

WHAT WE KNOW ABOUT MODALITY STRENGTHS

RESEARCH THAT SHOWS STUDENTS HAVE DIFFERENT MODALITY STRENGTHS SHOULD BE USED TO IMPROVE LEARNING.

WALTER B. BARBE AND MICHAEL N. MILONE, JR.

One of the most promising movements in contemporary education is the attention being given to student learning styles. The movement is based on the idea that students vary in their approach to learning, so "... no single instructional process provides optimal learning for all students" (Bracht, 1970, p. 627).

Perhaps the most thoroughly investigated of the learning styles are those involving perception, the process most intimately associated with learning. Educators usually refer to the channels through which perception occurs as *modalities*: vision, audition, and kinesthesia. The channels most efficient for processing information are referred to as *modality strengths* (Barbe and Milone, 1980). A modality strength may occur in a single channel, or be mixed—that is, involving two or more channels.

A modality strength is not the same as a modality preference. A modality strength implies superior functioning in one or more perceptual channels and is assessed through a task of some kind, as in the Learning Methods Test (Mills, 1970). A modality preference, on the other hand, is just that: a preference. Modality preferences are usually measured by self-reports, such as the Learning Style Inventory (Dunn, Dunn, and Price, 1975). While most adolescents and adults probably pre-

fer to use their strongest modality, there is no guarantee this will be the case.

To examine relationships among modality strengths, learning, and other aspects of development, we conducted a study involving 1,000 southern California school children and their teachers. To the data gained from these participants, we added the information obtained from several other sources: musically talented high school students, elementary students from a large midwestern city, and teachers from several parts of the country. Modality strengths were assessed by asking students to recreate sequences of geometric shapes of increasing length. The patterns were presented visually, auditorily, and kinesthetically. The percentage of correct responses in each modality provided a measure of their relative strengths. The matching-to-sample task proved to be both valid and reliable, and is commercially available (Barbe, Swassing, and Milone, 1979).

A more detailed description of our research is available elsewhere (Barbe, Swassing, and Milone, 1979), but the following paragraphs summarize the results. Keep in mind that our comments are based on group averages and are best used as general guidelines. Planning for individual students should be undertaken only after assessing their individual modality strengths.

• *Students vary with respect to their modality strengths.* As elementary as this conclusion may seem, it is the foundation on which all instruc-

tional planning can be based. We cannot cite exact figures at this point, but we can offer fairly accurate estimates. The most frequent modality strengths are visual or mixed; each accounts for about 30 percent of the population (although mixed modality strengths are more frequent among adults than children). About 25 percent of the population are auditory, and the remaining 15 percent kinesthetic.

In terms of achievement, students with mixed modality strengths have a better chance of success than do those with a single modality strength because they can process information in whatever way it is presented. Children with an auditory orientation usually perform poorly on standardized achievement measures, possibly because tests of this kind are more suited to mixed modality or visual students. Auditory students do better with the spoken rather than the printed word, so they would probably perform better on a non-print test.

• *Modality strength is not a fixed characteristic.* Modality strengths change with age. Primary grade children are more auditory than visual, and are least well developed kinesthetically. Between kindergarten and sixth grade, however, a modality shift occurs. Vision becomes the dominant modality, and kinesthesia overtakes audition.

This shift has not been reported by other researchers, although its existence can be deduced from the literature. Figure 1 summarizes seven selected studies, six of which have been reviewed by Mozingo (1978). The results of these studies support such a modality shift.

Sometime between the late elementary grades and adulthood another shift occurs. Vision remains the dominant modality, but audition becomes more important than kinesthesia.

These shifts reflect the changing environment of children. Young children interact with peers and adults primarily by speaking and listening. When they enter school, however, the situation changes drastically. For much of their waking day, they are expected to use the visual modality (through reading) and the kinesthetic modality (through writing). Teachers suppress audition, sometimes actively, in an effort to maintain an orderly classroom.

Walter B. Barbe is Adjunct Professor and Michael N. Milone, Jr., is Lecturer; both at The Ohio State University, Columbus.

Among adults and students in secondary school, audition becomes more important than kinesthesia. Individuals at these ages engage in fewer kinesthetic activities in school than elementary school children do, while oral/aural interaction increases somewhat (Frostig and Horne, 1964).

• *The modalities become more integrated with age.* In young children, the modalities are comparatively independent from one another. As the child grows older, however, maturation and experience contribute to integration of the modalities, and strategies are developed to transfer information from one perceptual channel to another (Chalfant and Scheffelin, 1969), so there are more adults than children with mixed modality strengths. Jones (1972) points out that intersensory transfer, another term for modality integration, has been found to contribute to success in reading, at least in the elementary grades.

• *There is no clear difference between the modality characteristics of boys and girls.* Through a factorial analysis of variance, we found that the modality characteristics of boys and girls were comparable. This finding is consistent with the contention of Maccoby and Jacklin (1974) that the perceptual skills of school-age girls and boys are similar.

It must be added, however, that the girls in our sample generally had higher raw scores than the boys. Although this superiority was not statistically significant, its consistency may signal an actual difference in modality functioning during the pre-adolescent years.

Gender had no bearing on modality characteristics among the adults we tested either. It is quite likely that the men and women we studied, all of whom were professionals in education, were cognitively sophisticated and used similar rules to solve the matching-to-sample problem.

• *Handedness and modality strengths do not seem to be related.* No measurable difference emerged in the modality strengths of left-handed and right-handed children or adults. The literature gave us little direction as to what types of differences we might expect, and no differences greater than would be expected by chance appeared.

• *Race and modality strengths were independent.* Based upon the

results of research in experimental psychology and other disciplines, we suspected that the modality characteristics of racially distinct children might vary. Evidence suggested that members of industrialized and non-industrialized societies respond to visual illusions differently (Glick, 1975) and that the optometric characteristics of Chinese and American subjects may be distinct from one another (Carr and Francke, 1976).

We identified 65 children in our sample who spoke Spanish as a first language, used Spanish in the home, and were members of an identifiable Spanish community. We matched these participants by sex, grade, achievement, and handedness with a like number of English-speaking students. An analysis of variance showed that the number of correct responses made and the relative modality strengths were similar for both groups.

These findings suggest that minority children who are exposed continually to the majority culture (most Blacks, Hispanics, and Orientals) have modality strengths similar to those of their majority peers. Children from groups outside the mainstream of American culture, such as

combinations of student and teacher modality strengths were associated with more rapid gains on the standardized test we used. For example, when children and teachers both had mixed modality strengths, their pre- and post-test scores (November-May) were the highest, and their rate of improvement compared favorably with that of any other combination.

Implications for Education

Our findings support the idea that student modality strengths should be considered in instructional planning, including selecting or developing media and materials and designing the physical plant. Barbe, Swassing, and Milone (1979) describe several instruments for assessing modalities, while Dechant and Smith (1977) report on others.

Another implication is that teachers and supervisory personnel should be aware of their own modality strengths. It is too early to recommend matching students and teachers by their modality strengths, but teachers should realize that they probably teach the way they learn best, and that many students have other modality strengths.

Figure 1. Summary of Selected Modality Research

Investigators	Year	Subjects	Dominant Modality	
			Visual	Auditory
McKirby and Rovee	1978	Infants		X
Budoff and Quinlan	1965	Second grade		X
Perelle	1975	Second grade		X
Lockhard and Sidowski	1961	Fourth and sixth grade	X	
Cooper and Gaeth	1967	Fourth and twelfth grade	X	
Many	1965	Sixth grade	X	
Van Mondfrans and Travers	1964	Adults	X	

Native Americans, may exhibit unique modality characteristics. The latter conclusion has not been established empirically, but is a possibility, given the reports of Carr and Francke (1976) and Glick (1975).

• *There is an interaction between student and teacher modality strengths.* It has been argued that the manner in which teachers conduct a class reflects their own learning style (Barbe and others, 1979; Gregorc, 1979). Although we have not yet acquired evidence to support this argument, we did discover a strong interaction between student and teacher modality strengths. Certain

Supervisors should be aware that their perceptions of a teacher's effectiveness may be clouded by their own modality strengths. They may be annoyed by Mr. Jones' bulletin boards and posters and think Ms. Smith's storytelling and phonics lessons are wonderful simply because they themselves are more auditory than visual.

Finally, it is apparent that more study needs to be done in this area. We do not know what materials work best with students of a particular modality strength, nor are we certain whether grouping students or matching students and teachers by modality

are worthwhile practices. The relationship between modality strength and achievement is still unclear, as is the effect of the school and home environment on development of modality strengths.

Gaining an understanding of these matters will not yield the answer to every educational question, but it should result in more effective teaching and learning. ■

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