8 Language Development, Aphasia, and Dyslexia

It is known that the study of the function of separate parts of the brain began with observation of cases of speech pathology.
A.R. Luria (1964)

... there are major and fundamental differences between rules of language and rules of games. The former are biologically determined; the latter are arbitrary.
Eric H. Lenneberg (1967)

The concept (of aphasia) always has entailed both physiological and behavioral facets; this is one reason for its being difficult.
Helmer R. Myklebust (1971b)

Probably the most compelling argument in favor of professional educators’ including neuropsychological knowledge in the understanding and treatment of children with learning problems is the close relationship between brain structure and function and the development of language. As Lenneberg (1967) has shown, the rules of language are biologically determined, because “all behavior, in general, is an integral part of an animal’s constitution.” It is related to structure and function, one being the expression of the other. Psychologists for many years have been interested in this dynamic interaction. “If a behavior sequence matures through regular stages irrespective of intervening practice, the behavior is said to develop through maturation and not through learning” (Hilgard, 1948). Put more simply, some forms of behavior result just because the animal grows older. Maturation must always precede learning, for all learning, and particularly for this discussion, verbal learning, is biologically dependent. By adopting the
view that language is an aspect of a human’s biological development, “we may regard the language capacity virtually as we would a physical organ of the body, and can investigate the principles of its organization, functioning, and development in the individual and the species” (Chomsky, 1978).

A simple example of this principle is the emergence of speech in the human infant. Not only does language first appear at about 9 months, but the same phonetic sounds begin to appear in different children regardless of their geographical or cultural location. This means that until the speech centers in the cortex and the necessary sensory and motor tracts in the central and peripheral nervous systems have matured, the child is unable to produce words. No matter how potentially bright a 6-month-old child is, and no matter how skilled the teaching, it is impossible to teach him or her to talk. Six months later, when the brain is older, the child now can produce two or three words. Not only that, but there is a system to the appearance of the sounds that appear, because “the onset of speech is regulated by maturational development of certain physiological and perceptual capacities” (Lenneberg, 1966). This development is complete in most children between the ages of 5 and 7 years, so that by this age the phonetic repertoire is complete; of course, the child will continue to learn new words beyond this age, but no new phonemes in English. To acquire language normally the child must learn to hear and discriminate different phonetic sounds and to recognize the subtle auditory speech cues that occur in a temporal sequence. He or she must also master the motor skills of articulation and motor–speech expression and, finally, must build up “the store of linguistic knowledge that eventually forms the basis for both the production and reception of speech” (Fry, 1966).

English has more than 40 phonetic units for the child to master, some relatively simple to produce because of the earlier cortical and neuromuscular maturational changes, and some much more difficult, presumably because of the later developmental changes in the human brain and central nervous system. Lenneberg (1966) has told us that “man’s brain-maturation history is unique among primates” and determines the onset and development of language.

A child’s first utterances will include those phonetic sounds easiest to produce, and these usually include p, b, m, n, d, t, and the vowel a (as in sofa), although he or she may use only three of these at first. For example, one child may say “mama” and “dada,” thus using only three phonemes in his or her first recognized words that emerge from the babbling stage, a period