Dear Friends,

Sincerely,
Nina Dronkers, Ph.D.
Director, Center for Aphasia & Related Disorders

Have you Heard?
Winter Holiday Party Dec. 17th
(note new location)!

Season’s Greetings from the Aphasia Center!
Overview of the Aphasias

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Aphasia is an acquired impairment in language due to a brain injury. To be considered aphasia, the impairment must affect a range of language functions, including speech, comprehension, reading, and writing. Aphasia usually follows from injury to the left hemisphere of the brain. In stroke, it is usually due to a disruption of blood flow in the middle cerebral artery, which provides blood supply to the lateral surface of the cortex. Aphasia can also occur following a traumatic brain injury or may emerge gradually due to progressive, degenerative brain disease. Traditionally, aphasia has been classified using subtypes that are characterized by specific patterns of impairment in spoken fluency, comprehension, naming, and repetition. These aphasia subtypes include Broca’s aphasia, Wernicke’s aphasia, conduction aphasia, global aphasia, anomic aphasia, and transcortical aphasia. Here we review the behavioral characterization of these aphasia subtypes as well as discuss their anatomical basis.

**Broca’s aphasia** was first described by the French neurologist, Paul Broca, in the 1860s. He described a patient who could say very few words and repeatedly uttered the sound, "au" when trying to speak. Despite his poor speech output, this patient understood much of what was said to him. A second patient soon followed who showed a similar dissociation of reduced speech fluency and relatively preserved comprehension. This form of aphasia came to be known as Broca’s aphasia, and is sometimes referred to as motor aphasia or non-fluent aphasia.

The following is a speech sample of a patient with Broca’s aphasia as he attempts to describe a drawing of a lakeside picnic from the Western Aphasia Battery:

> I see dog, boy, boy, sand, see book, people, boats, on boat… girl and man reading, man fishing…

Such speech is typical of patients with Broca’s aphasia. Despite its halting nature, such speech often contains important content words so that the main ideas are conveyed, but smaller functor words (e.g., *the*) are omitted, resulting in agrammatic speech (e.g., *I have a brother*). There is debate as to whether such agrammatic speech is due to the inability of these patients to use grammatical forms or whether it simply reflects a strategic choice due to a reduced processing capacity.

Comprehension in patients with Broca’s aphasia is relatively preserved, as long as sentences are not complex. For example, sentences such as *I have a brother* may be misunderstood as *I have a*, the latter being the more canonical construction in English. Repetition and naming are also disrupted in Broca’s aphasia due to the speech output disturbance. Similarly, reading and writing are affected, for example, patients often are unable to write complete phrases or sentences (parallel to their spoken output).

Textbook descriptions of the neural correlates of Broca’s aphasia most commonly associate it with Broca’s area in the posterior, inferior frontal gyrus, as originally described by Broca. Current research data, however, suggest that for a chronic, persisting Broca’s aphasia, the lesion is generally much larger, encompassing regions of inferior frontal and insular cortex, as well as deeper, white matter.

Wernicke’s Aphasia was described by Karl Wernicke who was a German neurologist and psychiatrist born in 1848. In 1874, at the age of just 26, he published a major work on aphasia that described patients with an inverse pattern of deficits from that observed by Broca, namely, patients with fluent speech and a marked comprehension impairment. This form of aphasia came to be called Wernicke’s aphasia but is also referred to as sensory aphasia or fluent aphasia. Unlike Broca’s aphasia, Wernicke’s aphasia is considered a fluent aphasia, because patients with Wernicke’s aphasia speak spontaneously with a normal to fast rate of speech, and their speech rhythm and prosody are normal. The following is a sample from a patient with Wernicke’s aphasia describing the picnic scene:

> !The /goll/ /dz/ George. It isn’t correct. He — 0 α 0 ! ! ! ! ! 0 α ! — oh I can’t say it. This girl 0 ! ! ! ! ! ! ! ! ! ! 0 α 0 ! — — ! 0 α ! ! ! ! ! ! 0 ! ! ! /

Though their speech may be fluent, patients with Wernicke’s aphasia are often unintelligible. This is in part due to the presence of numerous speech errors. Such errors sometimes involve the swapping of sounds or syllables or substituting one sound for another (e.g., saying *alien* for *alien*). Sometimes, these errors are so distorted that the target word is unclear (e.g., *auditorium*). Such errors are referred to as neologisms. Patients with Wernicke’s aphasia also make semantic errors, substituting a related word for an intended target (e.g., *for*). Paraphasic errors occur during repetition and naming as well as spontaneous speech. Interestingly, despite the abundance of paraphasic errors in Wernicke’s speech, many aspects of syntactic structure remain intact. Wernicke’s aphasia has traditionally been associated with lesions in Wernicke’s area, which generally is defined as the left posterior, superior temporal gyrus. However, the exact boundaries of this area vary from...
textbook to textbook, presumably because the boundaries were
never clearly defined. In our research, we have found that a
lesion centered in the middle temporal gyrus is critical for a
chronic, persisting Wernicke’s aphasia. Other areas that are
commonly affected include the posterior, superior temporal
gyrus and inferior parietal cortex. These regions have been
associated with auditory processing, lexical-semantics, and
verbal working memory.

Conduction aphasia was first described by Wernicke to char-
acterize patients with relatively preserved comprehension and
paraphasic speech. Later, following Lichtheim, Wernicke
added to the list of deficits a disorder of repetition. Clinically,
patients with conduction aphasia present with fluent speech,
relatively good comprehension, but their speech is somewhat
paraphasic and their ability to repeat is greatly reduced. Read-
ing and writing, as well as naming, are also affected to a mod-
erate degree.

Despite relatively fluent speech, patients with conduction apha-
sia exhibit significantly impaired repetition. Patients may get
the gist or general meaning of what is said (as evidenced by
their relatively good comprehension), but they are impaired at
repeating material verbatim. For example, in an attempt to re-
peat the sentence ! ! ! ! , one patient re-
sponded ! ! ! ! . This phenomenon
suggests that patients with conduction aphasia are relying on a
non-verbatim, semantic route since the phonological trace is no
longer available. Dependence on this semantic route is also
revealed by the fact that repetition is severely affected for non-
sense words (e.g., . Such words have no meaning, and
thus cannot give rise to a paraphrase or synonym, let alone
reproduction of the same word.

Traditional models of aphasia originally suggested that conduc-
tion aphasia should arise from lesions to the arcuate fasciculus,
the white matter tract connecting Wernicke’s and Broca’s ar-
 eas. Despite the fact that no data existed to support this model,
most textbooks in psychology and neuroscience perpetuate this
notion. Instead, patients with conduction aphasia most com-
monly have lesions centered in left posterior neocortex, most
notably in inferior parietal cortex, the arcuate fasciculus.
Global aphasia is the most severe of all aphasia subtypes, with
significant impairments across all aspects of language, namely,
impaired speech, comprehension, repetition, naming, reading,
and writing. Patients with global aphasia may be able to utter
automatic or stereotypic responses (e.g., / / etc.) but do so
unreliably. For example, one patient with global aphasia when
asked to describe the picnic scene from the WAB was only
able to utter ! ! on one occasion and ! ! on
another occasion. Other patients with global aphasia are only
able to produce overlearned or automatic phrases (e.g., ! !

Although the severe loss of speech and language makes it very
difficult for patients with global aphasia to communicate, they
are sometimes able to convey information by varying the inton-
ation in their voice or by using simple gestures. Importantly,
patients with global aphasia can be shown to perform normally
on non-verbal tasks (e.g., picture matching), demonstrating that
they are not suffering from confusion or dementia.

As described above, some patients with global aphasia have a
preserved ability to utter automatic phrases or repetitive utter-
ances. What is the brain basis of these abilities, if much of the
language network is damaged? There is some evidence that
these automatic and overlearned phrases are generated by re-
 gions within the intact right hemisphere of the brain. The right
hemisphere is also capable of supporting intonation in speech,
musical ability, and emotional expression. Again, these are
abilities that are sometimes preserved in patients with global
aphasia. As with the other aphasias, global aphasia is most
commonly the result of a stroke in the middle cerebral artery
that supplies blood to the lateral surface of the left hemisphere
of the brain. Not surprisingly, lesions necessary for a persist-
ing, global aphasia are generally quite large and encompass
large portions of the left hemisphere.

Anomia is the mildest of the aphasias, with relatively
preserved speech and comprehension, but difficulty in word-
finding. The persistent inability to find the right word is known
as (literally, ! ). Anomia is actually a
symptom of all forms of aphasia, but patients whose primary
language problem is word retrieval are diagnosed as having
anomic aphasia. In other words, patients with anomic aphasia
have relatively preserved speech fluency, repetition, compre-
 hension, and grammatical speech, but sometimes have diffi-
culty with word-finding. When searching for a word, some
patients with anomic aphasia paraphrase using words that they
can easily retrieve. For instance, a patient shown a drawing of a
pair of tongs said ! ! ! ! . Such circumlocu-
tions demonstrate that patients with anomic aphasia have nei-
ther lost conceptual understanding nor the ability to build co-
herent sentences and phrases.
**Project Recovery**

This is an adaptive physical exercise program for those with physical disabilities including moderately self-ambulatory, ortho-multi-handicapped, and other health impairments. The program will increase fitness, balance, strength, and range of motion.

Mon/Wed: 1:30-2:30pm or 2:30-3:30pm
Tue/Thur: 2:00-3:00pm or 3:00-4:00pm.


**Stroke Support Group of Contra Costa County**

Mt. Diablo Medical Center, Concord, CA 94520, or John Muir Medical Center, 1601 Ygnacio Valley Rd., Walnut Creek, CA 94596


Ann Dzuna, 1174 Alta Mesa Dr., Moraga, CA 94556-2042

Email: ADZUNA@COMCAST.NET

**Cal State University East Bay Aphasia Group**

California University - East Bay, Speech, Language & Hearing Clinic, MB# 1097A, Communicative Sciences and Disorders, Hayward, CA 94542

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Email: RJElman@aol.com Website: www.aphasiacenter.org

**Stroke Club San Francisco**

Stonestown Family YMCA, Senior Annex, 3150 20th Ave., San Francisco, CA 94132

D: Kathy Orsi (415) 242-7117
Happy Holidays!
We hope you have a happy and peaceful season.

Sincerely,
Your friends at the Aphasia Center
Stroke Support Group
Annual Holiday Party!

When: Wed., December 17th,
12:30-3:00 p.m.

Where: NOTE NEW LOCATION*
R4 Research Conference Room at top
of hill, northwest corner of the VA Center

What to bring: a dish or drink to share, if you are
able, and a

Questions: call Luci
(925) 372-2670

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Holiday Jokes

1. Why does Santa Claus have 3 gardens?
2. Why was Santa’s little helper depressed?
3. Where do polar bears vote?
4. What do snowmen eat for breakfast?
Contributors

Thanks to:

Nina Dronkers
Jenny Ogar
Janet Patterson
Sharon Willock
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Carl Ludy
Luci Varian
Juliana Baldo
Carolyn Benjamin

We would also like to thank the members of the Stroke Support Group and their families, the Speech Pathology staff, and the East Bay Institute for Research and Education.

Newsletter Information

If you would like to receive this newsletter or you have comments/suggestions, e-mail Juliana at juliana@ebire.org or call her at (925) 372-4649 or write to:

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VA Northern Calif. Health Care System
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Martinez, CA 94553

We welcome your comments and questions!

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