The Power of the Word

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The Sacred and the Profane

Edited by

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PREFACE

When I entered kindergarten, I knew how to read and write exactly one word—my first name. When my teacher misspelled my name, you can imagine the indignation of a kindergartener who knows only that one word—and that word is such a powerful word: her name.

I have thought about words almost since I could write them. At times words seem mysterious, and I wonder where they come from. I take great pleasure in etymology and discovering links between words that I hadn't known before. I like to dissect our idiomatic ways of saying things to see how they connect with reality. At other times words seem to be my friends. I've discovered that my colleagues think about words as well, but each of them has a different perspective on the use of words. To paraphrase what my colleague Mark G. Henderson tells his Communications students, "The use of language will open doors you never imagined opening and will close doors to you that you never knew existed."

This volume got its impetus from discussions about words, their power, and their many uses. I believe that it may answer some questions about words that arise from time to time, but it may also raise other questions, questions about how we do use words and how we can use words. For better or worse, I offer these words to the universe with the sincere hope that they may somehow transform our world.

INTRODUCTION: TRANSFORMING THE WORLD WITH WORDS

PATSY J. DANIELS

From birth, we hear the words of language. At our mother's knee, we learn to make the sounds to use words ourselves. As we grow and our bodies develop, we learn to make marks representing our thoughts, so that our thoughts can exist outside of us—we no longer have to be present to make our thoughts known to others. We all believe that, somehow, the thoughts come from our brains, that they arise there and can be made known through our bodies, whether through speech or through writing.

Words are the medium through which we learn; since the invention of movable type, which made the written word easily reproducible, we have used words, both oral and written, to pass on to the next generation all that we consider worth knowing. Eventually, we learn to use language, words, to control our world. We learn which words are good: the magic words, "Please" and "Thank you"—to get what we want. We learn which words are bad: in English, usually those four-letter words derived from Anglo-Saxon that we are not supposed to use in polite company. We practice the correct use of words in our study of the ancient art of rhetoric; we have debates to see who can use words better than the opponent can. We use words to draw others closer or to estrange them—to seduce or reject them. With words, we can both soothe and provoke.

We also respond to the words of others—perhaps to an advertisement for laundry detergent ("It even smells cleaner!") or to a playground taunt ("Naah, naah, naah, *naah*, naah!"). We feel good about making our clothes smell cleaner, or we feel anger, frustration, or shame on the playground. Even though we repeat the old adage, "Sticks and stones / May break my bones, / But words will never hurt me!" our responses to words are very real. Both playground bullying and cyberbullying have been known to drive some youngsters to suicide.

It matters not that you have hateful feelings toward another—until you voice those feelings. It is the use of words that allows us to talk ourselves into thinking of one thing as another; for instance, calling American Indians "insects" allowed Europeans to treat them as if they were actual insects to be gotten rid of. Haig A. Bosmajian writes, in "The Language of Oppression," that words have been used

> to justify the unjustifiable, to make palatable the unpalatable, to make reasonable the unreasonable, to make decent the indecent. Hitler's "Final Solution" appeared reasonable once the Jews were successfully labeled by the Nazis as sub-humans, as "parasites," "vermin," and "bacilli." The segregation and suppression of blacks in the United States was justified once they were considered "chattels" and "inferiors." The subjugation of the "American Indians" was defensible since they were defined as "barbarians" and "savages." (295-96)

And throughout history, people have been punished for their use of words, even killed. The suicide of Socrates came about because of his teachings. Therefore, we should take our use of words very seriously.

Some of us grow up to earn our living by using words, including broadcasters, singers, lawyers, politicians, teachers, scholars, poets, writers of fiction and nonfiction, even sign painters. But we all depend on words to some extent to carry on our daily affairs, even if all we write is a shopping list and all we read is the No Parking sign. The adult learner who has just learned to read can now go into a large department store and be amazed that the signs hanging from the ceiling actually tell him what he can find in each aisle. Before learning to read, he was forced to wander around until he located by sight the items he was looking for. And, of course, having a written language frees up our mental memory banks for further input because now we can write something down and save it instead of having to remember it. Words have become so ubiquitous that we hardly notice how much power that they do have over us and over others.

Because words have such power in our lives and over our world, we place great importance on them. Psycholinguists and others try to figure out where words actually do come from. Others attempt to de-fuse words that have the potential to cause trouble, while still others make use of words to further a political agenda, perhaps to persuade young citizens to risk their lives by going to war.

The way words are used can cause either the oppression of a people or their empowerment. Because words have such power to change the way people understand the world and relate to the world, we can use words to transform the world. For the same reason, we have a great responsibility to use words wisely; we need to understand the spiritual aspects of producing and reproducing thoughts. And there are times when silence "speaks louder than words" in making a point.

The dozen essays in this volume examine in depth many aspects of words and the ways we use them. We begin with a scientific explanation of speech in Chapter One, including the fact that some with language disabilities cannot understand jokes. In other words, it is speech that allows our brains to function at higher levels, giving us the ability to understand unspoken meaning. In Chapter Two, "The Right Word," Patricia Lonchar shows how we respond to the stimulus of the *mot juste*; in Chapter Three, "The 'Bad' Word," Elizabeth Overman discusses in depth how one comic was able to democratize our language by his use of profanity on stage. Mark Bernhardt explains how words allow us to share concepts which lead to action, how words can stir us to action and be used as propaganda. Cicely Wilson shows how ancient rhetorical theories can still persuade in contemporary times and explains how they were used to full effect by Stokely Carmichael in the 1960s.

Words are also used for empowerment, and in Chapter Six, Candis Pizzetta connects words with customs and customs with women's rights and abolitionism, demonstrating how boundaries are thereby expanded. Emily Clark uses two novels to show how rhetoric empowers people by lending them an identity. Empowerment from nicknaming is the discussion in Shawn Holliday's chapter; he shows how nicknames become an insider language which prohibits outsiders from understanding the full meaning behind the names, thus empowering those who do. Words can allow a community to remember collectively, creating meaning from fragments of memories of the past and thereby forming a closer bond.

There is a spiritual aspect to words. Thomas Kersen finds spirituality in the narrative of the quest. Helen Maxson analyzes the poetry of Pablo Neruda to show how powerful poetic language can be, how the poet revitalizes the past, even summoning the Incas from the fifteenth century. She demonstrates the transcendent power of language, allowing even ideas which were once oppressed to be now expressed. And she shows how language is such a powerful tool that it can even bestow life. My own essay seeks to show the ways language can make things happen and why it should be used very carefully. Language lives in our minds but is expressed through our bodies: through our breath and speech, or through our hands for writing and eyes for reading. Language is so powerful that we might even call it "magic," and the study of language and words is a noble endeavor.

Work Cited

Bosmajian, Haig A. "The Language of Oppression." *Emerging Voices: Readings in the American Experience.* Ed. Janet Madden and Sara M. Blake. Fort Worth: Harcourt Brace, 1993. 290-96.

PART I:

BACKGROUND

PSYCHOLINGUISTIC THEORY

THE RIGHT WORD

THE WRONG WORD

CHAPTER ONE

FROM PSYCHOLINGUISTICS TO NEUROSCIENCE: THE NEURAL MECHANISMS UNDERLYING LANGUAGE AND APHASIAS

TAUNJAH P. BELL

Psycholinguists are interested in the behavioral responses, mental processes, and emotional factors involved in acquiring, producing, and using language (Slobin, 1979). In order to examine and better understand these phenomena, theoretical and empirical tools of both psycholinguistics and neuroscience must be considered and elucidated (Chomsky, 1980). In essence, psycholinguists and neuroscientists are interested in the underlying knowledge, biological preparedness, and genetic predispositions that humans must have in order to acquire and develop language as well as to learn to use language in childhood (Pinker, 1994). Some researchers believe that language is not just a byproduct of overall intelligence but the evolution of a specialized brain mechanism (Kalat, 2013). Chomsky (1980) and Pinker (1994) proposed that humans have a language acquisition device which is a hard-wired (built-in) mechanism for acquiring language and developing speech. These theorists further posited that most children develop language so quickly and easily that it seems they must have been biologically prepared for learning language (Chomsky, 1991; Pinker & Bloom, 1990). Others suggested that because language involves producing speech and analyzing what others say to comprehend the meaning, language depends on the brain's ability to link concrete objects with abstract symbols and then to convey the symbols as well as the ideas they represent to others via words (Bates & Carnevale, 1993; Tomasello & Bates, 2001). In addition to facilitating communication between people, language enables individuals to reflect on their ideas (Carter, Aldridge, Page, & Parker, 2009; Pinel, 2003). Thus, in addition to our biological heredity, language gives humans another line of continuity which makes the accumulation of knowledge and the transmission of culture possible (Bates & Dick, 2002; Hayes, 1970; Kramsch, 1998; Marchman & Bates, 1994; Saporta & Bastian, 1961).

Language is an extraordinary medium that allows humans to communicate a myriad of concepts using a highly structured system of sounds and words in spoken and written languages, respectively, or employing a sophisticatedly developed mixture of manual and facial gestures in signed languages (Bates, Thal, Whitesell, Oakes, & Fenson, 1989; Damasio & Damasio, 1992; Thal & Bates, 1988). Language is characterized as an overt behavior and has been the central focus of scholars in many disciplines (Bates & Carnevale, 1993). For several decades, intensive scientific investigation by psycholinguists and neuroscientists has revealed that spoken language emerges spontaneously in typical children in most societies (Bates, 1999; Bates et al., 1998; Bishop, 2013). The lack of a homolog to language in other species precludes the attempt to model language in non-human animals (Geschwind, 1970, 1979). Thus, language is a uniquely human behavior supported by neural circuitry of considerable complexity (Kandel, Schwartz, Jessell, Siegelbaum, & Hudspeth, 2013; Lidzba, Winkler, & Krägeloh-Mann, 2013).

The cerebral cortex is divided into the left and right hemispheres. The segregation of human brain functions between the left and right hemispheres is associated with asymmetries of cerebral structures, such as the Sylvian fissures and the planum temporale (Rubens, Mahowald, & Hutton, 1976; Shapleske, Rossell, Woodruff, & David, 1999; Toga & Thompson, 2003; Van Essen, 2005). At first, research findings suggested that language and logical processing primarily depends on the left cerebral hemisphere, whereas spatial recognition depends on right hemisphere structures in most individuals (Damasio & Damasio, 1992; Geschwind & Miller, 2001). Language ability is dominant in the left hemisphere in more than 95 percent of the right-handed population but in only 70 percent of the left-handed population (Corballis, 2003). Interestingly, 90 percent of the population is more skillful with the right hand than with the left (Sun & Walsh, 2006). The right hand is controlled by the left cerebral hemisphere and the left hand is controlled by the right (Annett, 1985; Rakic, 1988). Approximately 96 percent of humans depend on the left hemisphere for language processing associated with the lexicon, grammar, phonemic assembly, and phonetic production (Kandel, Schwartz, Jessell, Siegelbaum, & Hudspeth, 2013). Even American Sign Language, which relies on visuomotor symbols rather than auditory speech signs, depends primarily on the left cerebral hemisphere (MacSweeney, Capek, Campbell,

& Woll, 2008). This conclusion is supported by research involving patients with focal lesions and studies of electrical and metabolic activity in the cerebral hemispheres of average individuals. In patients whose corpus callosum has been sectioned to control severe epileptic seizure activity, the right hemisphere has been implicated in a rudimentary ability of these individuals to understand or read words on occasion; however, the syntactic abilities of these patients are poor. In many cases, the right hemisphere has no lexical or grammatical abilities at all (Gazzaniga, 1983). Second, research results of aphasia (language impairment) studies revealed that damage to the lateral frontal cortex (Broca's area) and to the posterior superior temporal lobe (Wernicke's area) was associated with major language disorders with different linguistical profiles (Webster & Shevell, 2004).

Information gathered from aphasia studies allowed neurologists to develop a theoretical framework of language that has become known as the Wernicke-Geschwind model, which suggests that language impairments can be caused by damage not only to primary components of the language system but also to association areas and supplementary pathways that connect those components to the rest of the brain (Basso, Lecours, Moraschini, & Vanier, 1985). The earliest version of this model was predicated upon the following components. First, Wernicke's area was implicated in processing the acoustic images of words (language comprehension) and Broca's area was associated with the articulation of speech (language production). Second, the arcuate fasciculus was believed to be a unidirectional pathway that brought information from Wernicke's area to Broca's area. Third, both Wernicke's and Broca's areas were presumed to interact with the polymodal association regions. After the auditory pathways processed a spoken word and the auditory signals reached Wernicke's area, the meaning of the spoken word was evoked when brain structures beyond Wernicke's area, particularly in Broca's area, were activated (Bernal & Ardila, 2009; Catania & Mesulamb, 2008; Damasio & Geschwind, 1984; Damasio, Grabowski, Tranel, Hichwa, & Damasio, 1996; Krestela, Annonic, & Jagellad, 2013; Lüders et al., 1991). Moreover, nonverbal meanings were converted into acoustic images in Wernicke's area and transduced into vocalizations after the images were transferred by the arcuate fasciculus into Broca's area (Geschwind, 1970, 1979). Finally, reading skills and writing abilities depended on both Wernicke's and Broca's areas that received visual input from left visual cortices in the case of reading and facilitated motor output from Exner's area in the premotor region above Broca's area in the case of writing

(Dronkers, 1996; Katanoda, Yoshikawa, & Sugishita, 2001; Lubrano, Roux, & Démonet, 2004; Roux et al., 2009).

Damage to Broca's and Wernicke's areas results in mild and transient or severe and persistent aphasias caused by focal brain lesions that result from stroke, cerebral insults, and other traumatic head injuries (Damasio, 1989; Damasio, 1992). Broca's aphasia is referred to as expressive (non-fluent) aphasia and is characterized by the inability to produce spoken or written language (Prather, Zurif, Love, & Brownell, 1997). When damage is restricted to Broca's area alone, or to its subjacent white matter, a mild and transient language impairment now known as Broca area aphasia develops. Broca aphasia syndrome, however, is a severe and persistent condition resulting from a large frontal lobe lesion caused by damage to the inferior left frontal gyrus comprised of Brodmann's areas 44 and 45; damage to surrounding frontal fields comprising the external aspect of Brodmann's areas 6, 8, 9, 10, and 46; damage to the underlying white matter, insula, and basal ganglia; and/or damage to a small portion of the anterior superior temporal gyrus (Damasio, 1992; Fridriksson, Guo, Fillmore, Holland, & Rorden, 2013; Goodglass, 1993). In true or severe and persistent Broca aphasia syndrome, an individual's speech is slow and labored, articulation is impaired, and the melodic intonation of normal speech is lacking. In spite of these difficulties, verbal communication is successful although words are difficult to understand due to improper word selection, especially in the case of noun usage. Verbs, as well as grammatical words such as conjunctions, are less well selected and may be missing altogether (Damasio & Tranel, 1993). Another major sign of Broca aphasia syndrome is a defect in the ability to repeat complex sentences spoken by the examiner. In general, patients with this syndrome appear to comprehend, albeit partially, the words and sentences they hear (Mohr, 1976; Monoi, Fukusako, Itoh, & Sasanuma, 1983; Goodglass, 1993).

In most cases, the structures damaged in true Broca aphasia syndrome and in Broca area aphasia are believed to be components of neural circuitry associated with the both the assembly of phonemes into words and the assembly of words into sentences (Muter, Hulme, Snowling, & Stevenson, 2004). This neural network is thought to be involved in the relational aspects of language including the grammatical structure of sentences and the proper use of grammatical vocabulary and verbs (Webster & Shevell, 2004). The other cortical components of the network are located in external areas of the left frontal cortex (Brodmann's areas 9, 46, and 47), the left parietal cortex (areas 39 and 40), and sensorimotor areas above the Sylvian fissure between Broca's and Wernicke's areas located in the sector of areas 1, 2, 3, and 4 and the insula (Dupont, Bouilleret, Hasboun, Semah, & Baulac, 2003; Kandel, Schwartz, Jessell, Siegelbaum, & Hudspeth, 2013).

Wernicke aphasia is referred to as receptive (fluent) aphasia characterized by meaningless speech and the inability to understand spoken or written words (Saygin, Dick. & Bates, 2001). In most cases, Wernicke aphasia is caused by damage to the posterior sector of the left auditory association cortex (Brodmann's area 22). Moreover, severe and persistent cases of receptive aphasia appear to be involved in damage to the middle temporal gyrus and deep white matter (Naeser, Palumbo, Helm-Estabrooks, Stiassny-Eder, & Albert, 1989). Patients suffering from Wernicke aphasia have effortless and melodic speech produced at a normal rate. Therefore, these patients' symptoms differ from those of individuals diagnosed with true Broca aphasia syndrome. However, the speech content of patients suffering from Wernicke aphasia is often unintelligible because of frequent errors in the choice of words and phonemes (the specific sound units that compose morphemes). Patients with Wernicke aphasia often shift the order of individual sounds and sound clusters and add them to or subtract them from a word in a manner that distorts the intended phonemic plan (Badcock, Bishop, Hardiman, Barry, & Watkins, 2012). These errors are called phonemic paraphasias which refer to any substitution of an erroneous phoneme or entire word for the intended, correct one. When phoneme shifts occur frequently and close together, words become unintelligible and constitute neologisms (Rohrer, Rossor, & Warren, 2009). Even when words are put together with the proper individual sounds, patients with Wernicke aphasia have great difficulty selecting words that accurately represent their intended meaning. This condition is referred to as verbal or semantic paraphasia (Canter, Trost, & Burns, 1985). For example, a patient may say "four legs" for dog. These patients also have difficulty comprehending sentences spoken by others (Caffarra et al., 2013).

The Wernicke-Geschwind model provided a theoretical framework for the scientific investigation of the brain mechanisms involved in language processes and formed the empirical basis for a useful classification of specific language disorders (Damasio & Geschwind, 1984; Lüders et al., 1991). Although the neural underpinnings of the aphasias are supported by the Wernicke-Geschwind model, Wernicke's area is no longer viewed as the primary neural circuitry responsible for auditory, specifically language and speech, comprehension (Carter, Aldridge, Page, & Parker, 2009). The contemporary perspective is that Wernicke's area is a component of the neural network that processes speech sounds and associates different properties (sights, words, and meanings) of sounds. In addition to Wernicke's area, this network is composed of numerous brain regions including Broca's area, Geschwind's Territory, and even right hemisphere structures that subserve grammar, attention, social knowledge, and knowledge of the concepts associated with meanings of the words in the sentences (Kandel, Schwartz, Jessell, Siegelbaum, & Hudspeth, 2013; Kolb & Whishaw, 2014; Parbery-Clark, Strait, & Kraus, 2011). The three principal language areas responsible for articulating language, comprehending language, and recognizing words are usually found in the left hemisphere, while four other important language areas responsible for recognizing tone, producing rhythm, stress, and intonation, recognizing the speaker, and recognizing gestures are located in the right hemisphere (Carter, Aldridge, Page, & Parker, 2009).

The right cerebral hemisphere plays an integral role in language (Baynes, 1990). In particular, it is important for the development of communicative competence (pragmatics of language) and emotional prosody (stress, timing, and intonation) during interpersonal interactions particularly in social situations. In addition, patients with damage in the right hemisphere have difficulty incorporating sentences into a coherent narrative or conversation and using appropriate language in particular social settings. They often do not understand jokes. These impairments make it difficult for patients with right hemisphere damage to function effectively in social situations, and these patients are sometimes alienated because of their unusual behavior. Further, patients with right anterior lesions may produce inappropriate intonation in their speech. Patients with right posterior lesions have difficulty interpreting the emotional tone of others' speech (Bates, 1976; Bouton, 1994; Brooks, 1964; Canary, Cody, & Manusov, 2008; Cody & McLaughlin; 1985).

Several decades of new focal lesion studies and current research in psycholinguistics, cognitive neuroscience, and experimental neuropsychology have shown that the Wernicke-Geschwind model has significant shortcomings (Pinel, 2003). Specifically, many revelations of the model's limitations have come from the advent of contemporary neuroimaging techniques, including positron emissions tomography (PET) scans, functional magnetic resonance imaging (fMRI), event-related potentials (ERPs), and direct recordings of electrical potentials generated from exposed cortical areas of patients undergoing neurosurgery for the management of refractory (intractable or drug-resistant) epilepsy (Lesser, Arroyo, Hart, & Gordon, 1994; Mazzocchi & Vignolo, 1979; Naeser & Hayward, 1978; Ojemann, 1994; Petersen, Fox, Posner, Mintun, & Raichle, 1988; Stromswold, Caplan, Alpert, & Rauch, 1996; Watkins et al., 2002). Each of these innovations has contributed to a clearer understanding of the cortical as well as other brain regions in both hemispheres relevant for processing, producing, and comprehending language as well as performing language-related tasks (Démonet, Wise, & Frackowiak, 1993; Mazoyer et al., 1993; Murdoch, 1988).

Despite these technological advances and intellectual insights, it is apparent that the roles of Wernicke's and Broca's areas are not as clear as previously believed. Similarly, the arcuate fasciculus now is presumed to be a bidirectional system that joins a broad expanse of sensory cortices with prefrontal and premotor cortices (Fridriksson, Guo, Fillmore, Holland, & Rorden, 2013). Moreover, various cortical and subcortical areas of the left hemisphere have proven to be involved intricately in language processing. These regions include higher-order association cortices in the left frontal, temporal, and parietal regions that appear to be the intermediaries between concepts and language (Kim, Relkin, Lee, & Hirsch, 1997). Further, selected cortical areas in the left insular region are implicated in speech articulation and particular prefrontal cortical regions along with certain cingulate areas seem to implement executive control and mediate specific memory and attentional processes (Dronkers, 1996). Another area not included in the classical Wernicke-Geschwind model is a small section of the insula, a segment of cortex positioned deep inside the cerebral hemispheres. Recent evidence suggests that this region is relevant for planning or coordinating the articulatory movements necessary for speech (Dupont, Bouilleret, Hasboun, Semah, & Baulac, 2003). Patients who have lesions in this area have difficulty pronouncing phonemes in their proper order; they usually produce combinations of sounds that are very close to the target word. These patients have no difficulty in perceiving speech sounds or recognizing their own errors. They also do not have difficulty finding the word, only producing it. This area is damaged in patients with true Broca aphasia and accounts for much of their articulatory deficit (López-Barroso, Catani, Ripollés, Dell'Acqua, Rodríguez-Fornells, & de Diego-Balaguer, 2013; Muter, Hulme, Snowling, & Stevenson, 2004; Wertz, LaPointe, & Rosenbek, 1984). Thus, language processing requires a large network of interconnected and interdependent brain regions.

Even though early studies of language disorders laid the foundation for later discoveries of the neural underpinnings of language processing, the anatomical correlates of the classical aphasias comprise only a restricted map of language-related areas in the brain (Basso, Lecours, Moraschini, & Vanier, 1985). The past decade of research on aphasia has uncovered numerous other language-related circuits in the cerebral cortex and in subcortical structures. Some are located in the left temporal region. Until relatively recently, for example, the anterior temporal and inferotemporal cortices, in either the left or the right hemisphere, had not been associated with language. Recent studies reveal that damage to left temporal cortices (Brodmann's areas 21, 20, and 38) causes severe and pure naming defects, such as difficulty retrieving words. However, this condition is not accompanied by grammatical, phonemic, or phonetic difficulty. When the damage is confined to Brodmann’s area 38 located in the left temporal lobe, the patient has difficulty recalling the names of unique or unusual people, but not names of familiar persons or common things. When the lesions involve Brodmann’s areas 21 and 20 located in the left midtemporal pole, the patient has difficulty recalling both unique and common names as well as unusual and familiar individuals. Finally, damage to the left posterior inferotemporal sector causes a deficit in recalling words for particular types of items (e.g., tools and utensils) but not words for natural things or unique entities (Bishop, 2013; Dronkers, Redfern, & Knight, 1999). Recall of words for actions or spatial relationships is not compromised. These findings suggest that the left temporal cortices contain neural systems that access words denoting various categories of things but not words denoting the actions of the things or their relationships to other entities. Localization of a brain region that mediates word-finding for classes of things has been inferred from studies involving the examination of patients with lesions in their brain from stroke, head injuries, herpes encephalitis, and degenerative processes such as Alzheimer disease and Pick disease; research employing the functional neuroimaging of intact (non-brain damaged) individuals; and therapeutic interventions utilizing the electrical stimulation of these same temporal cortices during surgical procedures (Binetti, Locascio, Corkin, Vonsattel, & Growdon, 2000; Crinion & Leff, 2007; Dronkers, 2000; Lesser, Arroyo, Hart, & Gordon, 1994; Mazoyer et al., 1993; Ojemann, 1994).

The supplementary motor area and the anterior cingulate region known as Brodmann's area 24 in the frontal cortices in the mesial surface of the left hemisphere play important roles in the initiation and maintenance of speech (Dronkers, Redfern, & Knight, 1999). These brain regions are also implicated in attention and emotion and thereby can influence many other higher-order functions (Pinker & Bloom, 1990). Although damage to these areas does not result in an actual aphasia, injury can lead to akinesia (impairments in the initiation of movement) and can cause mutism (the complete absence of speech). Mutism is a rarity in aphasic patients; usually it is seen only during the very early stages of the condition (David

& Bone, 1984). Patients diagnosed with akinesia and mutism fail to communicate by words, gestures, or facial expression. It appears as though they are not suffering from an aphasia but from the lack of drive to communicate (Nagaratnam, McNeil, & Gilhotra, 1999; Nagaratnam, Nagaratnam, Ng, & Diu, 2004).

Results of other developmental language studies reveal that when adults diagnosed with severe neurological disease have the entire left hemisphere removed, they suffer a permanent and catastrophic loss of language. In contrast, when the left hemisphere of an infant is removed, the child does not suffer a permanent and catastrophic loss of language but later learns to speak fluently. One study of a small number of children in whom one hemisphere had been removed revealed that the children with only a right hemisphere suffered language impairments as well as other cognitive dysfunctions, compared with children who had only a left hemisphere and appeared less impaired overall. Like people with Broca aphasia, children with only a right hemisphere comprehend most sentences in conversation but have trouble interpreting more complex constructions, such as sentences in the passive voice. In contrast, children with only a left hemisphere appear to have no difficulty even with complex sentences. Unfortunately, adults do not have this plasticity of function, and this age difference is consistent with other findings that suggest there is a critical period for language development in childhood. For instance, children can learn to speak several languages fluently, whereas most adults who learn to speak new languages tend to have a foreign accent and seemingly permanent grammatical errors. In other cases, if children are deprived of language input because their parents are deaf or caregivers are neglectful, these children eventually can learn to speak fluently provided they are exposed to language before puberty (Bishop, 2006). However, these young children are strikingly inept in terms of language comprehension, word use, and speech production if the first exposure to language comes later in life, especially after puberty, which is a critical period of development. Despite the remarkable ability of the right hemisphere to take on responsibility for language in children, it still appears to be less suited for the task than the left hemisphere (Chiron, Pinton, Masure, Duvelleroy-Hommet, Leon, & Billard, 1999; Conti-Ramsden, 2003; Conti-Ramsden, Crutchley, & Botting, 1997; de Guibert et al., 2011; Duvelleroy-Hommet et al., 1995; Fromkin & Rodman, 1997).

A contemporary framework that has emerged from this research stream suggests that three large systems interact closely in language development, processing, perception and production. One system is formed by the language areas of Broca and Wernicke, selected areas of insular cortex, and the basal ganglia (Kurth, Zilles, Fox, Laird, & Eickhoff, 2010). Together, these anatomical structures constitute a language implementation system. The implementation system analyzes incoming auditory signals not only to activate conceptual knowledge but also to ensure phonemic and grammatical construction as well as articulatory control (Aboitiz & García, 1997; Dosenbach et al., 2006). This implementation system is surrounded by a second system, the mediational system, comprising various distinct regions in the temporal, parietal, and frontal association cortices (Fuster, 2002). The mediational areas act as intercessors between the implementation system and a third system, the conceptual system, composed of a collection of regions dispersed throughout the remainder of higher-order association cortices that facilitate conceptual knowledge (Oliveira, Marin, & Bertolucci, 2013).

Works Cited

Aboitiz, F., and R. García. "The Evolutionary Origin of the Language Areas in the Human Brain. A Neuroanatomical Perspective." *Brain Research Reviews* 25.3 (1997): 381-96.

Annett, M. *Left, Right, Hand and Brain: The Right Shift Theory*. Hillsdale, N. J.: Erlbaum, 1985.

Badcock, N. A., D. V. Bishop, M. J. Hardiman, J. G. Barry, and K. E. Watkins. "Co-Localisation of Abnormal Brain Structure and Function in Specific Language Impairment." *Brain and Language* 120.3 (2012). 310-20. doi: 10.1016/ j.bandl.2011.10.006.

Basso, A., A. R. Lecours, S. Moraschini, and M. Vanier. "Anatomoclinical Correlations of the Aphasias as Defined through Computerized Tomography: Exceptions." *Brain and Language* 26.2 (1985): 201-29.

Bates, E. *Language and Context: Studies in the Acquisition of Pragmatics.* New York, N. Y.: Academic Press, 1976.

—. "Language and the Infant Brain." *Journal of Communication Disorders* 32:195-205.

Bates, E., and G. F. Carnevale. 1993. "New Directions in Research on Language Development." *Developmental Review* 13 (1999): 436-70.

Bates, E., and F. Dick. "Language, Gesture and the Developing Brain." *Developmental Psychobiology* 40.3 (2002): 293-310.

Bates, E., J. Elman, M. Johnson, A. Karmiloff-Smith, D. Parisi, and K. Plunkett. "Innateness and Emergentism." *A Companion to Cognitive Science*. Ed. W. Bechtel and G. Graham. Malden, Mass.: Blackwell, 1998. 590-601.

Bates, E., D. Thal, K. Whitesell, L. Oakes, and L. Fenson. "Integrating Language and Gesture in Infancy." *Developmental Psychology* 25.6 (1989): 1004-19.

Baynes, K. "Language and Reading in the Right Hemisphere: Highways or Byways of the Brain?" *Journal of Cognitive Neuroscience* 2 (1990): 159-79.

Bernal, B., and A. Ardila. "The Role of the Arcuate Fasciculus in Conduction Aphasia." *Brain* 132.9 (2009): 2309-16.

Binetti, G., J. J. Locascio, S. Corkin, J. P. Vonsattel, and J. H. Growdon. "Differences between Pick Disease and Alzheimer Disease in Clinical Appearance and Rate of Cognitive Decline." *Archives of Neurology* 57.2 (2000): 225-32. doi:10.1001/archneur.57.2.225.

Bishop, D. V. M. "Cerebral Asymmetry and Language Development: Cause, Correlate, or Consequence?" *Science* 340.6138 (2013): 1302-09. doi: 10.1126/science.1230531.

—. "What Causes Specific Language Impairment in Children?" *Current Directions in Psychological Science* 15.5 (2006): 217-21. doi: 10.1111/ j.1467-8721.2006.00439.x.

Bouton, L. F. "Conversational Implicature in a Second Language: Learned Slowly When Not Deliberately Taught." *Journal of Pragmatics* 22.2 (1994): 157-67.

Brooks, N. *Language and Language Learning.* New York, N.Y.: Harcourt Brace Jovanovich, 1964.

Caffarra, P., S. Gardini, S. Cappa, F. Dieci, L. Concari, F. Barocco, C. Ghetti, L. Ruffini, and G. D. Prati. "Degenerative Jargon Aphasia: Unusual Progression of Logopenic/Phonological Progressive Aphasia?" *Behavioural Neurology* 26.1-2 (2013): 89-93. doi: 10.3233/BEN-2012-110218.

Canary, D. J., M. J. Cody, and V. Manusov. *Interpersonal Communication: A Goal-Based Approach* 4th ed. New York, N. Y.: St. Martin's/Bedford Press, 2008.

Canter, G. J., J. E. Trost, and M. S. Burns. "Contrasting Speech Patterns in Apraxia of Speech and Phonemic Paraphasia." *Brain and Language* 24.2 (1985): 204-22.

Carter, R., S. Aldridge, M. Page, and S. Parker. *The Human Brain Book.* London, U. K.: Dorling Kindersley, 2009.

Catania, M., and M. Mesulamb. "The Arcuate Fasciculus and the Disconnection Theme in Language and Aphasia: History and Current State." *Cortex* 44.8 (2008): 953-61.

Chiron, C., F. Pinton, M. C. Masure, C. Duvelleroy-Hommet, F. Leon, and C. Billard. "Hemispheric Specialization Using SPECT and Stimulation Tasks in Children with Dysphasia and Dystrophia." *Developmental Medicine and Child Neurology* 41.8 (1999): 512-20.

Chomsky, N. *Rules and Representations.* New York, N. Y.: Columbia UP, 1980.

—. "Linguistics and Cognitive Science: Problems and Mysteries." *The Chomskyan Turn.* Ed. A. Kasher. Cambridge, Mass.: Blackwell, 1991.

Cody, M. J., and M. L. McLaughlin. "The Situation as a Construct in Interpersonal Communication Research." *Handbook of Interpersonal Communication.* Ed. M. L. Knapp and G. R. Miller. Beverly Hills, Calif.: Sage, 1985. 263-321.

Conti-Ramsden, G. "Processing and Linguistic Markers in Young Children with Specific Language Impairment (SLI)." *Journal of Speech, Language, and Hearing Research* 46 (2003): 1029-37. doi: 10.1044/1092-4388 (2003/082).

Conti-Ramsden, G., A. Crutchley, and N. Botting. “The Extent to Which Psychometric Tests Differentiate Subgroups of Children with SLI.” *Journal of Speech, Language, and Hearing Research* 40.4 (1997): 765-77.

Corballis, M. C. “From Mouth to Hand: Gesture, Speech, and the Evolution of Right-Handedness.” *Behavioral and Brain Sciences* 26 (2003): 199-208.

Crinion, J. T., and A. P. Leff. “Recovery and Treatment of Aphasia after Stroke: Functional Imaging Studies.” *Current Opinion in Neurology* 20.6 (2007): 667-73.

Damasio, A. R. “Aphasia.” *New England Journal of Medicine* 326 (1992): 531-39.

Damasio, A. R., and H. Damasio. “Brain and Language.” *Scientific American* 267.5 (1992): 88-95.

Damasio, A. R., and N. Geschwind. “The Neural Basis of Language.” *Annual Review of Neuroscience* 7 (1984): 127-47. doi: 10.1146/annurev.ne.07.030184.001015.

Damasio, A. R., and D. Tranel. “Nouns and Verbs Are Retrieved with Differently Distributed Neural Systems.” *Proceedings of the National Academy of Sciences of the United States of America* 90.11 (1993): 4957-60.

Damasio, H. “Neuroimaging Contributions to the Understanding of Aphasia.” *Handbook of Neuropsychology* Vol. 2. Ed. F. Boller and J. Grafman. New York, N.Y.: Elsevier, 1989. 3-46.

Damasio, H., T. J. Grabowski, D. Tranel, R. D. Hichwa, and A. R. Damasio. “A Neural Basis for Lexical Retrieval.” *Nature* 380.6574 (1996): 499-505.

David, A. S., and I. Bone. “Mutism Following Left Hemisphere Infarction.” *Journal of Neurology, Neurosurgery, and Psychiatry* 47 (1984): 1342-44. doi: 10.1136/jnnp.47.12.1342.

de Guibert, C., C. Maumet, P. Jannin, J.-C. Ferré, C. Tréguier, C. Barillot, E. Le Rumeur, C. Allaire, and A. Biraben. “Abnormal Functional Lateralization and Activity of Language Brain Areas in Typical Specific Language Impairment (Developmental Dysphasia).” *Brain* 134.10 (2011): 3044-58. doi: 10.1093/brain/awr141.

Démonet, J. F., R. Wise, and R. S. J. Frackowiak. “Language Functions Explored in Normal Subjects by Positron Emission Tomography: A Critical Review.” *Human Brain Mapping* 1.1 (1993): 39-47. doi: 10.1002/hbm.460010105.

Dosenbach, N. U., K. M. Visscher, E. D. Palmer, F. M. Miezin, K. K. Wenger, H. C. Kang, E. D. Burgund, A. L Grimes, B. L. Schlaggar,

and S. E. Petersen. “A Core System for the Implementation of Task Sets.” *Neuron* 50 (2006): 799-812.
Dronkers, N. F. “A New Brain Region for Coordinating Speech Articulation.” *Nature* 384 (1996): 159-61. doi: 10.1038/384159a0.
—. “The Pursuit of Brain-Language Relationships.” *Brain and Language* 71 (2000): 59-61. doi: 10.1006/ brln.1999.2212.
Dronkers, N. F., B. B. Redfern, and R. T. Knight. “The Neural Architecture of Language.” *The Cognitive Neurosciences.* Ed. M. S. Gazzaniga. Cambridge, Mass.: MIT Press, 1999.
Dupont, S., V. Bouilleret, D. Hasboun, F. Semah, and M. Baulac. “Functional Anatomy of the Insula: New Insights from Imaging.” *Surgical and Radiologic Anatomy* 25 (2003): 113-19.
Duvelleroy-Hommet, C., P. Gillet, C. Billard, M. L. Loisel, M. A. Barthez, J. J. Santini, and A. Autret. “Study of Unilateral Hemisphere Performance in Children with Developmental Dysphasia.” *Neuropsychologia* 33.7 (1995): 823-34.
Fridriksson, J., D. Guo, P. Fillmore, A. Holland, and C. Rorden. “Damage to the Anterior Arcuate Fasciculus Predicts Non-Fluent Speech Production in Aphasia.” *Brain* 136.11 (2013): 3451-60. doi: 10.1093/brain/awt267.
Fromkin, V., and R. Rodman. *An Introduction to Language* 6th ed. New York, N. Y.: Harcourt Brace Jovanovich, 1997.
Fuster, J. M. “Frontal Lobe and Cognitive Development.” *Journal of Neurocytology* 31 (2002): 373-85.
Gazzaniga, M. S. “Right Hemisphere Language Following Brain Bisection: A 20-Year Perspective.” *American Psychologist* 38.5 (1983): 525-37. doi: 10.1037/0003-066X.38.5.525.
Geschwind, D. H., and B. L. Miller. “Molecular Approaches to Cerebral Laterality: Development and Neurodegeneration.” *American Journal of Medical Genetics* 101.4 (2001). 370-81. doi: 10.1002/1096-8628(20010715)101:4<370::AID-AJMG1223>3.0.CO;2-G.
Geschwind, N. “The Organization of Language and the Brain.” *Science* 170 (1970): 940-44.
—. “Specializations of the Human Brain.” *Scientific American* 241 (1979): 180-99.
Goodglass, H. *Understanding Aphasia.* San Diego, Calif.: Academic Press, 1993.
Hayes, J. R., ed. *Cognition and the Development of Language.* New York, N. Y.: John Wiley & Sons, 1970.
Kalat, J. W. *Biological Psychology* 11th ed. Belmont, Calif.: Wadsworth, 2013. 437-38.