

Calgary Keynote Presentation

How the Brain Influences Behavior

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Historic first public institution of higher learning in California

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We have learned more about how the brain influences human behavior in the past 30 years than we knew in the prior 3,000 years. Most of these discoveries were inspired by the Nobel Prize winning experiment of Roger Sperry from the California Institute of Technology. Sperry demonstrated with cats that each hemisphere of the brain can problem solve independently. From 4,000 follow-up studies worldwide, here are some highlights:

The brain has its own intelligence. For example, it is making billions of computations about the chemistry of our body which are never revealed to us. We are the last to know. The brain knows the answer to any question we may ask at least 1/2 second or more before we do.

Each hemisphere of the brain seems to have a different assignment. The left side is verbal, critical and analytic. It likes to talk and automatically evaluates what it observes. It seems to be dedicated to keeping us "safe and sane." It encourages us to "stick to what you know" and "look before you leap!"

The Instructor's Adversary

School attempts to change our behavior. But, the left brain wants students to walk out of the class exactly the same as when they walked in. Hence, the left brain is the instructor's adversary, often sending sabotaging messages to the students such as: "Is this relevant to my life?" "How will I ever use this information?" and "Does this teacher know what she is doing?"

Lies, lies, lies

The critical left brain may be telling the student that there is no language like the one the teacher is "selling." After all, the teacher is the only person in the room who is trying to change our view of familiar people, places and things that we all know to be true. She insists on renaming our world with strange "impossible to pronounce" utterances. Therefore, in the student's brain, what the person in front of the room is saying must be lies, lies, lies---and, the brain will not store lies in long-term memory. That's why an instructor can ask students to practice an exercise for an hour, come into the next class meeting and it is as if the exercise has been erased from the students' memories.

Cause-effect relationships

The right side of the brain is nonverbal (mute), non-critical, and pattern-seeking. Although the pattern-seeking side of the brain is mute, it will try to communicate by whispering faintly and use body language such as gestures. When the pattern-seeker finds cause-effect relationships, these are likely to be stored in long-term memory. The implication for teaching is that assertions by the instructor are not enough. The student's brain will insist that each assertion be proved. The foreign language of mathematics is notorious for making one assertion after another without showing the students what the Gestaltists called the "inner structure" or cause-effect relationships. For example, many people may remember the rule: When dividing fractions, invert the second term and multiply. No one, except perhaps for professional mathematicians, can explain why we "invert the second term and multiply." The results: in the USA, we spend more money on remedial mathematics than all other forms of mathematics combined.

Doodling

One way to bypass the critical, ever-vigilant left brain is play---and one little-known expression of play is doodling. Students believe that they have done their part in acquiring a second language by conscientiously completing assignments in class and then follow-up by doing their homework. But, this may not be enough. Students should be encouraged to doodle in the target language. Play with it on their way to and from class. Make up conversations with imaginary friends. This is the way the head of the Spanish Department at the University of Southern Mississippi told me that he acquired Spanish. A teacher of English in Korea with almost perfect pronunciation of the English language told me that his secret play activity was western movies. He would sit through them for 50 times until he could, in a low voice, speak the dialog before the actors. "Don't touch that six gun, you varment!"

For other exciting implications of brain research for second language acquisition (including mathematics), I recommend my latest books:

Learning Another Language Through Actions,

Brainswitching: Learning on the Right Side of the Brain,

The Super School: Teaching on the Right Side of the Brain,

and

The Weird and Wonderful World of Mathematical Mysteries.

Best wishes for continued success in the year 2001

James J. Asher