COGNITIVE PROCESSES IN LANGUAGE EDUCATION

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ABSTRACT

Some of the more interesting implications for language education have come from recent research in the neurosciences. These range from the work of noted neurosurgeons on the "split brain" phenomenon to cognitive psychologists and their attempts to further define the parameters of psychological differentiation. Many of the detailed neuroanatomical facts and the complex statistical evaluations on human information processing are not directly relevant to the language teacher in the classroom, however, many of the implications of these findings are indeed highly pertinent. As a consequence, this essay will focus on recapitulating and defining some of this cognitive research and relating it to the assessment of cognitive styles in the classroom.

COGNITIVE STYLES

Regardless of the content involved in learning about a new culture and its language, it has been found that people have a definite approach in structuring such information. The way in which they conceptually organize and structure

their environments is known in the psychological literature as cognitive styles. There are five different approaches used by psychologists in the study of structuring human information (Goldstein & Blackman, 1978) and each of these has emerged from different social and historical contexts and developed for different needs and concerns. Nevertheless, all of these approaches share a common focus. They all deal with how cognition is organized by means of psychological structures. They all involve such cognitive controls as the amount of tolerance one has for unrealistic experiences (cognitive dissonance), the amount of conceptual differentiation one has in accepting certain experiences as similar (constancy phenomenon), the susceptibility one has to distraction, the ability to either scan information or make judgments, the degree to which one levels or sharpens experiences, and the concern one has for details within a field of perception.

The first study of cognitive style under discussion grew out of the study of authoritarian personalities during the Second World War. Kurt Lewin and his associates used a laboratory paradigm to investigate the German model of authoritarian leadership. This led to a further study by Theodore Adorno and his associates (1950) on the nature of prejudice and how it relates to rigid personalities. There are people, it was argued, who have an intolerance for ambiguity and this cognitive style is evident in their overall manner of thinking, feeling, and behaving. To quantify these traits, Adorno and his colleagues developed various scales to measure personality. They found that the authoritarian individual is concerned with status and success. They attributed these characteristics to parent-child interaction and found that authoritarian parents felt inadequate about their social and economic achievements and developed an anxiety which was expressed in harsh and threatening or rigid child-rearing training. Parental discipline under these circumstances appeared capricious and arbitrary to the

child. This led to a hostility towards the parents which became repressed and shunted toward outsiders of different political, religious, and ethnic allegiance. What is significant about these studies on the authoritarian personality for language education is the fact that students who are rigid in their structuring of experience will require very formal curricula if they are to be successful in the learning experience. They do not have a tolerance for the unstructured classroom experience and are rather rigid in behavior. In this way they can reduce conflict and anxiety by denying that ambiguous experiences exist. This also reduces the need for guilt or shame brought about by insecurity.

The second approach to cognitive styles came about with the work of Milton Rokeach (1956) who argued that authoritarianism was not dependent upon political ideology or prejudice and that this same cognitive style could be found among adherents of the extreme left or right. The reason for this line of attack can be found in the concept of cognitive styles. They have to do with the way in which people structure their environments and hence the content should not play a role at all. Hence, for Rokeach (1960), the individual who possessed a closed mind did so because of a dogmatic cognitive style and those who are dogmatic in one area of their lives, he argued, are also dogmatic in others. They have closed their minds and have restricted their cognition to a narrow range of beliefs. They adhere to these dogmas regardless of the content of these beliefs and also glorify those authorities who support their own view of things. They tend to be elitist. To quantify this cognitive style and to measure the range of one's conservatism, Rokeach developed a Dogmatism Scale which he felt was relatively free from ethnocentric attitudes. When these scales were applied to the classroom situation, it was found that one becomes less dogmatic with more education. Eighth graders, for example, were more dogmatic than

eleventh graders; and on the collegiate level, graduate students were less dogmatic than undergraduates. Evidently, one's tolerance for ambiguity is lessened as one is exposed to a greater variety of experiences and social roles. Furthermore, it was found that some people replace old beliefs with new ones and demonstrate an analytical approach to cognition while others tend to integrate new beliefs into their present epistemological framework and appeal to a synthesizing of knowledge. It should be noted that highly dogmatic students were heavily influenced by authority figures and had difficulty in separating the actual message from its source. There are many similarities between the authoritarian personality and the dogmatic person and their cognitive styles. One immediate implication of this research for the classroom teacher is the realization that a student may become defensive and dismayed when the readings and the texts disagree with his or her own belief system. Hence, this is why a larger range of stories should be incorporated into a teaching situation. Diversity allows the dogmatic person to become more familiar with alternative realities.

The third model of cognitive styles comes from the research of George A. Kelly (1955) who was concerned with providing the clinician with an understanding of how his client or patient perceives and constructs reality. Kelly argues that people are actively involved in cognitively organizing the world around them. They are always forecasting events, making predictions, and negotiating reality. These modifications of ideas are known as constructs and they not only allow people to represent the environment, but also to respond to their own view of things. The construct system which one creates through social interaction becomes more and more integrated with the passage of time. Although differentiation of individual constructs do occur, it is the overall system which becomes more fully integrated in the process of psycho-social development. A cognitively

complex individual, it is argued, is able to predict the behavior of others more accurately while a cognitively simple subject tends to view others as similar to himself or herself. The latter, it should be noted, is less likely to change his/her attitudes and is more influenced by authority. What is important for the classroom teacher about these two kinds of cognitive complexity is the fact that less complex subjects are not able to handle conflict with ease. They have difficulty in handling discrepant information. Hence, they do better in classroom situations which are more highly structured for them. They can cope with drills, and have a disdain for unstructured situations such as the dialogue. Their only way to successfully cope with the dialogue is to memorize it in its entirety, reducing the element of chance and anxiety.

The fourth model of cognitive styles views people as processors of human information. It is a model advanced and advocated by Harvey, Hunt and Schroder (1961) and later expanded upon by Schroder, Driver, and Streufert (1967). They argue that people process information either by means of differentiation or by means of integration. In the case of the former, one locates stimuli along a dimension instead of combining them by means of complex rules or programs (i.e., through integration). A person is considered to be a concrete type of human information processor if he or she is low in both differentiating and integrating ability. Abstract types, on the other hand, are able to do well in locating concepts and integrating them within a system of thought. There are various levels of integrative complexity within this model. The most concrete type of cognitive style is one of dependence, in which a person views his or her world in terms of only a few dimensions combined by means of a few simple rules. Such a person tends to compartmentalize everything and is thus able to maintain contradictory beliefs. This strategy avoids ambiguity and reduces conflict. As one becomes more

and more able to alternate schemata for organizing the dimensions of perception, he or she makes a break with absolutism and embraces a negative approach toward the structuring of experience. This second level of functioning allows the person to view information as being related to a particular condition. The third level of functioning is even more complex and is marked by the ability to become independent of absolutism and to demonstrate an empirical attitude towards the environment. The most abstract level within this model can be found in the interdependent person who has a great tolerance for stress and is not intimidated by highly complex information. What these four types of complexities demonstrate is that the highly concrete person has a heavy reliance on authority, is intolerant of ambiguity, is rigid and can collapse under high stress conditions, is not adept in role taking, has a poorly defined self-concept, and has disparate and isolated views of the environment. Such a person would be intimidated by the classroom situation and would tend to resort to strategies which would minimize his or her interaction with the group. When asked to recite in class, this individual may develop a great anxiety verging on fear. Such a person does well in group recitals such as drills where the complexity of the response is highly controlled and concrete. Furthermore, such a student prefers the multiple choice and the true or false type questions rather than the essay, as these do not require much integration of the learned material.

The fifth model of cognitive styles is associated with the research of Witkin under the rubric of psychological differentiation. A person who perceives the field or environment as more discrete and structured is categorized as being differentiated. He or she has a definite sense of body boundary, a sense of individuality, and has internalized standards. Witkin set up a polarity along the continuum of differentiation. He classified the more differentiated person as one who is field independent and the less differentiated

person as one who is field sensitive. These terms came out of his research during the Second World War when it was learned that some airplane pilots became rather disoriented when their aircraft left the ground and their vision of landmarks was diminished. These pilots lost their sense of gravity orientation and would fly upside down or sideways from time to time and would occasionally crash. For Herman Witkin and his associates (1962), this problem of how people perceive themselves and their environment could be readily attributed to differences in cognitive styles. The person who focused on details had structured his information independent of the field; and the person who had a good sense or Gestalt of the field at the expense of the details was field sensitive. To further investigate this phenomenon, Witkin and his colleagues developed a series of experiments. They used a Body Adjustment Test (BAT), for example, in which the subject was placed on a movable chair in a simulated room allowing the blindfolded subject to be tilted either by the chair or by the room or by both. The task that the subject faced upon removing the blindfold was to align a luminous rod within a luminous frame. It was found that some people relied on external cues to reach a decision in aligning the rod and frame in a true upright position and others depended on internal cues. From this analysis, they argued that those who focus on the overall organization of the field in resolving spatial problems are field dependent or field sensitive. By contrast, those who tend to focus on discrete elements without taking into consideration the backgrounds or the totality in which these elements were merely a part were labelled field independent. From these studies, Witkin and his associates concluded that the disoriented pilots who lost their sense of spatial environment were indeed field independent. They saw details and lost a sense of the field. They are the same kind of people who would become disoriented while driving through a heavy

rain storm or a blizzard, where the background becomes visually diminished, thereby removing important spatial information in the process. Much of the work on psychological differentiation discussed in this last model mirrors previous research. However, what makes this model unique is that it will become intrinsically related with neurosociological research on cognitive styles (TenHouten, 1981) and bicognitive education (Ramirez & Castaneda, 1974).

CEREBRAL HEMISPHERES AND COGNITIVE STYLES

There are many other tests that psychologists have used in ascertaining perceptual differentiation in terms of cognitive styles (Ramirez & Castaneda, 1974; Shouksmith, 1970). The more noted ones are the Embedded Figures Test (EFT), the Rod and Frame Test (RFT), the Body Adjustment Test (BAT), the Draw a Person Test (DPT), and various subtests of the Wechsler Intelligence Scales (WISC). However, one of the more fascinating developments in this body of literature has been the discovery that cognitive styles are biologically localized in different cerebral hemispheres (Gazzaniga & Sperry, 1966). It appears that analytical cognitive styles or the field independent mode of cognition is characteristically associated with the left hemisphere of the brain while the relational cognitive style or the field dependent (field sensitive) mode is related to the right hemisphere of the brain. Both halves are joined by the corpus callosum in such a way that the left hemisphere of the brain controls the right half of the body and vice versa. Therefore, in dichotic studies of hearing, the signals which are picked up by the right ear are processed by the left hemisphere of the brain and vice versa. Certain senses, however, such as the eyes, are equally divided so that half of each eye sends information to the left hemisphere of the brain and the other half of the eye sends information to the right (Buzan, 1974). The nose, it appears,

is ipsilateral in that the left half feeds information into the left brain and the right half to the right brain.

CEREBRAL HEMISPHERES

LEFT	RIGHT
Analytical mode	Relational mode
Sequential processing	Simultaneous processing
Rational thought	Emotive, affective thought
Controls right body	Controls left body

Each side of the brain is involved in different information processing tasks. The left cerebral hemisphere, for example, is analytical and involves the temporal or sequential approach to structuring experience (Krashen, 1977). The right side of the brain, on the other hand, is concerned with relationships and views things in terms of Gestalt or simultaneous patterns of information. It is also where affective thought or emotion comes from (Edwards, 1979; Samples, 1976).

Ramirez and Castaneda (1974) have argued that the traditional Mexican-American child develops a field sensitive cognitive style and that in the American school system a conflict is created because the preferred mode of cognition is based on the field independent style. The child comes to school prepared to view and structure knowledge from the right side of the brain, but the school favors and tests for only the mode of cognition associated with the left side of the brain. Hence, the minority children studied by these educational psychologists are at a disadvantage; and it is this situation which demonstrates the need for teaching methods which combine both modes of cognition. Each of these cognitive styles differs in terms of the way in which the child relates to the teacher and the classroom situation, and unless a system of bicognitive development is employed,

problems will continue to occur which hinder the more effective use of human processing of information. The following provides a synopsis:

RELATIONSHIP TO PEERS

LEFT HEMISPHERE	RIGHT HEMISPHERE
Field independent behavior	Field sensitive behavior
Child prefers to work alone	Child prefers to work with others
Child likes competition	Child likes cooperation
Child is task-oriented	Child is person-oriented

PERSONAL RELATIONSHIP TO TEACHERS

LEFT HEMISPHERE	RIGHT HEMISPHERE
Field independent	Field sensitive
Avoids physical contact	Seeks stroking and feedback
Formal interaction	Personal interaction

INSTRUCTIONAL RELATIONSHIP TO TEACHERS

LEFT HEMISPHERE	RIGHT HEMISPHERE
Field independent	Field sensitive
Likes new tasks	Prefers the familiar
Works alone	Works in groups, seeks guidance
Likes to finish first	Seeks group acquiescence
Seeks nonsocial awards	Highly sensitive to social reward

TYPE OF CURRICULUM FACILITATING LEARNING

LEFT HEMISPHERE	RIGHT HEMISPHERE
Field independent	Field sensitive
Emphasize details	Emphasize general concepts
Meaning in parts	Meaning found in whole
Likes mathematics, science.	Likes stories in humanized format
Discovery approach	Language-experience based approach

Obviously, children may differ in terms of their cognitive styles and consequently will grow and flourish in some contexts as opposed to others. Fortunately, most children are bicognitive and can operate rather well with both modes of cognitive styles. Nevertheless, the visual arts are usually associated with the right cerebral hemisphere and this aspect of cognition is not legitimated by most school systems. Hence, the teaching format is dominated by some cognitive tasks and almost completely avoids others.

In teaching English as a foreign language, the cognitive styles of the students play a major role in the classroom. The kind of thinking required for tests is based on field independent tasks where one is asked to work alone, to be competitive, to be task oriented, and to strive for non-social rewards. Creativity is associated with the field sensitive student, on the other hand, and such a student is good at working out spatial relationships, prefers to work in a group with others, and furthermore, welcomes their comments. Unfortunately, creative students do not always place high in standardized tests because they tend to go beyond the format of the structured examination and are penalized for it.

Another aspect of the cognitive sciences which is important for language teachers is the area of dyslexia. In reading, for example, some students have difficulty in orienting such letters as "b" and "d." They confuse these in the reading process. However, there is more involved in dyslexia than a mere confusion in orientation. It appears that this phenomenon is related to gender differences also. It is a problem in which males dominate, comprising some 80% of all dyslexics. Some have argued (Farnham-Diggory, 1978: 131) that this is caused by right hemispheric dominance in males and left hemispheric dominance in females. The problem arises when both hemispheres of dyslexic males take on the cognitive functions of the right hemisphere in males and vice versa for females. It should be noted that in bicognitive children this problem does not exist. It is necessary to use both hemi-

spheres in the act of reading and this process of cognitive switching is summarized as follows:

BICOGNITIVE READING

MODALITY	TYPE OF STIMULUS MATERIAL	HEMISPHERE
Ear	digits, words, letters, syllables,	left
Ear	music, environmental sounds	right
Eyes	words, letters, digits	left
Eyes	colors, forms, dot patterns	right
Hands	letters, naming forms	left
Hands	abstract forms, unverbalizable forms	right

It should be noted that many of the problems of dyslexia are also related to the romanized script (Farnham-Diggory, 1972). In Japan, for example, where the writing system is ideographic and where the Kanji characters still retain much of their earlier visual imagery, these problems of dyslexia do not occur (Farnham-Diggory, 1978). The question should be raised, however, as to whether or not the introduction of the romanized script (romaji) in the English as a second language classroom would create dyslexic problems for some students whose problems of disorientation may not have surfaced earlier when processing ideographic information.

CONCLUDING REMARKS

There was a time when the classroom teacher had only to worry about executing drills and syntactic patterns and did not have to bother about such esoteric matters as cognitive styles or psychological differentiation. This is no longer the

case. Language education is a complex and interdisciplinary activity and there are many factors which could either enhance or deter the process of acquisition.

Once teachers of English as a foreign language became fully aware of error analysis and its implications for classroom behavior, it was only natural that the next stage of awareness should progress to a concern for cognitive styles. Some approaches to curriculum development are, after all, beneficial to some students and not to others. Some students feel comfortable with classroom lectures and others want to be personally assisted in the structuring of information. Furthermore, some students can relate readily to the print culture and the romanized orthography of the Western history of education and others are better suited to a more visual culture or an oral tradition.

The answer to all of these problems, of course, lies in the quest for bicognitive education. The classroom should appeal to both the analytical and the relational modes of cognition, the print and the graphic cultures, the competitive and the cooperative students, the highly structured and the hermeneutic approaches to knowledge, and the task-oriented as well as the person-oriented child or adult. What this essay has demonstrated by means of a recapitulation of the literature is that different cognitive styles do indeed exist. The next stage for the language teacher is to go beyond the awareness of this dichotomy and to actually integrate his or her classroom activities within the tradition of bicognitive development. It is this transition from awareness into action and from thought into performance that will be among the immediate concerns of the teacher in the language classroom. Many actual suggestions for such a transition can be found in the work of Ramirez and Castaneda, (1974) and the framework of Farnham-Diggory, (1972).

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