

2004

Do Caucasian and African American Students Have Different Learning Styles?

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Do Caucasian and African American
Students Have Different Learning Styles?

(TITLE)

BY

Robin J. Black-Vannoy

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Specialist in School Psychology

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2004

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Do Caucasian and African American Students
Have Different Learning Styles?

Thesis for a Specialist's Degree

In School Psychology

Eastern Illinois University

Charleston, Illinois

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ABSTRACT

This study explored whether African American and Caucasian students have different learning styles. It specifically examined differences in preferred modes of information processing and instruction. Participants in the study completed the Dunn and Dunn Learning Style Inventory and the Kolb Learning Style Inventory. Subsequent analyses revealed that there were no significant differences in how African American and Caucasian students choose to process information for learning. However, there were some significant differences in preferred modes of instruction. African American students were more likely to prefer noisier and warmer learning environments, to snack while learning, and to learn in the late morning. Caucasian students had a stronger preference for formal class designs, long-term assignments with limited teacher assistance, and to explore their environment with hands-on activities. Caucasian students were also more highly teacher motivated and had a stronger preference to learn in the early morning. No gender differences were found.

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Do Caucasian and African American Students Have Different Learning Styles?

This study explored whether Caucasian and African American students have different learning styles. Ninety-four third and fourth grade students participated by responding to inventories that measured students' instructional preferences and information processing styles.

Most people would agree that not everyone learns the same way. Researchers (e.g. Cross & Tilson, 1997) also agree that people process information in various ways. Learning styles are generally thought of as the various ways people learn or prefer to learn. For example, tactile learners prefer to touch and manipulate objects when learning new concepts. Auditory learners may simply enjoy listening to the teacher lecture, while visual learners may need to see key points written on the board or watch a movie to firmly grasp new information. It is not that people are inflexible and cannot learn in various ways. Educators believe that people learn best in one or two ways, and in order to maximize one's potential, it is best to accommodate their learning styles.

Addressing students' learning styles may be beneficial because knowing their learning style will then allow teachers to use more effective teaching strategies (Fatt, 1998). Teachers who take the time to know and implement strategies to benefit their class will be reaching out to students in a more effective way. The students will feel like individuals and will value their teachers' efforts. In other words, the ability to give every child an equal opportunity to succeed in school relies on the understanding of culture and learning styles by teachers (Guild, 1994). Not employing the various learning styles of a class may leave certain children at a disadvantage and feeling left out or frustrated.

Furthermore, it has been argued that the more a student understands him/herself, the more likely that student will be to accept him/herself (Martin & Potter, 1998). A child's self-esteem may be raised because the child understands his strengths and weaknesses. The student will know that it is "okay" if he or she learns differently from other students. Conversely, past research has shown that when students feel frustrated and confused in school, that they often become withdrawn or act out (Hlawaty, 2001). This is no surprise since most of the students one sees in the principal's office are also not doing well in their studies. Thus, it is academically, emotionally, and psychologically beneficial for all students to know their learning styles and then work on strengthening their less developed styles.

Value of Finding Learning Style Differences in African American and Caucasian Students

Currently, African American students are falling behind their Caucasian counterparts in academic achievement. Achievement gaps between Caucasian students and minority students exist at nearly all age and subject areas (Latham, 1997). Educators are fervently looking for ways to narrow this gap. Minority students are also more likely to be placed in special education classes than Caucasian students (Latham, 1997). African American students are enrolled in special education classes in disproportionate numbers. In 1998, it was estimated by the US Department of Education that even though African American students account for only 16.8% of the public school population, they comprise 21% of all students in special education courses (Neal, McCray, & Webb-Johnson, 2001).

It is important to account for learning differences between African American and Caucasian students because it could help explain some of the differences in academic achievement between these two groups. Educators (e.g. Lunenburg, 2000) have also looked at learning style models to help teachers prevent at-risk students from dropping out of school. They have even included learning styles in a dropout prevention initiative for minority students. They ascertain that “student interest, application, and academic success are positively related to the presentation of material that is congruent with the individual’s learning style” (Lunenburg, 2000). Educators are looking for any piece of the puzzle to solve this problem and differences in learning styles could be one piece, among many, of the puzzle. Accounting for learning style differences will not solve this problem, but could aid in reaching this goal.

Defining Learning Styles

Learning styles have been described in numerous ways. The learning style model one subscribes to will determine one’s definition of learning styles. For example, researchers (e.g. Cross & Tilson, 1997) who believe learning styles are primarily based on cognitive attributes define learning styles as the way an individual processes information. This includes a person’s “typical mode of thinking, remembering, or problem solving” (Kearsley, 1994). Others believe that the intrinsic differences of learners lie in the environment and how they interact with the environment (Cross & Tilson, 1997). Therefore researchers who acknowledge the social aspects of learning define learning styles as the students’ attitudes toward learning, the learning environment and their relationship with peers and instructors. Furthermore, some researchers believe that there are intrinsic characteristics in learners that affect how they interact in learning

situations. These researchers believe one's personality or temperament is responsible for one's learning style (Cross & Tilson, 1997). Furthermore learning styles may be described as "the way a person begins to process, internalize, and concentrate on new material" (Martin & Potter, 1998). Those who prefer this definition usually focus on manipulating the environment to make it conducive to learning for each individual. What all researchers do agree on is that students at any age will differ in their ways of learning (Guild, 1994). For the purposes of this study, a learning style will be defined as the unique approach an individual takes to learning material.

Current Learning Style Models

Carl Jung is considered to be the father of learning style theory. He noted the differences in the way students perceived, made decisions, and interacted (Snyder, 1999). Since Jung, researchers have tried to accurately assess those differences in both adults and children. Today, educators are trying to use this diagnostic capability to match instruction to the learning style of individual students in order to maximize the potential of the student. In recent years, research has migrated to four main learning style models including: instructional preference, social interaction, information processing, and the personality of the learner. All of these models attempt to create taxonomies of learning styles. What these models differ on are the dimensions they use for creating these taxonomies. Each model may be thought as describing a separate layer of a person, with the instructional model describing the outer most layer, the social interaction model acknowledging the next layer, the information processing model taking into account the inner layer, and finally the personality model attending to the inner core of a person (Clark, 1999.).

Instructional preference models outline the observable traits of learning that can be measured through tests, observations, and productivity studies (O'Connor, 1997.). Measures following this model focus on how students learn best. People could be visual, kinesthetic, or auditory learners. Say, for instance, an instructor was teaching about World War II. The visual learner would prefer to watch a movie about it, the kinesthetic learner would benefit from visiting an exhibit at the museum, and the auditory learner would enjoy a traditional lecture.

The social interaction model takes into consideration the effect social contexts and strategies have on learning. According to this model students interact differently in social contexts. For example, William Perry's model (1970) showed how students developed through four different maturation levels as they went through college and how these stages determined one's learning style. Stage one is the "Dualism" stage where students divide the world into dichotomies such as good/bad, right/wrong, and true/false (O'Connor, 1997). This division of the world affects the manner in which students view and interact with new information. For instance, some students may view their teachers as always being "right" and thus attentively pay-attention to all lessons, while other students may view their teachers' perceptions skeptically and not take information at face value. The second stage is the "Multiplicity" stage where students acknowledge that knowledge is usually a matter of opinion. At this point students are expected to offer their ideas and thus add their knowledge during interactions. Students at this stage learn by being open to the opinions of others, while simultaneously offering their own opinion. "Contextual Relativism" is the third stage and involves the student realizing that there are disciplinary guidelines for choosing among various opinions. Philosophy courses are a

great example of this stage because all they consist of are the various opinions and theories of many people. It is then the students' job to choose which ones they believe. The fourth and final stage is called the "Commitment within Contextual Relativism" stage. This stage involves the student applying and connecting information learned within the classroom to settings outside the classroom. Students at this stage learn by interacting with the environment with knowledge gained in the classroom.

The information processing model seeks to understand learning by the way in which new material is obtained, stored, and utilized. This is a cognitive model. The information processing model emphasizes that people do not fit into just one category, but has strengths and weaknesses in all of them (O'Connor, 1997). Michael Gardner (1983) is one leader of this field and believes that everyone has strengths and weaknesses. In particular he believes that people may excel in various forms of intelligence (e.g. musical, linguistic, logical-mathematical, spatial, body-kinesthetic, intrapersonal, and interpersonal). In addition, this model stresses that everyone is able to learn when faced with new material, but people have different ways of approaching information. Therefore, instruction is best when a variety of teaching mechanisms are used in order to reach the potential of all learners.

Finally, the personality model suggests that there are intrinsic characteristics in people that guide their learning. The personality of an individual guides his/her outlook on the world. Therefore this model seeks to define "types" of people. Many times individuals are viewed as introverts or extroverts, sensing or intuitive, thinking or feeling, and judging or perceiving (Brightman, 1998). Introverts are usually quiet and keep to themselves, while extroverts love interacting with people and things. Sensing people are

detailed oriented and trust facts. Intuitive people seek out the relationships among facts. People who focus on logic and principles are thinking students, while those who focus on human values and needs are feeling students. Judging people are decisive and plan things out. Conversely, perceptive people are curious and spontaneous. Thus, accommodations are crucial to their academic success.

This study adopted the information processing (how you store, obtain, and process information) and the instructional preference (how one prefers to learn) models. These two were chosen due to their outlook on learning, the basis of their research, and their applicability to the classroom. The instructional preference model focuses on the outer layer of a person's learning style (environment), while the information processing model focuses on the inner layer (cognition). These two models also have ample research pertaining to school aged children, while the other two models (social interaction and personality) were used primarily with high school and college aged students. Furthermore, they are classroom-based and more readily lend themselves to use and practice in the schools with younger populations. The learning styles that these models address can be accommodated easily in the classroom by manipulating the environment and teaching strategies. Learning style measures developed under these two models do not take a long time to administer and are easy for young children to understand. The Kolb Learning Style Inventory, which is an information processing model, will first be addressed and then the Dunn and Dunn Learning Style Inventory from the instructional model will be addressed.

Measures

Kolb. David Kolb's Learning Style Model (1984) is an information processing model. Drawing on the work of John Dewey, Kolb's Learning Style Inventory is based on the concept of a person being active in the environment. It is also rooted in Kurt Lewin's notion of learning as rooted in experience and Jean Piaget's belief that intelligence is a result of the interaction between the person and the environment (Clark, 1999). Dewey emphasized hands-on learning and strived to show how abstract concepts could work in everyday life. Lewin is known for his field theory which states that human behavior is the function of both the person and the environment. Piaget is famous for his holistic approach of learning through many channels including listening, exploring, and experiencing the environment (Clark, 1999). Kolb's model is also called the experiential learning cycle.

Kolb's experiential learning cycle describes the learning process on a two axis grid. The horizontal grid distinguishes between Active Experimentation and Reflective Observation. Active Experimenters learn by performing tasks, while Reflective Observers learn by watching tasks. The vertical grid distinguishes between those who prefer Abstract Conceptualization from those who prefer Concrete Experience. Those who prefer Abstract Conceptualization are more creative in their thought process, while learners who prefer Concrete Experiences are more scientific.

When divided into one of four quadrants readers must realize that learners may overlap dimensions, while having one dominant dimension. The quadrants are comprised of divergers, convergers, accommodators, and assimilators. Divergers are described as those who easily transform concrete experiences into reflective observation. These

individuals are “good at idea generation, are people-oriented and can be emotional” (Cross & Tilson, 1997). Conversely, convergers learn by transforming abstract conceptualizations into active experimentation. These learners are described as being concrete thinkers. Assimilators transform abstract conceptualizations by reflective observations into learning. Assimilators focus on the clarity and soundness of a theory. They are also labeled as being “less interested in people than divergers are” (Cross & Tilson, 1997). Accommodators on the other hand transform concrete experiences into learning by active experimentation. These people are good problem solvers, adaptive, and risk takers. Take for example the task of learning to swim. Divergers would think about swimming and watch another person swim. Assimilators on the other hand would first have a clear understanding of the theory behind swimming before attempting anything. Convergers would first receive practical tips and techniques from a swimming expert and finally accommodators would just jump in the water and go for it.

Dunn and Dunn. Rita Dunn’s model is an instructional preference model. She defines learning style as “the way in which individuals begin to concentrate on, process, internalize, and retain new and difficult information” (Hlawaty, 2001). Dunn suggests that students have a preference in the way that they prefer to learn. Therefore, she argues that uniform teaching practices will unfairly deny students of academic success because children do not learn or prefer to learn the same way. She asserts that the best way to meet the needs of students is to manipulate their environment, in order to make them comfortable, as well as teach in a variety of ways.

The Dunn and Dunn Learning Style Inventory draws on four characteristics at multiple levels in devising instructional settings. The four characteristics are

environmental, emotional, sociological, and physiological preferences. Environmental preferences include: class design (structured vs. unstructured), light (dark vs. bright), temperature (warm vs. cool), and noise level (silence vs. music). Emotional preferences are based on a student's responsibility level, motivational level, persistence level, and structure (internal vs. external). Sociological preferences are related to a variety of learning relations, such as team, peer, adult, pair, and private. Physiological preferences related to time (morning vs. afternoon or evening), mobility (stationary vs. walking), intake (eating or drinking), and perception (auditory, visual, tactual, or kinesthetic). Individual learning styles may encompass any combination of the above characteristics and some people may not necessarily have a preference for them all.

Learning Styles of African-American Students

Past research has looked at the cultural values of African Americans and determined that they value social interaction, harmonic communal aspects of life, interdependence, creativity and oral expression, and nonverbal communication (Durodoyle & Hildreth, 1995). This research has not employed standardized tests to examine their hypotheses. Based on observations, other researchers have identified typical learning patterns among African Americans and found that African Americans value physical activity, loyalty in interpersonal relationships, and oral experiences (Guild, 1994). From these findings it has been predicted that African American students could benefit from discussions, active projects, and collaborative work (Guild, 1994). Research based on the Dunn and Dunn LSI has found that African American students tend to focus on people rather than things, to prefer inferential reasoning, and to be more proficient in nonverbal communication (Heredia, 1999).

A study conducted by Norma Ewing and Fung Lan Yong (1992) compared the learning style preferences of gifted African American, Mexican American, and American born Chinese students. The Dunn and Dunn LSI was administered to 155 randomly selected sixth, seventh, and eighth grade gifted minority students. The six variables that significantly differentiated the groups were visual modality, persistence, studying in the afternoon, noise, intake, and light. Particularly gifted African American students were found to be responsible, preferred visual modality, and studying in the afternoon (Ewing & Yong, 1992). If there are differences among the learning styles of gifted minority students, there may be differences between African Americans and Caucasians in general.

Debate within the African-American community. There is a debate within the African American community about whether or not African American children learn differently from Caucasian children. This debate originated from five assumptions about the African American culture. The first assumption is that within America Caucasian and African American culture are incompatible. The second assumption is that characteristics of the African American culture ultimately determine the learning style of African American children. The fact that learning style assessment is reliable and valid is the third assumption. The fourth assumption is that African American children are incapable of producing behavior that is different from their culture. The last assumption is that there are "culture-specific" educational accommodations that are effective in increasing academic achievement for black students (Frisby, 1993). Based on these assumptions African-American students have been said to have "Black Cultural Learning Styles" (Frisby, 1993).

Some (e.g. Frisby, 1993) argue that to propose there are differences between African American and Caucasian students is making excuses for the disparity in academic achievement between the two groups of students. They argue that individuals should look deeper into the educational system, as well as history for the answers to the disparity. Proponents of this theory argue that African American students cannot thrive in the "Eurocentric" configuration of American schools and that their learning styles should be taken into account and accommodated (Richardson, 1993). Eurocentric is defined "as the perceptual set in which European values, customs, traditions, and/or characteristics are used as the exclusive standards against which people and events are evaluated and perceived" (Richardson, 1993). Proponents of Black Cultural Learning Styles stress that one does not have to be racist to hold a Eurocentric view because it is just "built" into people.

Learning Styles of Caucasian Students

Past exploratory research has shown that Caucasian Americans value accuracy, independence, analytical thinking, and objectivity (Guild, 1994). These are the characteristics that one needs to succeed on tests, grades, and competition. Individuals who excel in these characteristics will have a higher chance of being successful in a culture that values competitive grading and testing.

One group of researchers looked at the differences between Caucasian students and African American students on critical thinking and learning style (Gadzella, Masten, & Huang, 1999). A total of 103 college students were administered the Watson-Glaser Critical Thinking Appraisal (WGCTA) and the Inventory of Learning Processes (ILP). The WGCTA includes five subtests: Inference, Recognition of Assumptions, Evaluation

of Arguments, Interpretation, and Deduction. The ILP is comprised of four scales including, Fact Retention, Elaborative Processing, Deep Processing, and Methodical Study. Researchers found that Caucasian students had significantly higher mean scores on the Inference, Evaluation of Arguments, Interpretation, and Deduction subtests of the WGCTA, but found no significant differences between the two groups on the learning style inventory scales. Since this study was conducted with college students, they cannot be generalized to younger students and more research needs to be done focusing on a younger population.

Dangers of Making Generalizations about Ethnic Groups

One must be careful when making generalizations about any group of people. Guild (1994) has stated some reasons why researchers may be hesitant to explore the relationship between culture and learning styles. The first is that people may make premature inferences (stereotypes) about members of the group and not view them as individuals. One must remember that there is great diversity in every ethnic group and teachers should still employ a variety of teaching strategies. A second reason is that the failure to address the learning styles of ethnic groups may be only one small piece of the puzzle pertaining to why minorities are falling behind Caucasian students in academic achievement. Therefore, one cannot infer that all differences may be explained by this one component of the educational system. Finally, Guild (1994) argued that if researchers find that certain ethnic groups have different learning styles from the dominant culture, then these ethnic groups may be viewed as having a deficiency in some way, instead of learning and processing information in a different way.

Significance of the Study

Studying the learning style differences between African American and Caucasian students is important for several reasons. First, the demographics of the United States are rapidly changing. What was once a country populated by different ethnic groups of the white race has become a country constituted of many ethnic groups of all races. In 1990, seventy-percent of all American students were Caucasian and by the year 2026, it is projected that seventy-percent of all American students will be non-white (Latham, 1997). Based on these statistics it is advantageous to know if African American students have different learning styles than Caucasian students. Second, previous research has not focused on the learning style differences of these two groups among elementary aged children, which is the time that children begin to solidify specific patterns of behaviors. If a student starts off not liking school then that trend will most likely follow throughout his/her educational career. Finally, if different ethnic groups have learning style preferences, then addressing them in classes will be one way to make the educational system more positive for them.

The purpose of this study was to explore whether Caucasian and African American students have different learning styles. Ninety-four third and fourth grade students participated by responding to inventories that measure students' instructional preferences and information processing styles.

Hypotheses

It was predicted that overall, there would be a significant difference between the two groups of students. These differences may be due to the different backgrounds and cultural values of Caucasian and African American students.

In terms of information processing preferences, it was predicted that African American students would score higher on the concrete experience and active experimentation subscales of the Kolb LSI due to past studies stating that they are social and people oriented (Guild, 1994) and that Caucasian students would score significantly higher on the reflective observation and abstract conceptualization subscales due to studies (Guild, 1994) finding that Caucasian students think analytically and are competitive.

For the instructional learning preferences, it was predicted that there would be a significant difference between the two groups on the Environmental and Sociological subscales of the Dunn and Dunn LSI. According to past studies (Guild, 1994) African-Americans are more social than Caucasians which may carry over into the classroom in the form of unstructured class design and preferring to work in groups collaboratively. Although gender was not a focal variable in the study, the variable was included in the analyses to examine if any racial differences found varied by gender. In other words, were any of the racial differences found among male students or among female students alone?

Method

Participants

Forty-five African American and forty-nine Caucasian third and fourth grade students were recruited with the cooperation of teachers and administrators in the Matteson Elementary School District #159 and Burbank Elementary School District #111. The two suburban Chicago school districts were utilized due to the racial composition of each district. Matteson Elementary School District #159 is comprised of

primarily African American students, while Burbank Elementary School District #111 is primarily comprised of Caucasian students. All of the African American students were recruited from Matteson Elementary School District #159. Six of the Caucasian students attended Matteson Elementary School District #159 and the rest of the Caucasian students were recruited from Burbank Elementary School District #111. Participants were matched in terms of SES and gender in order to control for these variables. Furthermore, only non-referred students in the regular classroom track were allowed to participate and participants were assigned to each group based on race. The students' race was defined by the racial identification of their parents. Both parents were from the same race in order for the student to be included in the study. Students from the Burbank school district received various types of candy for their participation and students from the Matteson school district received a pizza party for their participation. The Burbank students did not have a pizza party due to previous concerns with food poisoning from pizza restaurants in the area.

Materials

Two scales were used in this study. They are the Dunn and Dunn Learning Style Inventory (Shaughnessy, 1998) and the Kolb Learning Style Inventory (Robert, 1996). The Dunn and Dunn Learning Style Inventory (LSI) is a self-report, 100-item inventory that measures 22 elements of personal characteristics. The scale is in five-point Likert form with responses ranging from "Strongly Disagree" to "Strongly Agree" and can be completed in approximately 30-40 minutes (Shaughnessy, 1998). It includes items such as, "When I really have a lot of studying to do, I like to work alone" and "I enjoy being with people when I study." Although the scale comes in three different forms (grades 3-

5, grades 6-12, and an adult version) the form for use with grades three to five will be used for this study. The Dunn and Dunn LSI was developed through content and factor analysis and measures individual preferences in the following dimensions: Emotionality, Environmental, Sociological, and Physiological. Environmental preferences include: class design (structured vs. unstructured), light (dark vs. bright), temperature (warm vs. cool), and sound (silence vs. music). Emotional preferences are based on a student's responsibility level, motivational level, persistence level, and structure (internal vs. external). Sociological preferences are related to a variety of learning relations, such as team, peer, adult, pair, and private. Physiological preferences are related to time (morning vs. afternoon or evening), mobility (stationary vs. walking), intake (eating or drinking), and perception (auditory, visual, tactual, or kinesthetic).

The Kolb Learning Style Inventory (Kolb LSI) was developed by David Kolb (1976) and was revised in 1985. The Kolb LSI is a 12-item scale designed to measure cognitive dimensions of learning styles. It consists of four quadrants: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. Based on the scores of the subscales individuals are categorized in one of the four learning styles: converger, diverger, assimilator, and accommodator. Internal reliability has been assessed through Cronbach's alpha to be high: .82 for Concrete Experience, .73 for Reflective Observation, .83 for Abstract Conceptualization, and .78 for Active Experimentation (Raschick & Maypole, 1998).

Procedure

After permission was granted from the principal at District #159 to conduct the study in her school, a time was arranged with the third and fourth grade teachers to

explain the study to their students. Once this was accomplished, all students were provided a brief introduction about the study and volunteers were given a form explaining the study to give to their parents, as well as a permission form to be signed by their parents. Only students who return signed permission forms were allowed to participate in the study. Next, a time was arranged with their homeroom teachers to conduct the study. Due to the large number of participants and limited space in the school, the third and fourth graders were assessed separately. First, the Dunn and Dunn Learning Style Inventory was distributed to the students. The African American female examiner read through the instructions with the students and then read each item aloud while the students recorded their responses. This was done to ensure that each student was on the same item and that they understood each question. Next, the Dunn and Dunn LSI was collected and the Kolb LSI was passed out. This was administered in the same manner as the Dunn and Dunn LSI.

After permission was obtained from the assistant principal at District #111 to conduct the study in her school, she was faxed the permission forms and explanation of the study. Then the assistant principal randomly selected a group of students to participate in the study and sent the packets home with them. The assistant principal felt this was the easiest way to ensure that only Caucasian students in the regular classroom would be recruited for the study due to their school consisting of a ethnically diverse population. Next a time was arranged for the testing to occur. All of the District #111 participants were assessed simultaneously in the same manner as the Neil Armstrong School students. The Kolb LSI was administered first, followed by the Dunn and Dunn

LSI. Questionnaires were coded with a number to ensure the participants' anonymity and overall, the two assessments took approximately 75 minutes to complete.

Results

A two-way analysis of variance test was conducted for each of the information processing and instructional preference dimensions. The gender and the race of the participants were used as predictors of each dimension.

Kolb

First, a two-way analysis of variance was conducted on the concrete learning process scores. Results indicate that there was no significant interaction between the gender and race of the students, $F(1, 90) = 1.78, p > .05$. Likewise, there was no significant main effect of race, $F(1, 90) = 1.13, p > .05$ or of gender, $F(1, 90) = .004, p > .05$.

In addition, a two-way analysis of variance was conducted on the reflective observation learning process scores. Results indicate that there was no significant interaction between the gender and race of the students, $F(1, 90) = 1.39, p > .05$. Similarly, there was no significant main effect of race, $F(1, 90) = .21, p > .05$ or of gender, $F(1, 90) = .76, p > .05$.

Furthermore, a two-way analysis of variance was conducted on the abstract conceptualization learning process scores. Results indicate that there was no significant interaction between the gender and race of the students, $F(1, 90) = .64, p > .05$. Again, there was no significant main effect of race, $F(1, 90) = 1.15, p > .05$ or of gender, $F(1, 90) = .17, p > .05$.

Finally, a two-way analysis of variance was conducted on the active experimentation learning process scores. Results indicate that there was no significant interaction between the gender and race of the students, $F(1, 90) = 2.41, p > .05$. Likewise, there was no significant main effect of race, $F(1, 90) = 1.31, p > .05$ or of gender, $F(1, 90) = .02, p > .05$.

Dunn & Dunn

A two-analysis of variance test was conducted on the students' scores on each of the learning preference dimensions of the Dunn and Dunn LSI. In these analyses, the gender and race of the students were utilized as predictors. Results indicated no significant effects on the following dimensions: light (low vs. bright), structure (wants vs. does not want), learning alone or with a peer, authority figures present, several ways (multimodal), auditory (verbal instruction), visual (printed or diagrammatic material), functions best in afternoon, mobility (sitting still vs. moving), and parent figure motivated.

On the remaining learning preference dimensions, however, there were significant main effects of student race, but no significant interactions between gender and race, and no main effects of student gender. There was a significant main effect of race on noise level preferences when learning, $F(1, 90) = 5.297, p = .02$. African American students were more likely ($M = 56.02, SD = 10.15$) than Caucasian students ($M = 50.82, SD = 10.82$) to prefer music or background noise when learning.

There was also a significant main effect of race on temperature preferences, $F(1, 90) = 27.18, p = .00$. African American students were more likely ($M = 56.04, SD =$

7.04) than Caucasian students ($M = 48.33$, $SD = 7.88$) to prefer warmer temperatures when learning.

In addition, there was a significant main effect of race on class design, $F(1, 90) = 6.53$, $p = .01$. Caucasian students were more likely ($M = 50.18$, $SD = 7.46$) than African American students ($M = 46.00$, $SD = 8.39$) to prefer a formal setting when learning.

Similarly, there was a significant main effect of race on motivation, $F(1, 90) = 10.23$, $p = .002$. Caucasian students were more likely ($M = 51.33$, $SD = 11.76$) than African American students ($M = 42.56$, $SD = 13.72$) to prefer self-designed objectives and pacing when learning.

Results further indicate a significant main effect of race on persistence, $F(1, 90) = 7.87$, $p = .006$. Caucasian students were more likely ($M = 52.76$, $SD = 9.07$) than African American students ($M = 46.24$, $SD = 11.26$) to prefer long-term assignments with limited assistance when learning.

Likewise, there was a significant main effect of race on responsibility, $F(1, 90) = 11.44$, $p = .001$. Caucasian students were more likely ($M = 54.78$, $SD = 8.59$) than African American students ($M = 48.36$, $SD = 9.06$) to conform and follow teacher directives.

Furthermore, there was a significant main effect of race on tactile preferences, $F(1, 90) = 9.60$, $p = .003$. Caucasian students were more likely ($M = 52.53$, $SD = 8.91$) than African American students ($M = 46.22$, $SD = 11.04$) to prefer manipulatives and three-dimensional materials when learning.

Similarly, there was a significant main effect of race on kinesthetic preferences, $F(1, 90) = .01$, $p = .01$. Caucasian students were more likely ($M = 53.61$, $SD = 7.78$) than

African American students ($M = 49.07$, $SD = 9.01$) to prefer real and active experiences when learning.

In addition, there was a significant main effect of race on food intake, $F(1, 90) = 12.33$, $p = .001$. African American students were more likely ($M = 58.20$, $SD = 6.21$) than Caucasian students ($M = 52.37$, $SD = 9.85$) to prefer snacks when learning.

Results indicate there was a significant main effect of race on the learning preference of morning or evening, $F(1, 90) = 4.87$, $p = .03$. Caucasian students were more likely ($M = 47.27$, $SD = 8.89$) than African American students ($M = 44.20$, $SD = 7.11$) to prefer learning in the early morning.

There was a significant main effect of race on late morning learning, $F(1, 90) = 4.51$, $p = .04$. African American students were more likely ($M = 48.18$, $SD = 9.18$) than Caucasian students ($M = 43.80$, $SD = 8.55$) to prefer learning in the late morning.

Finally, there was a significant main effect of race on teacher motivation, $F(1, 90) = 10.80$, $p = .01$. Caucasian students were more likely ($M = 51.86$, $SD = 19.96$) than African American students ($M = 37.71$, $SD = 18.36$) to prefer working near the teacher with praise often when learning.

It should be noted, however, that the African American and Caucasian students' scores on most of the various learning preference dimensions ranged between 40 and 60. The Dunn and Dunn LSI manual states that "scores that fall between 40 and 60 indicate their preference is neither high nor low in that area; those elements are not critical to their learning styles but will vary depending on the situation or the student's interest in what is being learned" (Price & Dunn, 1997). Both African American and Caucasian students, however, scored high on parent figure motivation ($M = 62.00$ and $M = 64.90$,

respectively). Thus, both African American and Caucasian students have a strong preference for parental praise and involvement, and in general want to please their parents. African American students also scored low on teacher motivation ($M = 37.71$), indicating that they are not motivated by pleasing their teachers.

Discussion

The purpose of this study was to explore whether Caucasian and African American students have different learning styles. Ninety-four third and fourth grade students participated by responding to inventories that measure students' instructional preferences and information processing styles.

Kolb: Information Processing

Results indicated that there were no significant differences between the African American and Caucasian students in the information processing dimensions of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Thus, African American and Caucasian students may have similar ways of processing the information they need for learning.

Dunn & Dunn: Instructional Learning Preferences

Results indicated that there were some differences in the instructional learning preferences of African American and Caucasian students in the present sample. African American students were more likely to prefer higher noise levels (e.g. music, conversations), warmer temperatures, to snack while learning, and to learn in the late morning. Caucasian students were more likely to prefer a formal class design, hands-on activities, to explore their environment, and long-term assignments with limited teacher

assistance. Caucasian students were also highly teacher motivated and more likely to prefer learning in the early morning. These differences though did not vary by gender.

What explains these differences in environmental learning preferences? What cultural experiences do African American and Caucasian students have that would make them prefer to learn differently?

Culture is defined as “a group’s preferred way of perceiving, judging, and organizing the ideas, situations and events they encounter in their daily lives” (Durodoyle & Hildreth, 1995). When one thinks about culture, a few themes come to mind such as child rearing, work ethic, and customs. Observation-based descriptions of the Caucasian culture have indicated that Caucasians value independence, analytic thinking, objectivity, and accuracy (Guild, 1994). The first characteristic was evident in this study when Caucasian students scored higher in the areas of responsibility (willingness to follow teacher’s directions and length of assignments), motivation (self-designed objectives and self-pacing), and persistence (supervision and assistance of assignments). All three of these dimensions indicate that Caucasian students like to work independently with limited teacher assistance. Although they are more likely than African American students to conform and to follow teacher directives, this may simply mean that they are more conscientious in following teacher instructions for work and assignments. However, once they have noted the instructions, they have a stronger preference than African-Americans to work on longer assignments at their own pace, with self-designed objectives, and with limited assistance.

Differences in child rearing may also explain other learning preference differences. The majority of Caucasian children are encouraged to roam and explore

their environment (Williams, 2000). Their parents want them to express their opinions and feelings, while many African American parents still subscribe to the rule that children should be seen and not heard (Williams, 2000). Due to protection and safety issues, African American parents do not want their children roaming around stores or exploring too far away from them. These differences in child rearing practices may explain why Caucasian students scored significantly higher on the dimensions of tactile and kinesthetic preferences. They are more likely to prefer to learn by touching and manipulating objects and by exploring their environment. Caucasian students are also more likely to prefer to experience what they are learning by taking trips or conducting experiments. This finding may appear to be contradictory to previous research that argues that African American students prefer to learn through creative, hands-on, and active environments (Graybill, 1997). However, African American students did not score low in this dimension ($M = 49.07$). The current study results simply indicate that Caucasian students have a stronger preference or tendency to learn in the above manners.

In addition, it was found that Caucasian students have a stronger tendency to prefer to learn in more formal settings, such as library environments or a conventional classroom. Formal settings such as these appear to be deeply ingrained in the Caucasian culture. It is deemed rude to talk in a library because people are concentrating, but who is to say that a quiet environment is preferred by all? Centuries ago the expectations and guidelines were set for libraries across the country. During this time, African Americans were deemed second class citizens and were not allowed to participate in academic activities. Thus, growing up in a culture where learning and concentrating is associated

with quiet, formal environments may be related to the Caucasian students' preference for this type of learning environment.

Conversely, it was found that African American students have a stronger liking for noisier work conditions, such as working with music or conversation areas. Previous research stated that African American students may benefit from discussions and collaborative work (Guild, 1994). While these two variables are not exactly the same, a preference for background sounds and verbal interactions could lead to a preference for discussions and collaborative work situations. African Americans also prefer a more relaxed environment where learning involves conversation, music, and food. African American students scored higher on the intake scale, which indicates their stronger liking for snacking while learning. In addition, African American students had a stronger preference for warmer temperatures when learning than Caucasian students. These students may want to wear jackets or sweaters or be placed in the warm areas of the class. It makes one wonder how libraries would be if African Americans created them in the United States. Would there be soft music playing over the intercoms and would conversation and food be welcome, with those who prefer more quiet having separate rooms to work in instead of vice versa?

Furthermore, this difference of a formal versus an informal environment may be seen in the style of worship of African Americans and Caucasians. Contemporary Caucasian churches have made great strides in their tempo and the liveliness of their ceremonies, but they still do not compare to the shouts and loud music heard from African American churches on Sunday mornings. Caucasian worship services are more

formal and structured, while African American services are traditionally more vocal with the congregation free to contribute and set the pace.

Other cultural distinctions are also found in prescriptions and admonitions concerning how one should behave. These are often encapsulated in sayings, proverbs, quotes or "mottos." For example, the sayings "The early bird catches the worm" and "Early to bed, early to rise, makes a man healthy, wealthy, and wise" date back to colonial times and are still quoted today. Therefore, it is assumed that individuals who get up early to go to work and start their day will be more productive and successful than those who wait. This may explain why Caucasian students prefer to learn in the early morning. Many standardized tests and high stakes inventories are administered in the morning because it is believed this is when students are the most productive, but this may not be true for all students. The current study shows that African American students have a stronger preference for learning in the late morning.

Implications for the Classroom

It is no easy task to educate every student according to his/her own learning style. This task is even more challenging when there is a class of diverse ethnic groups. Teachers should be provided information on and be encouraged to explore cultures other than their own in order to better connect with students of different backgrounds. Since there may be individual differences within cultural groups, teachers should remain sensitive to the needs of each child and not solely rely on the race of the student. For example, there are not only individual differences with cultural groups, but within families as well. Certain members of the family may prefer to wake at the crack of dawn, while others prefer to rise closer to afternoon hours.

Nevertheless, the results of this study indicate that a more formal class that learns most of its difficult information in the early morning, with little teacher assistance, with high kinesthetic and tactile activities and long-term assignments, may best fit Caucasian students. On the other hand, a more informal class that learns most of its difficult information in the late morning with background noise, snacks, warmer temperatures, and increased teacher assistance with short-term assignments may best fit African American students. While these environments may seem at the opposite ends of the spectrum, accommodations such as work stations, multi-modal presentations, head phones, quiet snacks, and a variety of assessments would help accommodate the various learning styles in one class. Work stations allow students to be mobile and give them a sense of exploration, as well as provide them with hands-on learning opportunities. Presenting information in a variety of ways ensures that the teacher is reaching each child, regardless of whether the child prefers to learn orally, visually, tactilely, or kinesthetically. The choice of listening to music using headphones would accommodate students with the need for noise without disturbing those students who prefer to work in silence. Similarly, quiet snacks such as Gummi Bears or bananas would meet the food intake needs of particular students while not disturbing other students. Since students have different times of day when they work best, assessments should be scheduled throughout the day. This ensures that both morning and afternoon students are assessed when they are feeling their best.

Suggestions for Future Research

Future research may benefit from alterations to both the design and conceptualization of the present study. Further exploration of learning styles may more thoroughly uncover the similarities and differences of diverse groups' learning styles.

Although the participants from this study came from two school districts located in middle class neighborhoods, there might still be some existing socio-economic differences between the African-American and Caucasian students. Thus, any learning preference differences found between the two groups in the study may be a reflection of socio-economic rather than racial or cultural differences. Future studies ought to explore the role of such demographic factors. Whether the children came from one or two parent homes and whether the students were from first, second or third generation middle class families may play a factor in the learning preferences of the students. Children who come from single parent homes may have extra stressors that a child in a two-parent home would not have. Some of these stressors may include watching younger siblings or an increased number of chores. These children may be accustomed to completing their homework with background noise or working later in the afternoon.

Given that one school district in this current study had more African-American students and the other school district had more Caucasian students, the differences in learning preferences between the two groups may also simply reflect educational philosophical differences between the two districts. If a student coming from one school district is accustomed to being allowed to roam the room and manipulate objects then this may become a learning preference. Conversely, if a student has grown up in a school district that values quiet working areas and traditional settings then this too could become a learning preference for a child. Thus one's school culture could influence one's

learning style more than one's ethnic culture. Future studies should include a larger sample of schools with various teaching philosophies in order to assess the influence of this variable.

Furthermore, the academic achievement of the school districts should be included as a variable. The learning preference of students may be related to their school performance. Thus future studies should match the academic performance of all schools involved or possibly include this as an additional variable to be studied.

The current study only employed standardized learning inventories in examining the learning styles of African American and Caucasian students. The results of the study can be further verified by adopting more qualitative measures such as actual classroom observations and other ethnographic tools. Such approaches also allow the researchers to find out why students prefer one mode of learning over another. The learning inventories were also administered in a differing order between the two districts. Future research should have participants complete the tools in the same order.

Although cognitive information processing differences were not found between African American and Caucasian students when using the Kolb LSI, the inventory may simply have not been sensitive enough to detect such differences among the participants of the current study. Future research ought to include at least one more inventory that taps into cognitive information processing styles. The same suggestion holds when measuring the instructional preferences of the students. In addition, inventories that have been found to be tested and standardized among various ethnic or racial groups ought to be adopted.

Cognitive differences using the Kolb LSI may not have been found due to the complexity of the instrument. Many words had to be further explained by the examiner such as the words, “analytical” and “perseverance.” Thus this instrument proved to be difficult for students of this age group.

Given an increasingly diverse student population, it becomes more important to assess learning style differences by including other racial or ethnic groups that were not included in the current study. More importantly, future research should be conducted on how these various preferences can be accommodated within the same classroom. How does one address groups of students whose needs are different from each other?

Thus, further information in the learning styles of diverse groups of students is needed that will have implications for not only understanding the learning preferences of these groups, but for understanding the academic achievement and classroom relations of these students. With growing academic achievement gaps and large numbers of students dropping out of school, it is crucial to explore every variable in making the educational environment comfortable and successful for all students. Discerning cultural learning preferences would aid researchers and educational staff alike to better understand the educational needs of students and, in turn, help understand cultural differences. The present study contributes to past research in that it provides empirical data concerning the learning preferences of African American and Caucasian students.

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