THE ROLE OF APHASIA RESEARCH IN THAI LINGUISTICS[1]

Thomas Scovel
Chiengmai University

Introduction

In his introductory linguistics text, *Aspects of Language*, Bolinger[2] makes the interesting observation that it has been only fairly recently in the history of science that man has turned to investigate the natural phenomena which are closest to him. Astronomy, the oldest of the sciences, is the study of the most remote objects in the universe whereas psychology, probably the newest science of them all, is concerned with the most intimate- the mind of man. A parallel development has occurred in the field of linguistics, and even, it could be argued, in the sub-field of Thai linguistics, where we have witnessed an early interest in historical linguistics, which is concerned with language data that is both physically and historically remote from the language user. But recently, we have seen interest in such new fields as generative semantics and neurolinguistics, which are concerned with the intimate and immediate- the linguistics composition and characterization of the very mind of the language speaker. This present paper, tentative and postulatory though it may be, is written to provide a historical counterpart to the rich literature already existing in historical and comparative Thai linguistics, and to suggest the possibility that Thai can provide exciting and relevant data to the search for neurological models of man's linguistic competence. In fact, the paper could appropriately be subtitled, "Future directions in Thai neurolinguistics" and thus be aptly paired with Gedney's well-known summary of historical and comparative studies, "Future directions in comparative Tai linguistics."

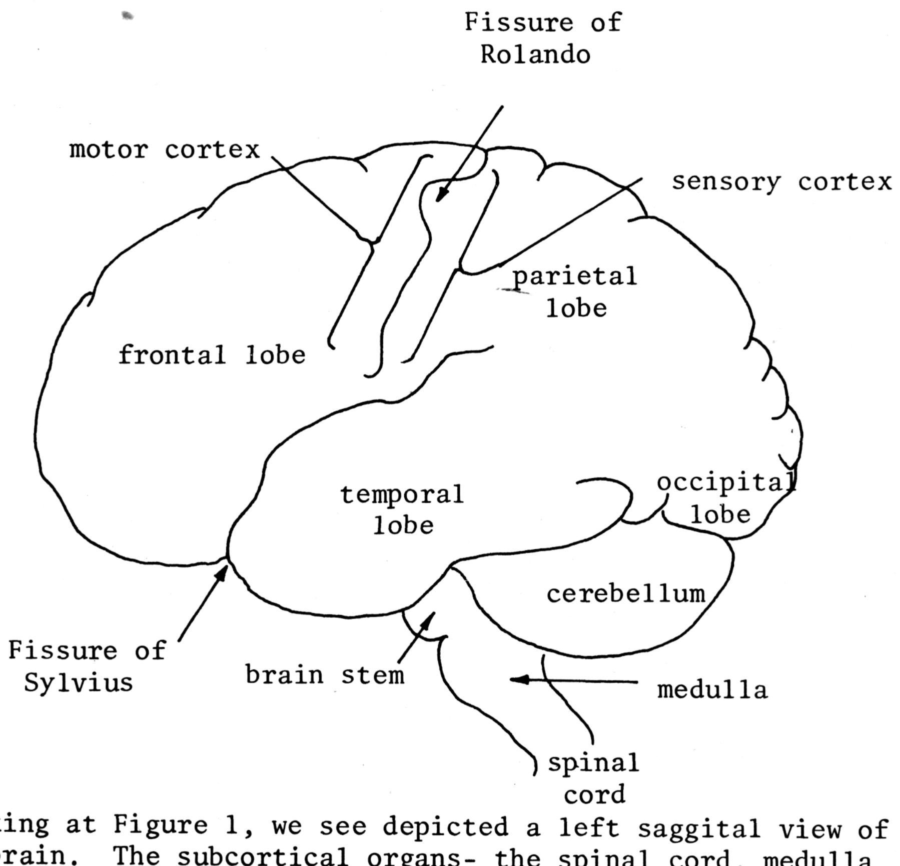
Because of the novelty of neurolinguistics compared to the established vocabulary and techniques of older disciplines such as comparative linguistics or phonetics, it is necessary to begin with a brief introduction to the neuroanatomy of language and to the nature of aphasia- currently the most salient interest of present-day neurolinguistic research. From this, we can proceed to a discussion of the relationship of aphasia research in Thai to the fields of neurology and neurolinguistics and its role in linguistics in Thailand.

The neuroanatomic basis of language

The brain has been likened to a telephone switchboard where connections are made between "incoming calls," sensory stimuli arriving via afferent nerve pathways and "outgoing calls," motor responses sent via efferent pathways. It should be realized, however, that this analogy is extremely simplistic. One reason why the brain is such a complex organ, one that has defied scientific investigation for so long, is that it is not a static receipient and transmitter of electrical impulses but a constantly active organ- a virtual sea of electrochemical activity where tides, currents, waves, and ripples intermingle in continuous agitation. The dynamic nature of the central nervous system is one reason why controversies pervade the basic hypotheses of neurology and psychology and has led one distinguished neurologist[3] to deplore that the field of aphasiology is like Arnold's "darkling plain, where ignorant armies clash by night!"

FIGURE 1

Saggital view of the Central Nervous System



Looking at Figure 1, we see depicted a left saggital view of the human brain. The subcortical organs- the spinal cord, medulla, cerebellum, brain stem, and associated organs, do not concern us here; they are essentially limited to automatic functions and, as such, are not related directly to language production and comprehension, although even this broad and unprovocative observation is a simplification. It is of interest to note in passing that as one ascends the central nervous system anatomically, one also ascends the phylogenetic tree of man from lower animal life to advanced primate. That is, all animals possess the organs of the lower brain, but only primates have an enlarged cerebrum (the "upper brain"), and it is only man, the most advanced primate, that boasts of the most developed cerebrum. It is not a coincidence then that man's unique ability to reason and to speak is linked to the evolution of the cerebrum and its cortical surface.

The cerebrum is divided into four lobes: the frontal, the parietal (separated from the frontal by the Fissure of Rolando), the temporal (separated from the frontal by the Fissure of Sylvius), and the occipital. Traditionally, certain intellectual functions have been localized to these anatomical divisions, although it must be remembered that there is disagreement over the nature and extent of this localization. The frontal lobe is linked to memory, the parietal to spatial organization, the temporal to hearing, and the occipital to sight. In addition, the strip of cortical area paralleling and immediately preceding the Fissure of Rolando is linked to motor innervation and hence called the motor cortex. Similarly, the cortical area paralleling and immediately behind the Fissure of Rolando, is concerned with sensory stimuli and consequently is called the Rolando, is concerned with sensory stimuli and consequently is called the sensory cortex. The lobes are not only intricately connected to the body by different efferent and afferent pathways, but also to each other via association pathways.

One interesting aspect of the way neural pathways are linked to the cortex is that the amount of cortical area devoted to these tracts from and to a particular organ of the body is not directly proportional to the physical size of that particular organ, but to the behavioral importance of the organ. Thus, the amount of sensory and motor cortex concerned with the sensation and innervation of the legs and feet is much smaller than the amount devoted to the sensation and innervation of the hands and fingers. Even though they are inferior in size to the legs and feet, the hands and fingers require a far greater amount of cortical control because they are of such behavioral importance in man, "the tool maker." Similarly, the musculature of the oral, laryngeal, and pharyngeal cavities is scant compared to that of the thoracic and abdominal cavities, but the former require a far greater amount of cortical localization because of the importance of speech in the evolution of man. In fact, it is interesting to see that the traditional Thai belief in the prominence and reverence of the head in comparison to the inferior status of the feet has a neuroanatomical basis. The head commands the largest amount of cortical control whereas the feet demand the least.

Not only are certain functions localized to particular areas of neural control within the cerebral hemispheres, but there is general agreement that the left cerebral hemisphere plays a particularly important role in the organization of language. This notion that the left side of the cerebrum dominates the perception and production of language is an important underpinning of aphasia research and of any neurolinguistic model of language behavior. Because of the importance of its linguistic function, the left cerebral hemisphere is usually referred to in the literature as the dominant hemisphere, but its role in language perception and production as well as its relationship to the right, or nondominant hemisphere, is controversial and subject to intense investigation. We shall observe later on that research into the speech of Thai aphasics may provide clues to the nature and extent of cerebral dominance in man.

The nature of aphasic disability

Let us turn now to a brief introduction to aphasia. Schuell has defined it as "a reduction of available language that crosses all language modalities and may or may not be complicated by perceptual or sensorimotor involvement, by various forms of dysarthria, or by other sequelae of brain damage."[4] It should be stressed that the language reduction is not a reduction of the patient's language repertoire but a limitation of his ability to retrieve linguistic information. It must be pointed out that aphasia results from organic brain damage and should be clearly differentiated from functional illnesses such as neurosis or psychosis. As the definition indicates, there are related disorders often co-occurring with aphasia, but which are traditionally distinguished from aphasic disabilities. Among these are: dysarthria, a disability in innervating the speech musculature- usually due to a lesion in subcortical areas; apraxia of speech, a disorder in the sequencing and firing of speech musculature- usually due to lesions in the motor cortex; confused language, language that is vague and irrelevant to linguistic context- usually due to non-localized traumatic injuries to the entire cerebrum; and generalized intellectual impairment, an overall loss of intellectual ability affecting language- usually caused by atrophy of nervous tissue in the entire brain. In contrast to the organic causes of these related disorders which are almost always either subcortical (below the cerebrum), bilateral (involving both hemispheres), or pervading the entire cerebrum, the etiology of aphasic disorders is usually confined to lesions which are cortical, unilateral (involving the dominant hemisphere in this case), and located in the general area of the confluence of the frontal, parietal, and temporal lobes. Strokes, tumors, and traumatic head injuries are the most common causes of aphasia.

Although aphasic nomenclature is replete with ambiguity, redundancy, and controversy, many clinicians accept certain classifications as useful generalizations for diagnosis and therapy. The two classic terms, Broca's aphasia and Wernicke's aphasia, are named after the eighteenth century neurologists who first isolated these syndromes. The former is typified by labored, "telegraphic" speech with a severe lack of grammatical markers; the latter refers to rapid-flowing speech with many inadvertant word substitutions and