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The Relationship between Culture and Cognitive Style: A Review of the Evidence and Some Reflections for the Classroom

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Abstract

This column summarizes factors in cultural experience that affect approaches to learning and problem solving. It reviews the evidence over the past thirty years on cognitive style differences in culturally diverse groups in the United States including Asian, African, Latino, and Native Americans and reports recent research findings on the Hmong. Finally, it raises some issues to consider when working with students from different cultural backgrounds.

The possibility of a relationship between cultural experience and cognitive style has been supported, challenged, or rejected by anthropologists, psychologists, and educators. Indeed, the mere idea of such a relationship has been the subject of recent controversy and much debate. The controversy has arisen primarily out of a concern about biases in Western thought in reference to cultural differences. However timely, this concern has tended to be based on assumptions that confuse concepts of so-called "intelligence" with different approaches to learning which arise out of diverse socialization practices. As a result, even the mention of cultural cognitive style is sometimes interpreted as evidence of an arrogant and Eurocentric bias in regard to non-Western populations.

The debate has arisen out of a long series of studies in the fields of cultural anthropology, psychology, and education. These studies have focused on how thinking and learning occurs in various cultural contexts. While early studies were based on the cognitive developmental concepts of Piaget, others were derived from the pioneering work of Witkin and his associates (Witkin et al., 1973) and Berry (1976) on the relationship between culture and cognitive style. The long dialogue regarding the complexities and inter-relatedness of culture and cognitive processing is beyond the scope of this paper but has recently been addressed in a comprehensive review of cultural psychology by Michael Cole (1996).

Kraemer (1973) asserted that people sharing common primary experiences develop similar styles of cognitive processing including perceiving, conceiving, and judging. The concept of diverse cognitive styles arising out of different cultural experiences has been supported by Anderson (1988):

> Because the social, cultural, and environmental milieus of ethnic and racial groups differ, one should expect these differences to be reflected in their respective cultural/cognitive styles. Much of the literature in cross-cultural research supports this contention (p. 4).

More recently Shade (1997) has concurred with this view and has stated that:

> Culture, through the mediating process called cognitive style, determines the affective and cognitive behaviors which an individual selects to meet environmental demands. As environmental psychologists have been able to suggest, situations in which individuals find themselves tend to solicit the behavioral patterns necessary for survival within the confines of that situation. As such cognitive style has a significant impact upon an individual's competent performance in various behavioral settings (p. 10).

In addition, Shade (1997) maintains that culture influences not only cognitive processing but modes of communication and social interaction as well.

Basically, the literature on cultural considerations and cognitive style falls into three main categories: (a) an array of philosophical and historical essays about the relationship of culture and cognition; (b) a wide variety of research studies reporting differences in cognitive style and interactive modes among students from diverse groups both globally and in the United States; and (c) suggestions for taking cognitive style into account in teaching. The importance for teachers to know specific ways in which cultural experience impacts cognitive style, however, generally has not been taken into account in discussions of implementing cognitive style in classroom settings. An example of this relationship between learning at home and learning at school is described later in this paper in regard to Hmong students in American schools.

Learning Style or Cognitive Style?

The term *cognitive style* needs to be differentiated from *learning style*. Because these terms have sometimes been used interchangeably, some confusion has arisen as to what degree they overlap or refer to similar or different issues.

Learning Style

The term *learning style* has been used to refer to different factors, some internal, some external, some cognitive, some emotional, some social, and some behavioral. Irvine and York (1995) consider learning styles to be "an umbrella

term encompassing three distinct substyles: cognitive, affective, and physiological" (p. 484). Curry (1990) has pointed out this problem of ambiguity in regard to the term itself. Slavin (1997) refers to "Theories of Learning Styles" but switches to the term "cognitive style" without differentiating between them (p. 136).

Kagan (1964) distinguished between an impulsive and a reflective approach to learning. Entwistle (1981) later concurred about the importance of impulsivity or reflectivity in style. Fischer and Fischer (1979) referred to style as "a pervasive quality in the *behavior* (emphasis mine) of an individual" (p.245). Shade (1989) distinguished between an analytic and a synergetic style.

Fischer and Fischer (1979) further identified and described ten different kinds of learners: the incremental learner, the intuitive learner, the sensory specialist, the sensory generalist, the emotionally involved, the emotionally neutral, the explicitly structured, the open-ended structure(d), the damaged (in self concept and social competence among other problems), and the eclectic learner.

Based on individual *preferences for different learning conditions,* Dunn and Dunn (1979) identified four parameters of learning style: environmental, emotional, sociological, and physical. These parameters, or "stimuli," were further broken down into eighteen "elements." Among these, the environmental elements were sound, light, temperature, and design (or physical arrangement of the room); the emotional elements were motivation, persistence, responsibility, and a need for structure; the sociological elements included a preference for working alone, with peers, with an adult, or a combination of these potential partners; and the physical elements referred to perceptual strengths (visual, auditory, tactile, kinesthetic), a need for "intake" (food, drink), time of day, and greater or lesser need for mobility.

Entwistle (1981) suggested that style refers to *information processing*. Similarly, Nieto described learning style as "the way in which individuals process and receive information" (1992, p. 111). The term *learning style* as used by Entwistle and Nieto in regard to information processing is synonymous with cognitive style. Gardner (1983) has suggested that culture, affect, and cognition interact and are conducive to multiple intelligences (logical-mathematical, spatial, musical, kinesthetic, and interpersonal), thus blurring the distinction between culture, style, and different *abilities*.

Perhaps the most comprehensive definition of learning style is that of the National Task Force on Learning Style and Brain Behavior (as cited in Keefe and Languis, 1983):

 Learning style is that consistent pattern of behavior and performance by which an individual approaches educational experiences. It is the composite of characteristic cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. It is . . . molded by . . . the cultural experiences of home, school, and society (p. 1).

Another ambiguity in definition of learning style is that the differences between style, strategy, and tactic have not always been clear. Entwistle (1988) suggested that strategy refers to *consistency in* (students') *approach* to different learning situations. Snowman (1989) suggested that tactic refers to the *observable activities or habitual responses* of students in learning situations. In view of these different interpretations of what learning style means , it is clear that different educators use the term "style" to refer to different processes and that in fact they are referring to behavior, preferences for different environments, strategies, or tactics.

In concordance with the concept of learning styles, a plethora of tests were created to measure "styles." Irvine and York (1995) report that more than thirty test instruments have been constructed. Some of these tests were designed for children, while others were created for adults and applied in both educational and business settings (Gregorc, 1982, for example). Research using these tests has been extensive. According to Irvine and York, several thousand studies were conducted between the mid 1980s and 1995. Curry (1990) has questioned both the validity and the reliability of many of these instruments. Timm (1996) has pointed out an additional problem in regard to learning style instruments. The forced choice format is based on an assumption that individuals have a fixed rather than an adaptive approach to learning situations and to problem solving. A final criticism of learning style instruments has been that they have low predictive value for achievement (Irvine and York, 1995). This, however, may be a spurious concern due to the fact that there is no reason to assume that one approach over another will necessarily result in success.

In spite of these problems in definition, test assumptions, and difficulties in utilizing test results in the classroom, the concept of learning styles does offer some important considerations about the relationship between cultural experience, individuality, and learning situations.

Cognitive Style

Correctly used, the term *cognitive style* derives from cognitive theory and refers to variations in information processing, perceiving, conceptualizing, analyzing, and problem solving procedures (Timm, 1996). Evidence suggests that cultures differ in respect to these processes. Ambiguities have occurred with the term cognitive style, however, similar to those associated with learning style. For example, Kuchinskas (1979) identified cognitive style "as the way an individual acts, reacts, and adapts to the environment" (p. 269).

In this review, the term *cognitive style* is used to refer to cognitive processes. Field independence or sensitivity, communication, and social interaction modalities are specified as such. Wherever the term *learning style* appears in this review, it is the term used by the author(s) under discussion.

Another interpretation of cognitive style (which also includes social and behavioral factors) is a concept known as *field independence/dependence*, first identified and described by Witkin and his associates (Witkin et al., 1971;

Witkin et al., 1977; Witkin, 1979; Witkin and Goodenough, 1981) by means of the Embedded Figures Test and subsequently the Group Embedded Figures Test (Witkin et al., 1973). The Children's Embedded Figures Test (Karp and Konstadt, 1971) was further developed from this test. These tests require the test taker to locate or identify basic geometric shapes embedded in surrounding complex patterns. Two important aspects of these tests have generally been overlooked in the literature. First, the shapes are basic configurations and, second, the tests are language free, thus eliminating the bias of linguistics, although directions for the test may be provided in different languages.

Because many studies have reported cultural differences in field independence/dependence, it is important to clarify these terms here. Chickering (1976) described field independence/dependence as differences in ability to distinguish figure from ground (or shape from pattern) and (by logical extension) a construct from its surrounding context. Field independent learners have been reported to be adept at identifying specific aspects of a situation and at separating concepts from context. Other characteristics include a preference to work independently, intrinsic motivation, and a desire for personal recognition. Heppner and Krauskopf (1987) further reported that field independent learners persevere longer and are more self-directive in their learning than field dependent learners. Field dependent learners tend to be situation specific in their orientation to learning, and tend not to separate concepts from context. Other characteristics include a preference to work with others, a need for extrinsic motivation, an orientation toward social cues, and a sensitivity to others. Heppner and Krauskopf (1987) have also reported that field dependent learners adapt to new situations more easily than field independent learners. Recently the term *field sensitive* has been used rather than field dependent. It is important to note that field independence or dependence are *value free* designates and that they should not be confused with notions about intelligence, ability, or as predictors of academic performance. They are simply tendencies along a continuum by which individuals perceive, conceptualize, and problem solve in their approach to a learning situation.

Cultural Factors in Learning

In the definition of learning style by the National Task Force on Learning Style and Brain Behavior (cited above), reference is made to the relationship between style and cultural experiences. Guild (1994) has reported three different sources for research information about the relationship between culture and learning processes. These are: (a) observations and descriptions of learners from different cultural groups; (b) data based on test instruments administered to diverse student populations; and (c) direct discussion (including interviews). The major ways in which cultural experiences affect cognitive style have not always been made explicit in reports of students from diverse groups, however.

These experiences include socialization or child rearing practices, cultural "tightness," ecological or environmental considerations, a written or oral/aural language tradition (Worthley, 1987; Bennett, 1990), and so-called "high" or "low" context cultures (Halverson, 1993).

Permissive socialization practices, which encourage individual experimentation or trying different ways of performing tasks, result in a wider flexibility of cognitive style. Strict socialization practices, with pressure to perform tasks according to traditional ways, result in less flexibility of style (Jahoda, 1980). Strict practices which focus on obedience also tend to result in an orientation to learning which is specific to the present situation (Nedd and Gruenfeld, 1976).

Cultural "tightness" refers to the degree of emphasis and value given to traditional routines. Cultural "looseness" refers to the degree of latitude given to variation in the performance of daily tasks or routines. Thus "tight" cultures tend to follow precisely various time-honored ways while "loose" cultures are less rigid and more flexible in regard to traditional procedures (Worthley, 1987).

Ecological adaptation refers to customs in relation to nature within any given culture (Berry, 1976). For example, some cultures rely on highly developed perceptual skills for survival. Cultures which depend primarily on agriculture and animal husbandry emphasize customary routines in order to survive. Child rearing practices focus on responsibility, conformity to customs, and the value of traditional ways. Cultures which depend primarily on hunting, gathering, and to some extent fishing for survival require more self-reliance and application of skills under varying circumstances. Child rearing practices, while teaching traditional methods, also tend to encourage more individual initiative.

Literate societies use written symbol systems for the transmission of knowledge. Learning is more abstract and decontextualized than in oral societies which follow a more active mode and use demonstration and role modeling in order to teach. Learning is through observation and is based on specific situations (Hvitfeldt, 1985).

In addition to the foregoing considerations, Halverson (1993) has described another factor—that of "high" and "low" context cultures. In high context cultures, learning is situationally based within a social context. Skills and procedures are demonstrated and learning depends to a large degree on observation. Learners also relate the learning process to their place in social groups and to their role in society. In low context cultures, learning is more detached from the immediate use of the information and procedures are described in verbal or written form. Learners are less oriented toward the applicability of the information being transmitted in terms of the immediate task or social situation than they are in high context cultures.

Cultural Diversity and Cognitive Styles

There is a steadily increasing body of evidence in support of the notion of different patterns in cognitive style in-

cluding field independence/dependence among students from diverse cultural backgrounds. The following review focuses on diverse groups in the United States.

Asian Americans

Differences among Asian Americans have been reported in accordance with ethnic background.

The Hmong. As an example of the relationship between the cultural factors cited above and cognitive style, Timm and Chiang (1997) have described traditional Laotian Hmong culture and the cognitive style of Laotian Hmong students in the United States. In their former rural agricultural mountain communities in Laos, the Hmong approach to learning was situation specific. Strict socialization practices emphasized obedience and adherence to time honored procedures. The culture was "tight" with little latitude in routines. Ecologically, survival depended primarily on successful crops, although there was some hunting and fishing. As part of the socialization process, children participated in agricultural work as young as four years of age (Lee, 1986). Pressure for conformity was high in Hmong social organization, based on patrilineal clans with clear lines of male authority. Social roles were delineated along gender lines.

The culture was primarily oral and formal education was rare. Few villages had a school. Knowledge was handed down from generation to generation. It has been estimated that seventy percent of Hmong refugees were non-literate when they left Laos (Takaki, 1989). Thus, learning to use a written language was a profound problem which many faced in their relocation into literate societies such as the United States. The concept of writing was not unfamiliar to the Hmong, however. There have been "at least fourteen major attempts to develop writing systems for the Hmong language over the past one hundred years" (Smalley, 1990, p. 149) but Hmong students who did attend school were instructed in either Lao or French. The Hmong who cooperated with the United States during the Vietnam War gained some literacy in English (Duffy, 1997). The Romanized version of Hmong, developed in the early 1950s by two linguists (William Smalley and Linwood Barney) and a French priest (Yves Bertrais) and known as the Romanized Popular Alphabet (RPA), has become the most widely accepted and is the script used in the United States (J. Duffy, personal communication, January 12, 1998).

Finally, Hmong culture may be described as being high context. Learning was situationally based and children received their "education" at home and in the fields where they learned through observation. Procedures were demonstrated rather than discussed.

Hmong families in the United States continue to teach their children in the traditional way by using demonstration and relying on observational learning. At the same time, however, Hmong students are encountering curricular programs in American schools which transmit information in a decontextualized, written form and emphasize a more independent approach to learning. Using the Group Embedded

Figures Test (available from Consulting Psychologists Press in Palo Alto) as the test instrument to determine field independent and field dependent cognitive styles, Timm and Chiang (1997) first reported a field dependent cognitive style consistent with Hmong situation specific learning experience. In a follow-up study, Timm, Chiang, and Finn (1998) found acculturating effects of length of residency in the United States and duration of time in American schools on Hmong students' cognitive style. Covariance statistical analyses yielded significant effects for both U. S. residency and years in American schools. In other words, evidence of Hmong cultural practices was found in the cognitive and social interaction styles of these students but shifts were also found from a situation specific or field dependent style to a more field independent style associated with the number of years the students had been living in the United States and attending American schools. Gender differences were also found in the shift in style with the boys moving into a field independent mode slightly ahead of the girls. This difference may be attributed to Hmong socialization practices in regard to gender roles (Timm et al, 1998).

Prior to the studies by Timm and Chiang (1997) and Timm et al. (1998), two earlier studies reported both cognitive and interaction styles consistent with Hmong cultural experiences. Hvitfeldt (1986) reported behaviors characteristic of a field dependent style in a literacy class for non-literate and low literate Hmong adults, ranging from twenty to sixty-five years of age. These behaviors included consistent interpersonal interactions among the students, a reliance on contextual referents, and a personal relationship with the instructor. Using the Group Embedded Figures Test, Worthley (1987) reported a two-to-one ratio of field dependence over field independence among Hmong male high school and college students, ranging from seventeen to thirty-five years in age.

Other Asian students. Reid (1987) also found acculturating effects among other Asian students and reported that college ESL students who had been in the United States for more than three years were significantly more auditory in their learning style preference in comparison with students who had been in this country for shorter periods of time. Reid further reported visual learning style preferences among Korean, Chinese, and Arabic-American students in comparison with Japanese students.

In a study of learning style preferences among Chinese, Filipino, Korean, Vietnamese, and Anglo high school students, Park (1997) reported major preferences for an auditory style among Vietnamese and Chinese American students, and a minor preference among Korean, Filipino and Anglo students. Park also reported a minor visual learning style preference among the four Asian groups in contrast with Anglo students who showed a negative response to visual learning. There were also differences among the Asian groups, with the Chinese students being the most visual, followed by the Filipino and Korean, and the Vietnamese students being the least visual in their preference. Ewing and

Yong (1993) also reported a visual preference among gifted American-born Chinese students.

Park (1997) further examined these students' preferences for group or individual approaches to learning. The Vietnamese students showed the highest preference for group learning, the Filipino students showed a minor preference for it, and the Chinese, Korean, and Anglo students did not prefer it. This is an important finding because cooperative learning approaches may work well with Vietnamese and Filipino students but not so well with Chinese, Korean, and Anglo students. Park reported that high achievers across all groups preferred an individual style and that low achievers preferred group learning.

Differences in socialization practices, social interaction styles, and educational values have been reported among other Asian American groups in reference to ethnicity and length of residency in the United States. Cabezas (1981) reported differences in socialization practices in the San Francisco area among Chinese and Filipino mothers born overseas in comparison with American born mothers. Rumbaut and Ima (1988) reported that Vietnamese, Chinese-Vietnamese, and Hmong parents in San Diego placed more emphasis on school achievement than Lao and Khmer (Cambodian) parents. These value differences may be attributed to their prior cultural experience. Lao refugees in the United States have tended to come from rural areas. The more educated and urban Lao refugees relocated in France following the takeover of Laos by communist forces after the Vietnam War. Likewise, many of the Khmer refugees who settled in the states were from rural areas of Cambodia and were less educated. The more educated Khmer were massacred during the Pol Pot regime. Consistent with Rumbaut and Ima, Timm (1994) reported that although Laotian Hmong families now living in the Midwest had come from rural areas where education was minimal, they have adopted a high value for education in regard to their children in the United States.

African Americans

Ogbu (1983) described an historical, caste-dominated society along racial lines in the United States by which exploitation has extended across economic, political and social experience. It is not surprising, therefore, that African American cultural patterns include values which emphasize group unity and mutual support (Staples, 1976). Jones (1979) added spirituality, spontaneity, and a preference for oral expression. Boykin (1986) suggested that African American culture contains nine themes: spirituality, harmony or interdependence with humans and nature, movement, "verve", affect, communalism or social connectedness, personal expression, oral tradition, and a focus on "social time." These aspects suggest that students may learn better through personal relationships with the teacher, cooperative learning modes, and oral strategies. In Shade's (1997) view, African American experience has led to "survivalisms" (p. 14) or an experiential wisdom among African Americans which is not shared by non-Blacks. According to Shade, the sources of African American culture

include these survivalisms, European American mainstream society, and a culture of oppression which causes anxiety, over-identification with those in power, hostility, an ability to handle contradictions, and a preoccupation with issues of freedom and equality. Shade has suggested that "the kinship system (including protection and mutual support), world view, and social interactive behaviors have the greatest impact on learning style" (p. 15) and that African American culture and social stratification "serve as the transmitters of the cognitive and affective entry behaviors which come with the child to school" (p. 24).

Shade (1997) further reported an auditory processing mode, a precociousness sensori motor capability, a socially oriented (as opposed to an object centered) modality, and a preference for an interactive learning situation among Black children. She further suggested that perception (and therefore interpretation) of visual cues is affected by cultural experience. African Americans are more likely to be field dependent when tested on the Embedded Figures Test (Shade, 1986). This field sensitive finding is consistent with Gitter, Black, and Mostofsky (1972) who reported that African Americans are sensitive to social cues and adept at interpreting facial emotions. This social sensitivity impacts Black students' behaviors in the classroom (Shade). Ewing and Yong (1993) also found a preference for a visual learning mode among gifted African American students.

Mexican Americans

A sensitivity in the social interaction of Mexican Americans, together with an orientation to collective or collaborative efforts, reflects the traditional Mexican cultural values of close affiliation with family and community (Shade, 1997). Slonin (1991) suggested that Hispanic culture is based on cooperation, interpersonal relationships, a "relaxed" time perception, a preference for physical proximity, and traditional sex roles. Vasquez (1990) suggested that Hispanic American students' orientation of loyalty to family and groups may predispose them toward cooperative learning. Dunn and Dunn (1978) reported that Mexican American students were peer oriented and were more likely to perform well in cooperative group situations. In a large study of Mexican American immigrant and first generation elementary students and Anglo American elementary students (n=687), Dunn, Griggs, and Price (1993) found that the Mexican American students were more peer-oriented than were the Anglo students, with the Mexican American girls more peer oriented than the boys. They also found that the Mexican American boys had the strongest preferences for tactile learning and that the Mexican American girls in general showed less tactile learning preferences and a more varied approach to learning than the boys. Similarly, Ewing and Yong (1993) reported that gifted Mexican American students preferred a kinesthetic learning style over an auditory or visual one. Mori (1991) reported that Mexican students with higher English proficiency continued to show a stronger orientation for active learning in compari-

son with high English proficiency Japanese students who did not prefer this modality.

Saracho (1991) cautioned against making assumptions about cognitive style in Mexican American children, however. She asserted that, although a generally field dependent, prosocial orientation has been assumed in Mexican American children, field independence/dependence "is a relative rather than an absolute tern (and that) extensive data must be collected and analyzed before accepting any generalizations" (p.23). In a study of Mexican American kindergarten children from an agricultural community, Saracho found a range of field independence/dependence on The Children's Embedded Figures Test (CEFT). She also found significant differences in the children's play behavior and social competence. In other words, Saracho found both a diversity of cognitive styles and a range of social competency related to that stylistic diversity.

Saracho (1997) further suggested that both the amount of traditional procedures in child rearing and the degree of generational distance from migration to the United States both affect cognitive style. Several findings on differences in cognitive style among Mexican Americans in relation to Anglo contact support Saracho's view. Some of these findings are similar to the findings for Hmong students with regard to United States residency (Timm et al., 1998). For example, Buriel (1975) reported that first and second generation Mexican immigrants had cognitive styles similar to traditional communities, but the third generation did not. Ramirez and Castaneda (1974) reported that Mexican American students were inclined toward a field sensitive learning style but that style varied in relation to assimilation, distance from Mexico, length of residence in the United States, impact of urbanization, and amount of prejudice encountered. Ramirez, Castaneda, and Herold (1974) studied three different types of communities: (a) Mexican American members with a primarily traditional Mexican culture; (b) dualistic with Mexican American members and a mixture of Mexican and Mexican American cultures; and (c) Mexican American members with manifest values from Anglo-American culture. They reported that the students from the dualistic community were in between the more field dependent members of the traditional community and the less field dependent members of the Anglo-oriented community. Other studies have reported similar results from traditional and dualistic communities (Laosa and DeAvila, 1979).

This section has focused on Mexican American students but other students may experience shifts in their cognitive style in relation to type of community, demographic considerations, and length of residency in the United States. In light of Creason's report (1992) that 40% of Hispanic students drop out of school, there is clearly a need for more research in this area.

Native Americans

Smith and Shade (1997) cited some Native American cultural factors that are conducive to a field sensitive cogni-

tive style and socially sensitive interactive style. Among these are a conviction of the inherent good of all people, a belief that all people are interconnected with each other and with nature, and a view that cooperation is important for solving problems. According to Pepper and Henry (1997), socialization among Native Americans tends to be permissive and children are encouraged to experiment and to explore. Discipline does not mean obedience, but development of self control whereby children come to regard non-interference as normal. "Respect for individual dignity and personal autonomy are valued and youngsters are taught not to interfere in the affairs of others" (p. 170). Socialization further emphasizes observational and contextually relevant learning. Thus a cognitive style emerges that includes a preference for visual processing, an informal and exploratory learning preference, and a sensitivity to social cues.

An association between culture, ecology, and cognitive style has been reported among Native Americans by Kleinfeld (1970). In a testing situation for visual memory which required the ability to recall complex visual patterns, rural Inuit native children of all ages outperformed urban White children. These results were attributed to the ecology of a sparse Arctic landscape and to socialization that included a hunting tradition, both of which require visual acuity and an ability to perceive slight variations in the environment. Berry (1971) also reported visual acuity among urban Inuit subjects, in spite of less hunting experience. This finding suggests that Inuit child rearing practices emphasize visual learning, imitation, and non-verbal instruction.

Phillips (1978) reported that Native American students show a preference for learning by observation before they attempt to perform a task themselves. According to More (1987), Native American students prefer a visual to verbal learning mode and use images to learn concepts. These characteristics suggest a field sensitive cognitive style. Caldwell (1989) and Kasten (1992) reported a preference for cooperation in learning situations among Native American students.

Gender and Social Class

Within diverse groups, cognitive style may be mediated by gender and socioeconomic status. In a large study (636 boys and 638 girls), Park (1997) reported gender differences in style preferences across auditory, visual, and tactile modes and a significant gender difference in kinesthetic preference, with the girls reporting a higher preference. Some findings of gender differences within groups are reported above for Hmong and Mexican American students. Social class differences are also sometimes overlooked in the reporting of cognitive styles. Blackwell (1975) reported that African Americans in the professional/middle class and skilled blue collar class are more oriented to achievement, social striving, and consumerism in comparison with the economically disadvantaged. In an early study of Chinese, Jewish, Black, and Puerto Rican children from middle class and low income homes, however, Stodolsky and Lesser (1967) reported different patterns in cognitive processes for each ethnic group

regardless of social class. In other words, ethnicity appeared to influence cognitive style more than social class. Banks (1988) also reported similar findings of the effect of ethnicity over social class and further reported that ethnic differences remained even when social class had changed for the better. These findings suggest that the interrelationship between ethnicity, gender, and social class is a complicated one in which cognitive styles may not necessarily be assumed by one dimension alone.

Educational Implications

The research findings considered in this review raise some important issues for classroom application. First, not all students in any cultural group necessarily approach learning in the same way. As Irvine and York (1995) assert, stereotyping occurs when inaccurate or general characteristics of a group are ascribed to, or assumed, for individuals. Second, educators must remember that learning is a fluid process and that students' cognitive styles are not static but may change across time. Findings of acculturation effects among Mexican American, Hmong, and other Asian Americans suggest that individual differences and acculturating experiences must be considered. Third, individuals may use different approaches to learning and problem solving, depending on the nature of the problem. Timm (1996) reported the following anecdote:

> . . . a teacher was required to take a widely marketed learning style test by her school administrator. During the test she considered how she approached the task of writing a report and answered the test items accordingly. Being suspicious of the test's validity, she asked to retake the test immediately. Because her hobby was sewing, this time she considered how she approached the task of creating a dress of her own design. The results of her two tests indicated two totally different learning styles (p. 190).

In other words, the creators of learning style tests have not generally taken into consideration the fact that people may use a variety of approaches that best suit the task at hand.

In spite of these caveats, the above review does reveal some general patterns for diverse groups. Shade (1997) suggested that cognitive processes are the result of socialization and cultural experiences and that the environment is interpreted through cultural filters and responded to accordingly. Thus, people who share common experiences develop similar processes of "conceiving, judging, and reasoning" (p. 134). Shade, Kelly, and Oberg (1997) offer a variety of teaching strategies for working in culturally responsive classrooms. As educators, we need to remember that our own interpretations, problem solving strategies, and communication styles are the result of our cultural experiences, but we sometimes forget our own ethnocentrism in these matters. And worse, we make judgments about the abilities of students that are filtered through our own cultural lenses.

I will close by sharing an incident, told to me by a Wisconsin teacher, that dramatically illustrates how a school task may be culturally biased and fail to take diverse cultural styles into account. Hmong students in a Wisconsin school were given a sorting test and asked to draw a circles around objects that did **not** belong. One test item included a picture of a hammer, a saw, a hatchet, and a fire. The "correct" answer was the fire because it was not a tool, but the Hmong students choose the hammer. Rather than assuming that the students were wrong, the teacher asked them why they had chosen the hammer. They told her that "you would use a saw or a hatchet to cut the wood for the fire but not the hammer." This context oriented and procedurally based answer is not surprising in Hmong culture. There is a lesson here for all of us.

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