

The three additional definitions which follow concentrate on the origin of learning styles. The viewpoint of Schmeck, Ribich, and Ramaniah (as cited in Dunn, DeBello, Brennan, Krinsky, and Murrain, 1981) is stated in this way: "Learning style is the product of the organization of a group of information processing activities that individuals prefer to engage in when confronted with a learning task" (p. 374).

This idea of how students develop their learning styles is expressed similarly by Kolb (as cited in Dunn, et al., 1981) in these words: "Learning style is a result of hereditary equipment, past experience, and the demands of the present environment" (p. 375).

The final viewpoint structured in this way is found in the words of Canfield and Lafferty (as cited in Dunn, et al., 1981). In considering the origin of learning styles these two researchers reach the following conclusion: "Individual learning style is derived from academic conditions, structural conditions, achievement

conditions, content, mode of preferred learning, and expectation of performance level" (p. 374).

As different researchers continue to explore the dimensions and aspects of learning styles, there is a tendency for the terminology to become rather complex. To serve as an example, Kolb (as cited in Dunn, et al., 1981) categorizes his four basic learning styles as "Concrete Experience", "Reflective Observation", "Abstract Conceptualization", and "Active Experimentation" (p. 375). Fischer and Fischer (1979) are equally creative and complex in their terms with contributions such as "the eclectic learner", "the sensory specialist", "the sensory generalist", "the intuitive learner", and finally "the incremental learner" (pp. 246-250).

SIGNIFICANCE AND PERSPECTIVE OF DUNN AND DUNN

Because the topic of learning styles has generated such enthusiastic interest and popularity in the past decade, an investigation of this topic could easily include a myriad of definitions and viewpoints. However, the work by one team of researchers seems significant in the literature. It is the perspective of Dunn and Dunn that will serve to direct this project. Their contributions over the past fifteen years and the practicality evident in their approach make their conceptual framework useful to researchers.

Like all researchers the Dunns have composed a definition

of learning styles which reflects their own perspective and points out the aspects of the topic which seem particularly important to them. Dunn (1983b) contributes the following viewpoint:

Basically, learning style is the way individuals concentrate on, absorb, and retain new or difficult information or skills. It is not the materials, methods, or strategies that people use to learn; those are the resources that complement each person's style. Style comprises a combination of environmental, emotional, sociological, physical, and psychological elements that permit individuals to receive, store, and use knowledge.

(pp. 496-497)

Dunn emphasizes that the elements which are present or absent, predominant or slight, in an individual student's learning style are the crucial determiners of how that student is empowered to assimilate knowledge, understand new concepts, or master new skills. This same configuration of elements helps the student to retain the newly acquired knowledge. And, perhaps most importantly, it is within the specific confines or boundaries set by these elements that the student actually uses the knowledge.

Because the field of education has given increasing credibility to the concept of learning styles within the past decade, there is

now both acknowledgement of and appreciation for the great variances in how students approach the learning task. Clearly learning style is also a mirror which ultimately reflects how students use the knowledge they have gained.

How, then, do students show that they have acquired new skills and can use them? For many years they have been placed in some type of situation which demands a demonstration of their expertise. Perhaps the student of the ancient world used his voice to show his mastery of a particular subject. Perhaps a different student used his stylus to mark on wet clay and thereby represent his unique skills. In contrast, the modern student may prove his proficiency by punching the keys of a computer. The ways in which learners have proven their use of knowledge are varied.

However, there is a glaring gap in how educators treat or view the student and/or the learning process. If we clearly and firmly accept the premise that students learn in different ways and use their knowledge differently and if we, therefore, employ some kind of testing device which calculates or measures this knowledge, then we must question how testing students in similar ways makes logical sense.

In today's classrooms large groups of students are placed in a single environment and are given identical instructions and identical materials such as paper and pencil with which to work.

If there is a strong affirmation of the differences in these students, then we cannot presume that such test results or scores will be accurate.

In a single elementary classroom differences among individual students are clearly seen. Some students feel more secure while sitting erectly at a desk during testing while others would relish having the opportunity to lie down on a soft carpeting during the testing period. Certain students may perform better on tests if soft music is a part of the testing environment while their classmates may prefer total silence.

A particularly human aspect of learning style is "intake". Some individuals may be happier, more relaxed, and subsequently perform with increased proficiency when they have snack foods available for munching. The reverse, of course, is true in the fact that nibbling on food might prove to be very distracting for other students within the same classroom.

If opportunities for differing physical postures were included in the testing environment, the test scores might be more accurate. If students had the opportunity to listen to soft music or munch on snacks while being tested, the achievement levels might reflect more clearly the actual skills or potential for learning possessed by the students being tested.

Because the differences among learners are so pervasive,

educators should go beyond simply acknowledging the existence of these variances. In the future it seems that there must be a clear, aggressive movement toward addressing the issue of learning differences within the arena of testing if we are to give great importance to the assessment value of the scores produced. This becomes particularly vital in the specific context of standardized testing because of the growing importance of standardized test scores in an extremely competitive academic environment.

While the issue of standardized testing has been explored for many years, the issue of learning styles, as stated previously, is relatively new as a topic of interest and research within the academic segment of the educational field. Moreover, at this time the linking of learning styles and the standardized testing environment as a topic of study is extremely rare. The question of what results are evident when learning styles are acknowledged and incorporated into the standardized testing environment remains unanswered, for the most part.

PURPOSE

This study will address the relationship of learning styles and the standardized testing environment and will focus primarily on the effect of mobility -- the need to move about within the physical setting, to change locations while learning or being

tested. Because most young students in the primary grades are naturally active in the physical sense, mobility is a particularly important force to consider when structuring the appropriate testing environment.

The project will answer the specific question: Will the scores of those students who demonstrate a need for mobility as measured by the Learning Style Inventory - Primary Version or who are identified as mobile by the classroom teacher be significantly higher when mobility is allowed during the administration of a portion of the Gates-MacGinitie Reading Test as compared to the scores of those same students who demonstrate a need for mobility as measured by the Learning Styles Inventory - Primary Version or who are identified as mobile by the classroom teacher when they are not permitted mobility during the administration of a portion of the Gates-MacGinitie Reading Test?

REVIEW OF RELATED LITERATURE

Dunn and Dunn (1978, 1979, 1982, 1983a), like many other researchers, have spent many years identifying the factors which affect learning styles. Through extensive research programs and projects they first isolated and identified eighteen elements that affect learners. While no learner is influenced by all the elements, specific elements which evoke strong likes or dislikes in the student's attitudes can characterize his or her learning style.

Dunn and Dunn (1978) categorized their eighteen elements of learning style into four distinct subheadings. In the area of "immediate environment" are found the elements of sound, light, temperature, and design of the classroom setting. The subheading of the student's "own emotionality" includes the elements of motivation, persistence, responsibility, and structure. The "sociological needs" subheading describes how the learner relates to others and his social preferences for learning such as by himself, in pairs, in a team, with adults, or in varied settings. The fourth subheading is called "physical needs" and includes the important element of perceptual strength.

In this latter category which deals with the predominant learning mode, the student is identified as a person whose learning style can be primarily visual, auditory, tactile, or kinesthetic.

In addition to this element of perceptual strength are included the elements of "intake" which may be necessary for learning, preferred time of day for learning, and the need for mobility.

For several years Dunn and Dunn ended their series of four subheadings and eighteen elements with those just mentioned above. However, recent research has focused on the ways in which our brains operate and function. Therefore, in the early 1980's Dunn and Dunn added a fifth subheading which they labeled as "psychological" and within which they chose to include three elements which refer to the workings of the brain.

The first of these three additional elements is expressed in the phrase "analytical vs. global". Dunn (1982) explains that the child who is analytical has a thought process which centers on the sequential development of ideas. This student attempts to acquire new skills in a detailed, step-by-step fashion. The global learner, however, thinks in terms of a general overview of a new topic and only thinks of details at a later time.

The next element that Dunn and Dunn (1982) added is termed "cerebral type of dominance". This element focuses on the idea that a student's brain is divided into two sides or hemispheres and that one side or hemisphere may be used more extensively than the other. As a result of the emergence of this new concept of hemispheric preference, a graphic educational term has evolved. Now a learner may be classified as "Right-brained" or "Left-brained".

Dunn (1982) states in very general terms that the "Right-brained" students may be unmotivated, may not be persistent, are usually not bothered by sound, may enjoy social contact with others, may prefer tactual learning, and usually prefer to move around while learning. The "Left-brained" students may be more ideal in the perceptions of some teachers because they are the pupils who generally are obedient, calm, controlled, are able to sit still for fairly long periods of time, usually prefer silence, are more comfortable learning via verbal instructions, are generally motivated and persistent.

The final factor added to the set of elements is labeled by Dunn and Dunn (1982) as "impulsive vs. reflective". The two adjectives give a good clue as to the contrasts shown in the thinking processes and subsequent behavior of these two very different types of students. The impulsive thinker makes decisions and reaches conclusions quickly and without much deliberation. This type of student typically calls out answers before the teacher can complete the question. Conversely, the reflective pupil ponders and thinks in depth about the issue at hand and rarely volunteers any answers in class even though he may know the correct response.

The findings of the brain-related research projects have made an important contribution in our attempt to view the learner in as comprehensive and thorough a perspective as possible. This final

subheading gives an added dimension to the total picture of those factors in the world and within ourselves which affect the way in which we set out to learn new ideas and acquire new skills.

The interest in learning styles has increased dramatically since Dunn and Dunn (1972) and other researchers began their investigations in the early 1970's. With this increased interest has come a growing number of research projects which have displayed more sophistication and complexity as time has gone on. However, the different elements of learning style as identified by Dunn and Dunn have received varying degrees of emphasis as topics of research.

The element of mobility seems like a middle child in the field. To researchers this particular component of learning style does not seem to have the importance of perceptual strengths (visual vs. auditory, for example) or the drama and complexity of the brain research which has gained importance in the last 10-15 years.

Nevertheless, mobility is important to average classroom teachers. The need for this element is not only graphically displayed by some of their students, but also, if this need is not addressed in some meaningful way, teachers are frequently faced with a loss of attention and discipline problems.

However, the most important reason for considering mobility is that in traditional classrooms which still dominate American

education this need is usually not even acknowledged. Children are simply told to "sit down and quit fidgeting." Nevertheless, when the need for mobility is acknowledged, accepted, and dealt with creatively, the student often makes substantial gains in measures of his learning and makes higher scores in testing (Della Valle, as cited in Dunn, 1984). The denial of this need for movement can inhibit performance in both areas.

Because perceptual strengths are such a crucial part of learning styles research, mobility will be related to what has already been studied in this area. Recent research (Dunn, Dunn, and Price, 1979) indicates that mobility is becoming increasingly important as a component of how students learn to read. Moreover, research (Carbo, 1983) suggests that mobility is particularly important when the learning of young children is examined. Therefore, the following discussion will focus on how mobility relates to the specific perceptual strengths of individual learners.

LEARNING STYLES RESEARCH AND READING

In the past, and even today, the phonics approach is fundamental in teaching beginning readers. While the dominance of phonetic methods might have waned, their importance has been consistent and their credibility assumed. However, the implementation of these phonics approaches made the crucial

presumption that most young children were auditory learners.

For many years American basal readers have been filled with drills and activities that were geared to the assumed strength the child possessed in discriminating between the sounds of the letters. The child also supposedly had the ability to reproduce the sounds just presented and blend the sounds together to finally "figure out" the new word.

One may ask how these assumptions relate to recent findings in learning styles research. In the late 1970's as the popularity and credibility of research into learning styles were becoming more established, questions were raised regarding whether the old assumptions about perceptual strengths were really true. Researchers recognized that, at the very least, this topic needed more exploration since many past studies had examined only how the visual and auditory modalities functioned in reference to each other. Therefore, presumptions had been made that a child had to be either a visual or an auditory learner without the possibility of the existence of tactile or kinesthetic predominance. In fact, Keefe (1979) reached the conclusion that "perceptual preference seems to evolve for most students from psychomotor (tactile/kinesthetic) to visual and aural as the learner matures" (p. 127).

At the same time that Keefe made this pronouncement, Price

(1980) had tested 3,972 students ranging from the third grade through the seventh grade. Price used the Learning Styles Inventory, a device developed by himself and Dunn and Dunn to ascertain the strengths and weaknesses of specific learning style elements in individual students. His study verified Keefe's findings. Price confirmed that the younger the child is, the greater the tendency to be tactual and kinesthetic in approaching learning tasks. Visual strengths are developed as the student matures, and auditory strengths are not developed until the child reaches fifth or sixth grade.

One primary focus of Carbo's (1980) work was not which perceptual strength was more prevalent than another, but rather whether a child who was taught reading according to his strongest perceptual mode would learn more, learn more easily, and retain more of the learned skill. Her findings were significant and consistent. Her study demonstrated that if a child's perceptual strength were the determining factor in the reading approach used, then that child would benefit greatly in all the areas of learning to read.

Carbo (1982) later studied 293 students in the second, fourth, sixth, and eighth grades who were given the Reading Style Inventory, an instrument she had developed herself. She found that the second graders demonstrated the greatest inclination

for tactual preference, while the second and fourth graders preferred kinesthetic stimuli significantly more than the older students. Carbo also found that the second graders had significantly less auditory strength and less visual strength than the other three groups.

Lemmon (1985) describes the implementation of a program centered on learning styles in her school. She states that when the teachers first began to determine the learning styles of their students, they were amazed to find how few of their pupils were auditory learners. The other surprising patterns to emerge was that many of the children were designated as either tactual or kinesthetic learners according to the learning styles testing.

The learning approach used by the kinesthetic student may be linked to mobility. In their investigation of perceptual strengths, Price, Dunn, and Dunn (1979) found that "kinesthetic learners appear to be in need of frequent mobility; they find it difficult to 'sit' and, of course, to 'listen' for substantial amounts of time" (p. 53). Furthermore, their research indicated that "the majority of the students tested are not auditory learners, results which certainly do not support the widespread use of the 'lecture' method" (p. 53).

Mobility as an element of learning style can, therefore, be closely related to the element of perceptual strength. This

relationship is perhaps most important in the consideration of young learners for it is these beginners in school who are most likely to have tactual and/or kinesthetic strengths (Price, 1980 and Carbo, 1982). In giving opportunities for movement and more use of the whole body, these strengths would be enhanced and allowed to flourish, rather than being inhibited by the denial of the physical aspects of learning which are so important to young children.

MOBILITY AND THE UNDERACHIEVING READER

While it seems clear that young students have a greater need for mobility, research also indicates that there is another type of learner who has a pronounced need for movement. Price, Dunn, and Sanders (1981) undertook a project with 85 elementary school children as the subjects. These students were in the third through the eighth grades and were already classified as either high reading achievers or as low reading achievers. The three researchers set out to determine whether members of each group did or did not share common learning style elements. They found that the high achievers were persistent; they could stay "on task" for quite a long time; and they required virtually no mobility while learning. The poor readers, on the other hand, did require mobility and demonstrated reduced persistence. Another set of characteristics which differentiated the groups

was that the good readers did not prefer to learn through their tactile or kinesthetic senses, while the poor readers had a definite preference for these two sensory modes.

Carbo (1983) was also interested in the correlation, if any, between specific learning style elements and reading achievement. When she conducted her study of the 293 students in the second, fourth, sixth, or eighth grades, she also included the testing of learners as characterized not only by their predominant perceptual strength, but also by the level of their reading ability. She states:

The 293 students in the RSI study were classified according to reading level and differed significantly on 10 reading style elements. On the elements of perception, intake, and mobility the reading styles of poor readers were quite similar to those of the second graders. The poor readers demonstrated significantly less visual and auditory strength, higher preferences for tactual-kinesthetic stimuli, and a greater need for mobility. (p. 130)

MOBILITY AND SELF-CONCEPT

There is a third type of student who has a pronounced need for mobility. The importance of mobility varies when two types of students are considered: students with high self-concept (i.e. students who are confident and self-assured) and students

with low self-concept (i.e. students who are hesitant and who lack confidence in themselves). Subjects in a 1981 study conducted by Griggs and Price consisted of 170 junior high students from a predominantly white, upper-middle class, suburban New York school district. Conclusions from the study centered on the fact that students with high self-concepts had little need for mobility while those students experiencing diminished self-esteem needed more frequent "breaks" and required more movement during tasks.

Earlier Price (1979) had also collaborated with Sanders, Dunn, and Dunn to investigate the same question. Their findings were identical to the Griggs and Price study in that the need for mobility was clearly evident in those students who also displayed feelings of low self-esteem.

Therefore, the need for mobility is seen most clearly in three types of students. The opportunity for movement is important to young children who are likely to have tactile and/or kinesthetic perceptual strengths and the younger the child, the greater the need for mobility. The opportunity for movement also seems more critical for low-achieving readers and students with low self-concepts.

LEARNING STYLES FINDINGS AND THE FUTURE

Planners of future educational environments may likely

acknowledge the importance of these new findings in the field of learning styles. Moreover, they may plan creatively so that individual needs may be addressed more directly in terms of preferred time of day, classroom design, lighting, preferred perceptual strength, need for intake, social preferences, and need for mobility.

Based on research it would seem that tomorrow's classrooms should not merely continue to be geared to old ideas, but should change to accommodate new ways of teaching which will hopefully mean success rather than failure for more students. With the introduction of materials and approaches which are geared more accurately to the perceptual strengths of students and other needs such as mobility will likely come more meaningful learning experiences. These new approaches may ultimately break the cycle of inappropriate teaching methods leading to poor achievement levels which yield low self-esteem.

MOBILITY AS A NEED OF VARYING DEGREES

Just as future educational programs may deal more innovatively with needs that are becoming more clearly defined through research, the need for movement can be clearly seen in contemporary classrooms. Mobility is now, has been, and probably always will be a part of the total perspective in considering some students. Yet the extent of the need for physical movement is varied. Some

students may find it natural to sit for fairly long periods of time, while some of their classmates who are the same age may consider it very restrictive and frustrating to have movement prohibited, even for short time intervals.

Educators may ask what causes one student to be restless and physically active while his classmate is sitting still and quietly working to complete the assigned task. Brain research may provide part of the answer. In fact, according to Thies (1979) the brain itself may be the final answer.

Mobility may be either an attempt to increase cortical tone or a reflection of an aroused cortex. These two explanations parallel the complementary theories for organically-based hyperactivity. The 'under-aroused' theories hypothesize that hyperactive children are extremely active in order to excite a chronically under-aroused nervous system. Alternatively, the 'over-aroused' theories postulate that hyperactivity represents excessive reaction to stimulation by a chronically oversensitive nervous system. In either case, mobility is the result. (p. 58)

In 1983 Thies corroborated the conclusions he had reached in his 1979 study. Stating his findings in a more contemporary way, he concluded that learning style is not so much a learned

function, but rather is a reflection of how a person's nervous system is organized.

The attitude of Thies is shared by Eysenck (as cited in Schmeck and Lockhart, 1983) as he "places great emphasis on the assumption that there are inherited differences between people in the ways their nervous systems function" (p. 54). Eysenck continues his explanation by differentiating between "introverts" and "extraverts". He states that "introverts are assumed to have such weak neural inhibition that stimulation of the senses easily prompts activity in the brain, while extraverts have strong neural inhibition, which makes it more difficult for sensory stimulation to activate the brain" (p. 54).

By 1983 Schmeck and Lockhart had concluded that each individual has a nervous system which is programmed to function in a particular way. Stimulating environments are required for some students while others need a quiet, peaceful environment. Schmeck and Lockhart express the view that many times extraverted students seek out situations that disrupt the classroom. However, these students, who are sometimes mistakenly labeled hyperactive, pursue these overt activities so that messages will be sent to their brains. Their brains would be understimulated without the activities. A clear contrast is provided by the introverted students. They may seem ideal to classroom teachers because

these individuals are usually found sitting quietly and are not the instigators of situations which ultimately become problems for the teachers.

In the field of brain research there seem to be two dominant schools of thought as to the reason for the great variances in the need for mobility. As just stated, researchers such as Thies (1979, 1983), Eysenck (1983), and Schmeck and Lockhart (1983) believe that the nervous systems of individuals are the key in that these systems reflect varying needs for stimulation. As a result, the extraverted students with a nervous system which needs stimulation to a great degree may feel compelled to create or search for situations which will provide that needed stimulation. Conversely, the introverted student has a nervous system which is easily stimulated, and, therefore, this learner prefers a quiet, calm atmosphere.

However, this theory focusing on individual nervous systems is only one of the dominant schools of thought. There is a second theory which may, to some researchers, seem to provide a more definitive perspective to the issue of mobility. This second theory has evolved because of the work done in the area of cerebral dominance or hemispheric preference. This field of research, as stated earlier in this section, focuses on the concept that not only is the brain divided into two separate

parts or hemispheres, but also that some learners use one part of their brains much more extensively than the other. Due to this hemispheric perspective, the terms "Right-brained" and "Left-brained" have been created and appear frequently in the literature.

Dunn (1981) acknowledged the importance of this theory as it relates to learning styles: "Hemispheric preference, or cerebral dominance, is a newly recognized element of learning style. During the past few years, we have learned that students who use their left brain more than their right brain learn in extremely different ways than those who do the reverse" (p. 33).

Zenhausern (1982) characterizes the child who is a "Right" as a person who is impulsive, meaning that he acts quickly or answers questions quickly with a minimum of thought. This child is also likely to have an outgoing, aggressive personality. Zenhausern continues, however, by identifying the child who is a "Left" as one who will likely be perceived by the teacher as the perfect student because he is calm, obedient, and controlled. This student also tends to be reflective, meaning that he usually thinks and considers options before acting or answering.

Zenhausern, Dunn, Cavanaugh, and Eberle (1982) used the Learning Styles Inventory and Zenhausern's Hemispheric Activation Test while studying a group of high school biology students. Their goal was to determine the learning preferences of the

students who were strongly "Right-brained" or strongly "Left-brained." They found that the "Right-brained" biology students had strong preferences for an environment which allowed them to sprawl or lie down comfortably while studying. They preferred music rather than silence. Most important to this project, the researchers also found that the "Right-brained" students needed frequent "breaks" and chances for movement.

Therefore, variations in the need for mobility may be grounded in one of two specific and different frameworks. Perhaps the differences in need are due to the student's nervous system which may be programmed to lean toward overstimulation or understimulation. On the other hand, variations in need for movement may be related to which hemisphere of the brain a particular student uses more extensively, with the "Right-brained" student displaying the greater need for mobility.

MOBILITY AND ACHIEVEMENT RESULTS

It would seem that both theories concerning the origin of the need for mobility have a common factor. This need may be due to the unique functioning of the student's individual nervous system or, instead, may be a reflection of which hemisphere of the brain is being used to a greater extent. In either case, however, there would seem to be little the student could deliberately

do to change his need for movement. Of course, the "introverted" students or the "left-brained" students usually do not encounter problems in educational environments because their need for movement may not be great. However, one may wonder what can be done for the other students who have a pronounced need for mobility. Have their chances for success been diminished because this need has not been acknowledged? Would their academic potential be enhanced if the need for movement were accepted and dealt with in a meaningful way?

What happens to achievement levels if mobility is allowed? There is very little research on which to base an answer. Della Valle (as cited in Dunn, 1984) explored this question when she tested 417 New York seventh graders with the Learning Styles Inventory. The results indicated that there were 217 students with a preference for mobility and 89 students who had a definite preference for passivity. Out of these students who represented the extremes in need, she chose a final group who would participate in the learning activity. The 20 students who were extremely mobile and the 20 students who were extremely passive were given the task of learning word-pairs. All the students were taught and tested in both environments and under both conditions. Her data confirmed the following:

Students with either preference performed equally as

well when matched, corroborating that both mobility and passivity are strengths when they are responded to positively. No differences were evidenced between the scores of students in the two extremely different environments, substantiating that no single environment - one that permits movement or one that requires students to sit still - generates greater achievement. Significant differences were yielded when students' environments were mismatched with their learning style preferences. Specifically, although actively and passively preferenced students performed equally well in the passive environment, those with a preference for mobility obtained the highest scores of all groups when they were taught in the condition that permitted mobility while learning - suggesting that those students have never performed to their maximum potential in conventional classrooms.

Similarly, Lemmon's (1985) work in the past five years reveals that attention to the many elements of learning style, such as time of day, perceptual strengths, intake (munching or nibbling on snack foods), lighting, social preferences, and mobility can change performance. She notes that individuals who apparently needed mobility began to accomplish more when movement was permitted in the classroom. Moreover, assignments were completed accurately and on time when opportunities for mobility were present.

The educational programs in Lemmon's (1985) school focused heavily on the learning styles of the students. Moreover, testing procedures and environments were designed to take advantage of the specific elements of learning style possessed by these students. When the Iowa Basic Skills Test was to be administered in this school, the children were allowed to take the test at their preferred time of day. They were also allowed to munch on snacks if they desired, and dim or bright lighting was provided according to their preferences. Of interest is the fact that students were allowed to move about the room while being tested. While some students preferred to sit quietly at their desks during the entire testing procedure, others moved from desks to quilts or small pieces of carpeting. There were dramatic gains in both reading and math scores, in addition to gains in the overall composite scores for the two subjects. Because Lemmon's implementation of learning styles has existed five years, she has a long-range perspective not available to most researchers. She states that not only are current test scores showing gains, but that the gains have increased with each year that learning style preferences have been a part of the testing program.

It would seem that mobility is a need that cannot be denied. Perhaps the need is expressed by a young child with tactual or kinesthetic preferences for learning. Maybe it is the poor reader or the student with a low self-concept who is displaying this need for movement. While some research studies have

concentrated on identifying the types of students who have a more pronounced need, other projects have tried to determine the reason for the great variances in the need. Their conclusions have usually fallen in the category of programmed nervous systems or the category of cerebral dominance. Hopefully, in the future more research projects will focus on the changes in performance levels and achievement if mobility is allowed in learning and testing environments.

For those in our classrooms today who have a pronounced need to move about while learning and while being tested, there seem to be directions or paths which educators may follow. Educators may become increasingly concerned not with how a student should learn, but how he does learn. Perhaps additional research in this field will bring more acceptance of learning styles by members of the educational community, whether they be teachers or administrators. Increasingly, schools and educators will likely recognize the uniqueness of students as individuals and address their particular needs so that maximum opportunities for learning and achieving may be provided.

STATEMENT OF PROCEDURES

INTRODUCTION AND PURPOSE

This study will address the relationship of learning styles and the standardized testing environment and will focus primarily on the effect of mobility -- the need to move about within the physical setting, to change locations while learning or being tested.

The project will answer the specific question: Will the scores of those students who demonstrate a need for mobility as measured by the Learning Styles Inventory - Primary Version or who are identified as mobile by the classroom teacher be significantly higher when mobility is allowed during the administration of a portion of the Gates-MacGinitie Reading Test as compared to the scores of those same students who demonstrate a need for mobility as measured by the Learning Styles Inventory - Primary Version or who are identified as mobile by the classroom teacher when they are not permitted mobility during the administration of a portion of the Gates-MacGinitie Reading Test?

SUBJECTS AND SETTING OF THE STUDY

The subjects for this study are members of a second-grade class at Oceanway Elementary School, a public school in Duval County. Oceanway is located in the northern part of the city in an area that is somewhat rural. It is also a low socio-economic

area, and generally parents of the Oceanway students have only finished a few years of high school or have received a high school diploma. The school has a large number of students whose families move frequently. Oceanway's achievement scores on the SAT have typically been near the bottom when compared with the levels of other elementary schools throughout the county. The school has a total student population of 509 with only 6 children designated as "gifted".

The second-grade class is composed of 9 boys and 13 girls. The classroom teacher states that reading levels range from 2 students who are almost non-readers to 1 "gifted" child. At the 9th month in second grade, most of the children are just beginning the first book in the second grade series; therefore, most students are not "on grade level" since the school year is almost at an end. There are 6 students who are repeating second grade.

INITIATION OF THE PROJECT

Because the students might initially feel uneasy with the researcher, I plan to read the book, "Elephant Style" aloud to the class at our first meeting. At the next meeting the Learning Style Inventory: Primary Version will be administered to small groups of 3-8 students. Hopefully, "Elephant Style" will have helped to acquaint the class with the concept of learning styles and will have developed the idea that there are no "right"

answers or "wrong" answers to the questions on the inventory.

IDENTIFICATION OF THE MOBILE STUDENTS

The original Learning Style Inventory was developed by Dunn, Dunn, and Price in 1977. It is a questionnaire type of inventory used to determine which elements of learning style are perceived by the student to be important or unimportant. Over the years this testing device has been used extensively by Dunn, Dunn, and Price and other researchers to test thousands of students. It has had 2 revisions.

In 1982 Perrin altered the Learning Style Inventory so that it could be used more easily and more accurately with young children. The Primary Version she developed still determines strengths and weaknesses in learning styles, but utilizes large, simple illustrations which are shown to the child as the testor is asking the child questions. Also, the verbal language used is much more child-oriented than in the original Learning Style Inventory of Dunn, Dunn, and Price.

The Learning Styles Inventory: Primary Version will identify which of the second-grade students tested are extremely mobile and which are extremely passive. There will be 2 testing days and the entire class will be used in both testing situations. The reading comprehension section of the Gates-MacGinitie Reading Test - Level B will be used in both cases.

ADMINISTRATION OF THE READING TEST

On the first day of testing Form 1 of the Gates-MacGinitie Reading Test will be used. All the students will be tested simultaneously. Pillows, small pieces of carpeting, and small quilts or blankets will be placed around the classroom. The school media center has several colorful chairs made of hard plastic. These chairs are designed in such a way that the person sitting in the chair is in a somewhat reclining position with his head slightly back and his feet elevated. These chairs will also be placed around the classroom. On this first testing day the children will be allowed to choose where they wish to sit. They may decide to remain at their desks or they may choose one of the alternative positions such as on the floor on a small blanket. However, they will be told that no movement is allowed during the administration of the test. They must remain in their chosen location during the entire time period allotted for the test.

The second testing will take place the following week. Form 2 of the Gates-MacGinitie Reading Test will be used and the time of day (12:30 P.M.) will remain the same. The classroom setting will remain the same. The children will be allowed to choose whether to begin the test at their desks or to begin at an alternate site. As with the first testing pillows, quilts, and plastic chairs

from the media center will be available. However, in this second testing the students will be told that moving about the room and changing locations will be permitted. The only restriction will be that no student will be allowed to disturb another student. They may move only to a location that is vacant and therefore available. Again, no talking and no interaction between students will be allowed.

RESULTS AND CONCLUSIONS

Siegel (1956) speaks of the purpose and advantage of using two-sample statistical tests and states that these tests "are used when the researcher wishes to establish whether the two treatments are different, or whether one treatment is 'better' than another" (p. 61). In this particular study the treatment used is the availability or the denial of the opportunity to move about or change body postures while being administered a portion of a standardized reading test.

When a researcher is attempting to determine whether a particular treatment is the true reason for the differences shown at the conclusion of his study, he always needs to question whether the treatment was, indeed, the determining factor or whether the two related samples under scrutiny had other differences such as IQ, which would have contributed to the differences in scores.

Therefore, it is important for the researcher to get two samples that are as closely related as possible. A good way to match the two samples is to have each subject "serve as his own control" (Seigel, p. 61) and then each subject is exposed to each of the two differing treatments and the treatments are given at two different times.

In this study the primary focus was on the nine students who had been identified as having a pronounced need for mobility while

learning or being tested. Each of the nine students served as his own control. Two comparable forms of the Gates-MacGinitie Reading Test were administered to the subjects in question. However, the tests were given on different days and the conditions of the testing environment were quite different. In the first testing session no movement was allowed within the classroom setting while in the second testing session movement and/or changes in body posture were mentioned as factors within the environment which were clearly permissible.

In undertaking a statistical study of the data compiled from the two testing sessions, the Wilcoxon Matched-Pairs Signed-Ranks Test was used. Siegel states that the Sign Test may give us information about simply the direction of the differences shown between related pairs. However, Siegel continues:

If the relative magnitude as well as the direction of the differences is considered, a more powerful test can be made. The Wilcoxon matched-pairs signed-ranks Test does just that: it gives more weight to a pair which shows a large difference between the two conditions than to a pair which shows a small difference. (p. 75)

Insert Table 1 about here

The Table of Critical Values of T in the Wilcoxon matched-pairs signed-rank test (Seigel, p. 254) was used. Because in our

Table 1

Differences Between the Traditional Settings and Mobile Settings According to the Wilcoxon-Matched Pairs Signed-Ranks Test

Students	Traditional Setting	Mobile Setting	Difference	Rank of Difference	Rank With Less Frequent Sign
a	15	14	-1	-1	1
b	33	38	5	4	
c	28	29	1	1	
d	13	13	0	-	
e	30	26	-4	-3	3
f	16	17	1	1	
g	30	35	5	4	
h	33	37	4	3	
i	15	12	-3	-2	<u>2</u>
					6

T = 6

study the observed T is equal to six and the Table T is 7, we can therefore reject the null hypothesis that the testing situation is not a factor in the student achievement differences on the Gates-MacGinitie Reading Test. There is a level of significance of .05 for the two-tailed test.

This significance becomes even more meaningful when the testing conditions are considered. Both testing dates occurred in May. However, on the second testing (in late May) which made available the opportunity for movement, the classroom temperature was almost 100 degrees. The students were noticeably fatigued and bothered by the heat. Yet, for the mobile students the level of concentration and the desire to complete the test were greater than those same characteristics exhibited on the prior testing day when no movement was allowed.

A particularly graphic example of how the testing environment can affect attitude and performance was shown in a young male student named Marlon. On the Learning Style Inventory-Primary Version he had indicated a pronounced need for mobility. The classroom teacher readily agreed to this characterization of Marlon and added that her observations indicated a weak persistence in Marlon's personality. During classroom activities, many times he became restless and simply wanted that particular activity to end so that a different activity and/or setting could become

available. However, on the day when movement was allowed during the testing procedure, Marlon seemed to find it relaxing to have the opportunity for movement. He had a strong and visible desire to complete the test and to do well on it. His classroom teacher remarked that it was the end of the school year and she had never seen such a level of concentration in Marlon.

This researcher believes that if the testing conditions on the second testing day had been more favorable or simply more equal to the conditions of the first testing, that perhaps the scores of the mobile students would have shown an even more dramatic improvement. Therefore, it may be concluded that even under conditions which were somewhat unfavorable for completing a test, the mobile students scored at a significantly higher level when placed in a mobile environment.

RECOMMENDATIONS FOR FUTURE STUDY

The future of education may be viewed as an entity filled with exciting possibilities or instead, as one dominated by tremendous problems to be solved. While there are, indeed, new needs to be addressed because the child's world and his relationship to it are constantly changing, still there are perpetual needs of children and students in general that transcend the variances of the immediate present and the circumstances prescribed in that present.

Students will always need to be shown respect by the classroom teacher. Further, they will forever need to feel the support and understanding of an instructor who deals with them in a sensitive and caring manner. If all or most of these positive qualities are present, then the reflection of these qualities can be seen in the confidence and assurance possessed by the students.

Yet, while it may be readily acknowledged that stabilizing, supportive qualities in the classroom teacher are an important influence on the child's emotional state and level of performance, still perhaps the greatest gift an educator can bestow is the gift of the opportunity for maximum achievement. The teacher and classroom that provide a climate in which the student's true potential may be developed and/or obtained may be providing the ultimate benefit that education has to offer.

It would seem that today's educators are making a determined

effort to be more creative and more enlightened in approaching the learning structures and processes of the students. As an example, many times classrooms are now more colorful and child-oriented when the student is a young one. Hopefully, teachers are becoming more open to new ideas centering on instructional modes and activities. Because the home lives and environments of today's students may be more disoriented and unstructured, many times classroom teachers are improving their sensitivity to and recognition of the fact that many modern children do not live in a nuclear family.

However, it would seem that the field of learning styles is only slowly gaining acceptance and is finding only a sparse and slow implementation of its theories. Studies in the area of learning are mushrooming. It is a tremendously exciting, contemporary area of educational research because it encompasses so many differing aspects of the learner and the learning processes. Yet while the experiments, studies, and findings focused on learning styles are becoming increasingly prolific, one would have to search diligently to find many classrooms or educational materials which recognize and utilize the opportunities for maximum growth which learning styles findings offer us.

In the specific field of reading, deliberate and sweeping changes are slow to happen. Carbo (1982) tells us that:

Only recently have educators begun the important task of exploring and researching a diagnostic-prescriptive approach to improving reading instruction. This critical shift in focus from attempts to discover the best reading approaches for all students toward efforts to discover the best reading approaches for a particular youngster based on learning style diagnosis can have a far-reaching, positive effect on the quality of reading instruction in the future.

(p. 126)

Perhaps some educational theorists feel that learning styles research is simply a fad. It could readily be acknowledged that the teaching/learning process is by nature somewhat nebulous and not bounded tightly by numbers as are other fields such as engineering. Therefore, this teaching/learning relationship is easy prey for those who would come along armed with the perfect solution, the perfect and definitive answer to "why Johnny can't read". Anderson and Bruce (1979) remind us that:

The history of education is replete with movements that briefly influenced the course of the profession, and then passed on, leaving a legacy upon which researchers, philosophers and practitioners could build. As the literature on the subject of learning styles grows, it is becoming apparent that this is an idea that may join

the select group of concepts that has had a major and lasting impact on education, (p. 81)

This idea of learning styles as a vehicle that can be used in the search for maximum growth for our students brings us back full circle to Della Valle (as cited in Dunn, 1984) and her doctoral work on mobility. Of all her findings, perhaps the most far-reaching was the conclusion she reached that the extremely high scores attained by the mobile students within a mobile environment could mean that those students previously had never been given the opportunity for maximum achievement. These were junior-high students who had attended school for seven years and, in all probability, had never been allowed to move about freely while learning and/or while being tested.

This researcher thinks fondly of Marlon and of the dramatic change in countenance, determination, and concentration when movement was allowed during the testing procedure. It would seem logical that Marlon's level of concentration would diminish due to his movements and changes in posture. However, quite the opposite occurred. His serious desire to complete the test and to do well was clearly visible to this researcher and to the classroom teacher as well.

For all the Marlons who must cope, learn, and achieve in our educational environments filled with desks and chairs,

pencils and papers, teachers and classmates - for all the Marlons there must be an acknowledgement of their unique ways of learning and a real effort to make the climate of their educational world one in which opportunities for achievement and accomplishments are available and inviting.

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