

FOREIGN ACCENTS, LANGUAGE ACQUISITION, AND CEREBRAL DOMINANCE¹

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It has long been accepted that children are able to master the sound patterns of a second language with much greater ease than adults. In fact, adults never seem capable of ridding themselves entirely of a "foreign accent." There have been many attempts to account for this discrepancy in language learning between children and adults in terms of nurture, but, for the most part, these theories have proved inconsistent. It is proposed that it is the nature of the human brain, not its nurture, that is essentially involved here—specifically, that the onset of cerebral dominance, which seems to occur around the age of twelve, inhibits the ability of a person to master the sound patterns of a second language without an impinging foreign accent.

Almost everyone learns the sound patterns of a language perfectly as a child, and yet, almost no one can learn the sound patterns of a language perfectly as an adult. In the proper environment, children can learn to speak a second language with the complete fluency of a native speaker; adults cannot. Despite the fact that the adult learner has, as Land (1962) pointed out, extensive discrimination training, a highly articulate verbal repertory, and a great deal of control over the language learning process, adults cannot master the sound patterns of a second language with the fluency of a native speaker. Although adult learners often far surpass their younger counterparts in learning vocabulary items, syntactic rules, and stylistic variations, they never seem able to rid themselves of a foreign accent.

Thus, if Professor Irwin Corey, Indianologist and Phonetician at a large Midwestern university, moves to New Dehli for a year's sabbatical, he will discover, much to his chagrin, that his young, six-year-old son, William Jones Corey, will be able to speak Hindi with the fluency of an Indian schoolboy. Professor Corey's Hindi, on the other hand, usually elicits the response, "You speak excellent Hindi..... for an American!" It does not seem to matter

¹This paper was presented to the Michigan Linguistic Society, Mount Pleasant, Michigan, October 4, 1969. My thanks to Professor James D. Ranck, Department of Physiology, University of Michigan, for his interest and guidance.

very much that our Professor Corey has published a Hindi-English Dictionary, a transformational grammar of Hindi, which, incidentally, received excellent reviews, and has taught phonetics and phonemics for many years. Unless we accept the fact that children are much more intelligent than adults, a position untenable for those of us over thirty, there does not seem to be any innate reason why there is a discrepancy between Professor Corey's acquisition of Hindi and that of his son. For this reason, most linguists and psychologists have sought to explain this discrepancy in terms of *nurture* rather than *nature*: that there are environmental differences between child-learning and adult-learning that account for the superior ability of children to master languages without a foreign accent.

For example, David Wolfe (1967) has suggested that a child's acquisition of language is unconscious whereas an adult's is conscious. Wolfe does not explain, however, what unconscious learning is or how it affects the learning of a language. Furthermore, even in situations where the child is forced to learn language consciously, in a formal school situation for example, the child is still able to master a second language without a foreign accent whereas his older counterpart cannot.

Geschwind (1966) has argued that the discrepancy between language acquisition in adults and in children may be related to the anatomical manner in which language is learned.

There is another sense in which second-language learning usually takes place in circumstances different from first-language learning: we probably learn a second language in an anatomically different way than that in which we learn our first language. In first-language learning, associations are made between actual objects in the environment and their names, the largest number being visual-auditory and tactile-auditory association. By contrast, when a second language is learned by an adult, it is primarily done by translating from the first language, i.e., by auditory-auditory associations, not by dealing directly with the environment. Different anatomical regions are used in the two cases. (61)

It is difficult to see, however, in what way visual-auditory and tactile-auditory associations are connected to the ability to speak a language fluently, and, again, as was pointed out above, there are instances where children learn a second language fluently in a school situation, a situation in which most language learning is through auditory-auditory associations.

It may be argued at this point that since language acquisition in childhood is essentially first language acquisition, and since language acquisition in adulthood is almost exclusively second language

acquisition, the real issue is not the difference between child and adult acquisition, but between first and second language acquisition. The adult, having acquired the ability to speak at least one language fluently, is unable to master a second language without experiencing enormous interference from his grounding in a first language. In contrast, a child, in learning a first language, experiences no interference from a previous language background. There are many bilinguals, nevertheless, who have learned a language several years after another and thus provide a counter argument to the interference theory; specifically, why doesn't a first language interfere with the acquisition of a second language by children? Valette (1964) cites evidence that there is, indeed, some interference; children who learned English before moving to France spoke French with a marked foreign accent at first, but, in time, learned to speak French fluently. If the interference theory is at all valid, how can it account for the fact that children are able to overcome first language interference whereas adults cannot?

Furthermore, if first language interference is strong enough to prevent the complete acquisition of the sound patterns of a second language, why would it not affect the complete acquisition of the syntactic patterns of a second language as well? Although most adults have great difficulty fully learning the syntactic patterns of a second language, there are many instances of adults learning the syntax of a second language completely and yet not being able to lose a foreign accent when speaking. Joseph Conrad, who learned English when he was eighteen, was able to write fluently and creatively in English after a few years' practice. His prose demanded almost no grammatical editing, and yet his strong foreign accent prevented him from lecturing publically in English (Gerard 1967).

Newmark (1968) claims that it is neither the innate ability of the child nor the interference of a first language that causes the discrepancy between language acquisition in children and adults, rather, it is the way in which language material is presented.

We believe that the necessary and sufficient conditions for a human being to learn a language are already known: a language will be learned by a normal human being if, and only if particular, whole instances of language use are modeled for him and if his own particular acts using the language are selectively reinforced. (149)

Again, as with the arguments of Wolfe and Geschwind, it has been shown that children can acquire a second language without a foreign accent under the same pedagogical system which adults learn a second language. Furthermore, there is evidence that adults

learning a language in an unstructured, informal situation are no more able to lose a foreign accent than those studying within the dreary confines of a university classroom.

Implicit in the discussion presented so far is a claim that no learning theory based solely on nurture can account for; that is that language acquisition in childhood is a *trait* while language acquisition in adulthood is a *skill*. In other words, the child is able to master the language system completely, regardless of his intellectual capacity or his social environment whereas an adult is unable to master at least the sound patterns of a language system completely, although his intellectual capacity and his social environment do come into play. There are many adults who are more skilled at language learning than others, and there seem to be many environments that are more conducive to language learning than others. In this sense, proponents of nurture theories are correct. Notice, however, that there is a distinction made between the *complete* ability of all children to acquire language which I call a trait, and the *varying* abilities of adults to master a language which I call a skill. Nurture theories can account, to some extent, for the varying skills of adult speakers in learning a language, but they cannot account for the trait of all children to acquire a language.

It is important to note here that the idea that all humans have the ability to learn a language without a foreign accent in childhood can be applied, not only to language production, but to language recognition as well. All native speakers of a language have the ability to recognize a non-native speaker by his accent; the existence of foreign accents is dependent upon the ability of native speakers to recognize them.

In a small survey taken of 117 junior high school students, a tape of ten speakers was played- five native speakers of English of varying dialectal backgrounds, and five non-native speakers of English of varying ability in oral English. All the non-native speakers had an excellent command of English syntax and were able to write several paragraphs of discourse with few grammatical errors. The speakers said the following sentence twice, HELLO MR. SMITH, HOW ARE YOU TODAY? The junior high students were able to judge whether the speakers were native born Americans with 85% accuracy, despite the fact that they heard only one sequence twice. The students' ability to judge foreign accent was not related to their academic ability nor to their sex. It is interesting to note that the majority of errors that did occur were made with A) a speaker who had been born in Great Britain but had lived the past ten years in Boston, and B) with speaker A's wife, who had been

born in New England, but had lived several years in Great Britain. It is obvious, then, that the relatedness between two languages has some import to our claim that no language can be learned as an adult without a foreign accent. The claim is qualified to the extent that, given enough exposure, any adult can learn a second dialect (or possibly a closely related language) without a foreign accent. In fact, an interesting operational definition of a dialect is the second language an adult can learn to speak without a foreign accent! Obviously, an adult speaker of Mandarin, however, will never be able to learn to speak English fluently, although there are adults who became bilingual in Mandarin and English in childhood. The fact that children can acquire language with native-speaker fluency and adults cannot, and the fact that the production and recognition of foreign accents is a trait and not a skill, forces us to conclude that it is *nature* and not *nurture* which determines our ability to speak without a foreign accent.

I would like to present the possibility that it is the nature of the brain, specifically, the phenomenon called *cerebral dominance* or *lateralization*, that accounts for the ability of children to learn languages fluently. Certainly, one very appealing reason why linguists and psychologists have avoided talking about the relation of brain mechanisms to human behaviour is because the brain, unlike the environment, cannot be subjected to much control. Furthermore, so little is really known about the neurophysiology of human behaviour, it is difficult to know to how great an extent any cerebral area of mechanism is responsible for any particular facet of human behaviour. Thus, Penfield (1959), in some fascinating clinical experiments, has been able to repress certain kinds of verbal behaviour and to elicit certain sensations of memories by touching various areas of the surface of the cerebral cortex with an electric probe. It is impossible to determine, however, how much such gross and unnatural stimulation can tell us about the association areas of the cortex and how they are related to human behaviour.

Lashley (1961), in his classic paper on serial order in behaviour, draws an excellent picture of the interrelatedness of brain mechanisms by likening the circuits of the brain to a large lake, whose surface is constantly stirred by the blowing of the wind, the bobbing of a floating log, the wake of a passing boat, and the ripples from a surfacing fish. To complicate this picture even more, the firing of nerve cells, unlike wave motions, which are uniform, is individualistic enough to change the patterning of the nervous response. In addition, unlike the surface of a lake, nervous activity is never activated from an initially placid system.

My principal thesis today will be that the input is never into a quiescent or static system, but always into a system which is already activately excited and organized. (181)

Despite these doubts as to the overall acceptability of neuro-physiologically-based explanations and accepting the fact that any characterization of brain mechanisms is an oversimplification, there is still strong circumstantial evidence that the maturational development of cerebral dominance is closely linked to the ability to acquire language.

Historical interest and awareness began with two French physicians, Marc Dax and Paul Broca and was continued by the British physician, John Hughlings Jackson, who wrote, in 1874:

I hope to show to things— 1) that both halves [of the brain] are alike, in so far that each contains processes for words, 2) that they are unlike in that the left only is for use of words in speech and the right for other processes in which words serve. (130)

The relationship of the dominance for speech of one hemisphere (predominantly the left) and handedness (which, incidentally is also dominated by the left hemisphere since most people are right-handed) was not clear in Jackson's time. Clinical evidence cited by Rosadini (1967), Bassler (1962), and others in this century has shown that cerebral dominance for speech and cerebral dominance for handedness are not related.

Goodglass and Quadfasel (1954) concluded that 'cerebral laterality for language and handedness are not directly linked, and one does not determine the other. Left cerebral laterality for language is more prevalent than right-handedness and right cerebral laterality for language is much less prevalent than left-handedness. (Bassler 1962:429)

Interestingly enough, man, who has often been called "the speaking animal" could just as well be known as "the lateralized animal."

The most dramatic difference between the human brain and that of any other vertebrate is the appearance of hemispheric dominance or language specialization. (Lenneberg 1967:66)

It might be asked at this point, if the left or dominant hemisphere controls speech, what is the function of the right or minor hemisphere? Interesting evidence collected by Luria (1965), who examined post-operative cases with right hemisphere injury and

findings by Gazzaniga (1967) in his work with split-brained patients, have shown that the minor hemisphere is peculiarly related to spatial orientation. Recent evidence from Gazzaniga has indicated that the minor hemisphere also plays an important role in stimulus association.

Jung (1962), in a Princeton conference on interhemispheric relations and cerebral dominance several years ago, has summarized current research on the relationship between the two hemispheres.

Dominance manifests itself only for special functions: in the left hemisphere, dominance exists for language, including reading and calculation. In the right hemisphere, dominance seems to exist for certain spatial and practical functions. . . To characterize hemispheric functions further, Dr. Hécaen cited Wagner's metaphor comparing the right hemisphere to the conductor, the left to the composer and orchestra of a complex musical performance. (273)

Of special interest to those interested in the difference between language acquisition in children and adults is the age of onset of dominance, or, more precisely, the age at which the brain has become completely lateralized. Clinical evidence from children and adults who have suffered severe injury to the dominant hemisphere has shown that dominance for speech is automatically relocated to the right hemisphere in children up to the age of about twelve. Penfield (1965) states:

I have seen children, below the age of ten or twelve, lose the power of speech when the speech convolutions in the left hemisphere of the brain had been destroyed by a head injury or a brain tumor. I have seen them recover after a year of dumbness and aphasia. In time, they spoke as well as ever because the young child's brain is functionally flexible for the start of a language. They start all over again. (788)

After the age of ten or twelve, the general functional connexions have been established and fixed for the speech cortex. After that, the speech centre cannot be transferred to the cortex of the lesser side and set up all over again. This 'nondominant' area that might have been used for speech is now occupied with the business of perception. (792)

Lenneberg (1967) claims that the transfer to the minor hemisphere can occur only between the ages of about two to thirteen. Gazzaniga (1967) goes on to explain the manner in which one hemisphere becomes dominant in the maturational development of the child.

Up to the age of four or so, it would appear from a variety of neurological observations, the right hemisphere is about as pro-

ficient in handling language as the left. . . The implication is that during maturation, the processes and systems active in making this capacity manifest itself are somehow inhibited and dismantled in the right hemisphere and allowed to reside only in the dominant left hemisphere. (28)

In a summary table in a chapter entitled, "Language in the Context of Growth and Maturation," Lenneberg (1967:181) has listed in the row describing language behaviour at ages eleven to fourteen: 1) lateralization firmly established but definite statistics not available, 2) some asphasic symptoms become irreversible (particularly when acquired lesion was traumatic), and, most importantly, 3) foreign accents appear. The simultaneous occurrence of brain lateralization and the advent of foreign accents is too great a coincidence to be left neglected. It seems reasonable to me that the ability to master a language without a foreign accent before the age of about twelve is directly related to the fact that lateralization has not yet become permanent; similarly, it seems apparent that the *inability* of adults to master a language without a foreign accent after the age of about twelve is directly related to the fact that lateralization has become permanent. By this I do not mean that children have the ability to store a second language in the right hemisphere and thus have, in effect, two dominant hemispheres. Nor do I mean that adults cannot learn the sound patterns of a language completely because the dominant hemisphere is completely occupied with one language system already. Rather, I mean that the same plasticity that accounts for the ability of the child's brain to relocate speech to the non-dominant hemisphere accounts for the plasticity that must be evident in the neurophysiological mechanisms underlying the production of the sound patterns of a second language. To reverse the criticisms made earlier of the nurture theories, why does this cerebral dominance theory account for the obstruction of the sound patterns of a language only, and not of the syntactic patterns of the language as well? A tentative guess is that sound patterns are produced by actual motor activity and are thus directly initiated by neurophysiological mechanisms. To the best of my knowledge, lexical and syntactic patterns lack any such "neurophysiological reality."

Finally, if this theory is to be given any credence, it might have some implications on foreign language teaching. For example, to what extent are we as teachers of English as a second language trying to rid our students of a foreign accent? If what I have suggested is true, our efforts towards this end are as futile as Professor Corey's attempts to become a native speaker of Hindi.

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