NBASLH Praxis Review

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Topics

- Normal Aging
- Aphasia
- Cognitive-Linguistic Disorders
  - Traumatic Brain Injury
  - Dementias
  - Right Hemisphere Syndrome
- Neuroanatomical Basis
- Foundational Information
- Core Characteristics
- Key Assessment Tools
- Treatment

Other Information

- Key Diagnostic Tests will be identified but NOT reviewed in substantial detail
- Key Treatment Approaches will be highlighted for core information, but additional review should be considered
- QUESTIONS are always welcomed but devoted time may be limited

Questions

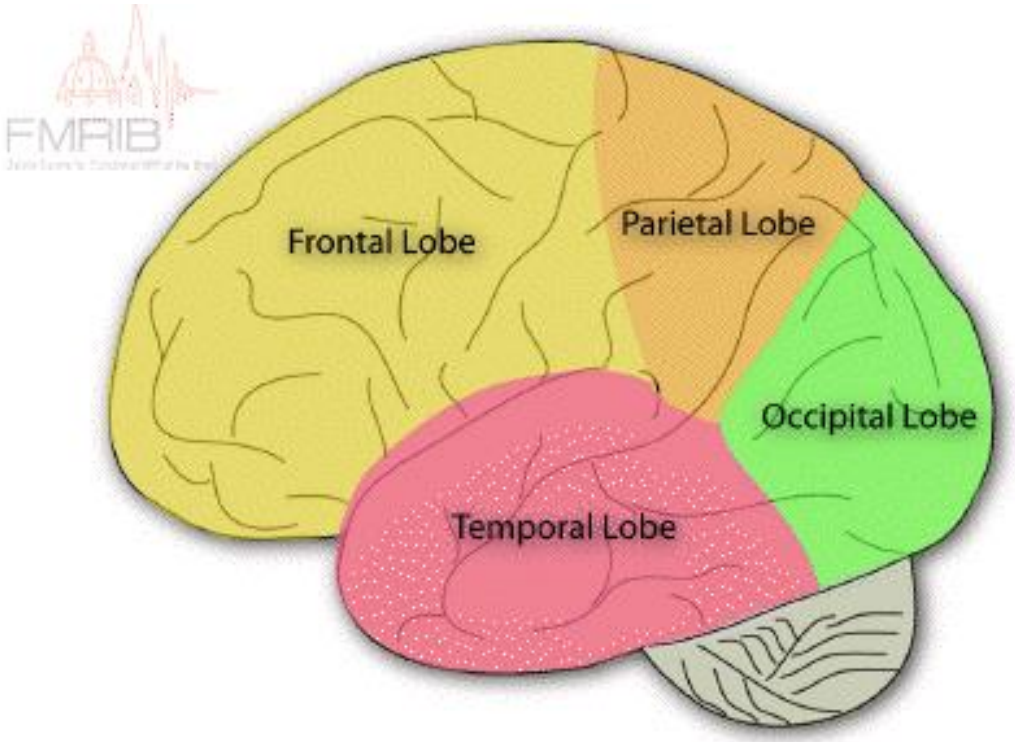
- Accepted at any time; please use chat function during lecture
- Q/A after each section; chat or microphone
- Q/A at completion; microphone

Aphasia

Brain Basics

Cerebral Anatomy

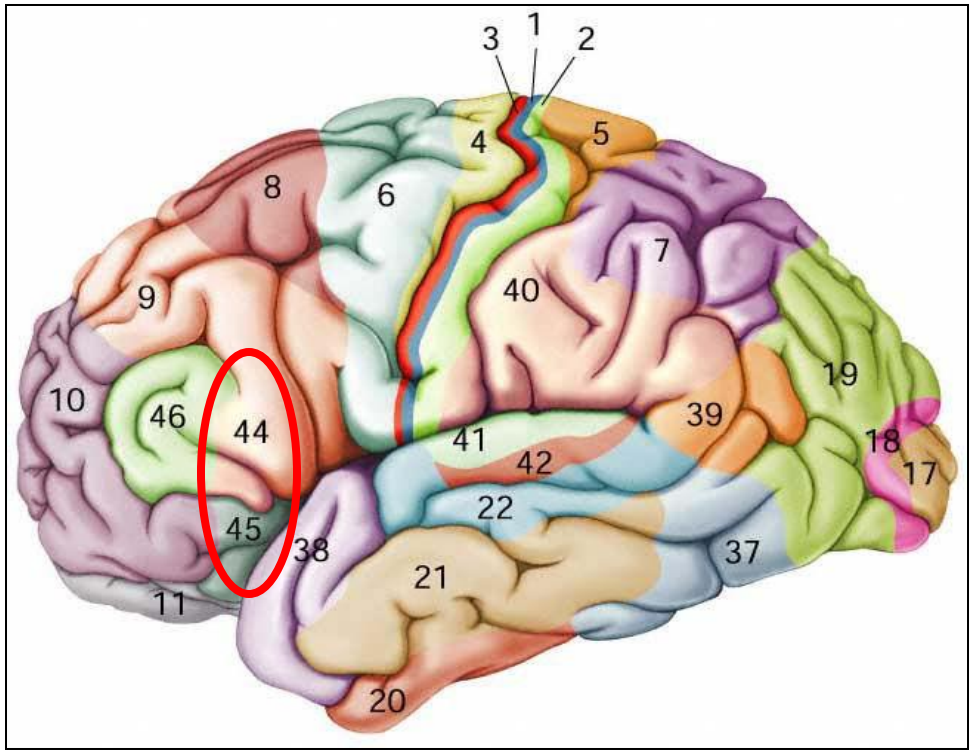
- Frontal Lobe
- Parietal Lobe
- Temporal Lobe
- Occipital Lobe



http://users.fmrib.ox.ac.uk/~stuart/thesis/chapter_3/section3_2.html

Brodmann's Areas – Speech-Language

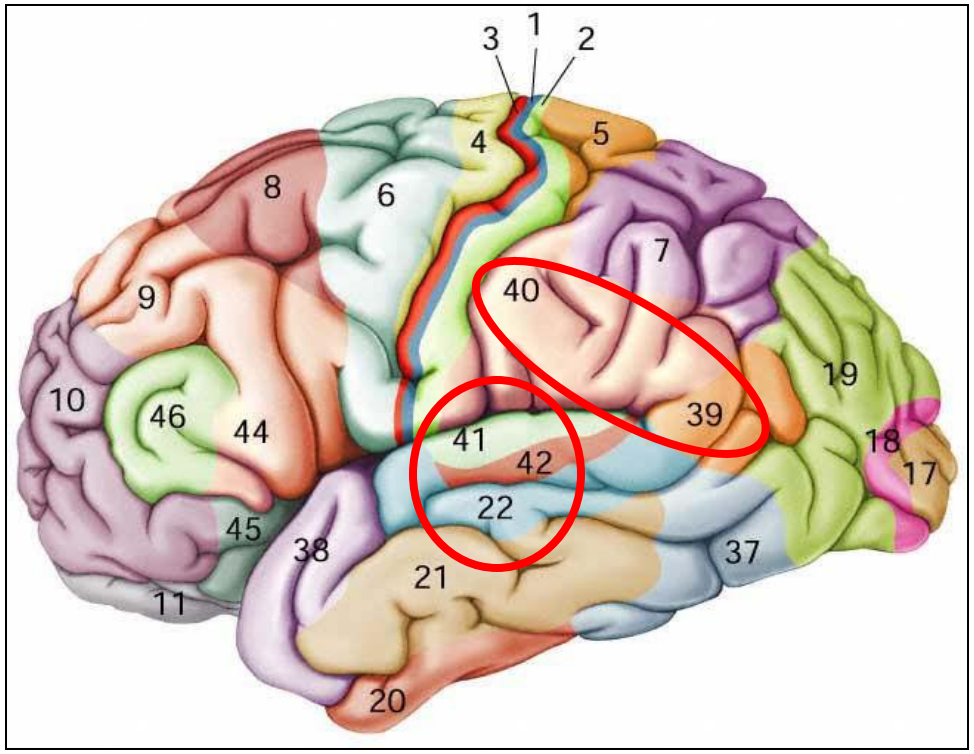
- 44 Pars Opercularis
  - Traditional Broca's Area
  - Condition: Broca's Aphasia; Apraxia of Speech
- 45 Pars Triangularis
  - Part of Broca's Area
  - Condition: Broca's Aphasia; Apraxia of Speech



Taken from: http://airto.loni.ucla.edu/BMCweb/CourseWork/NAClass/brodmann.html

Brodmann's Areas – Speech-Language

- 22 Superior Temporal Gyrus
  - Part of Wernickes Area
  - Condition: Wernicke's aphasia
- 40 Supramarginal Gyrus
  - Part of Wernickes Area
  - Condition: Wernicke's aphasia
- 41, 42 Primary Auditory Association Cortex
  - Condition: Processing Issues in Wernicke's Aphasia
- 39 Angular Gyrus
  - Part of Wernickes Area
  - Acalculia, agraphia



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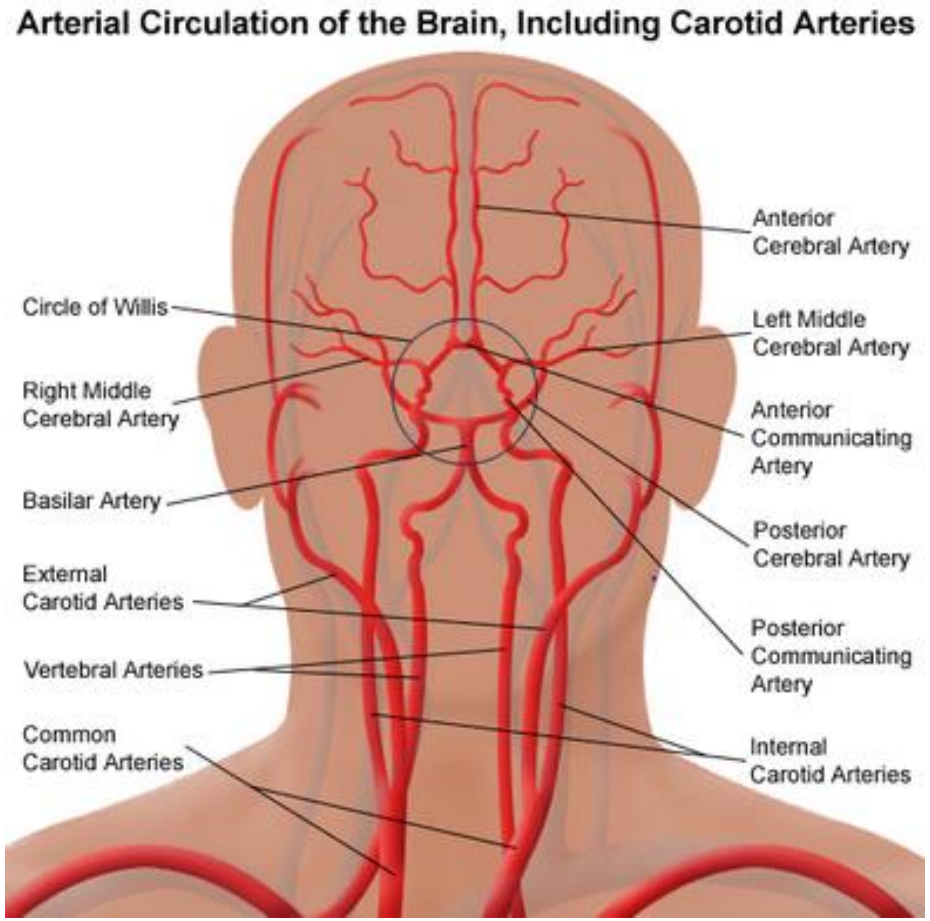
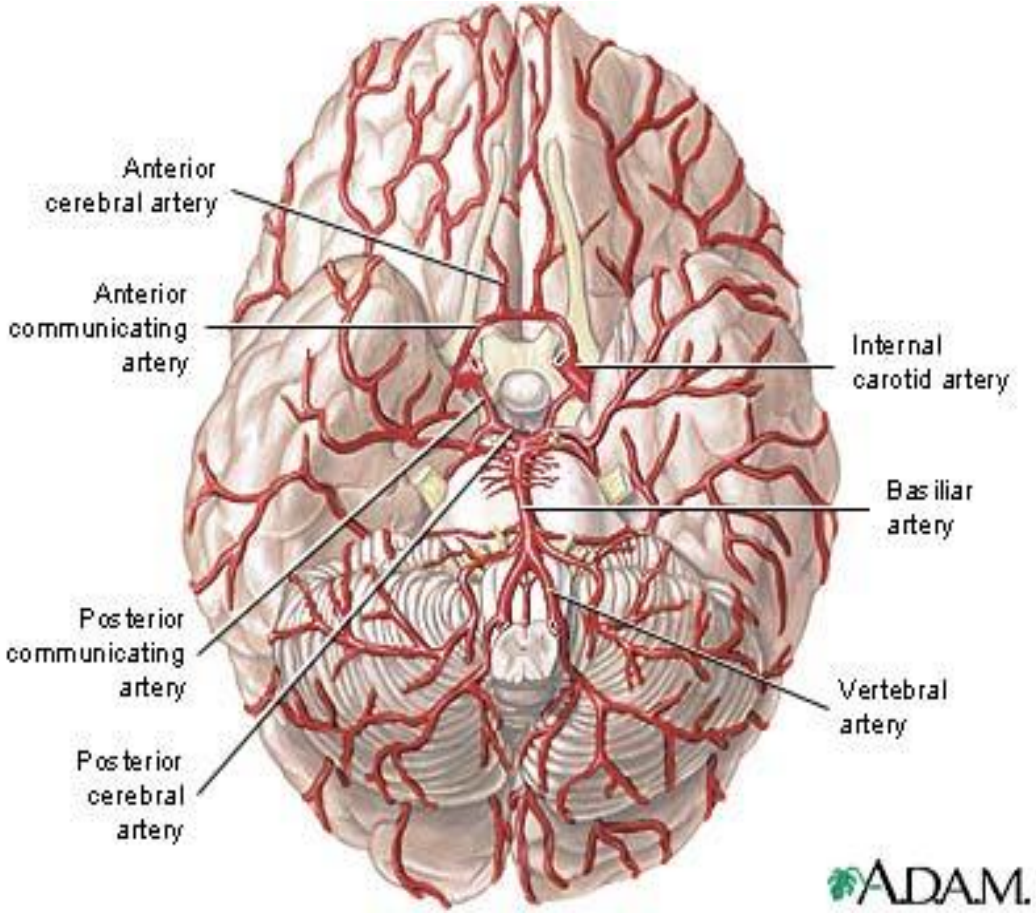
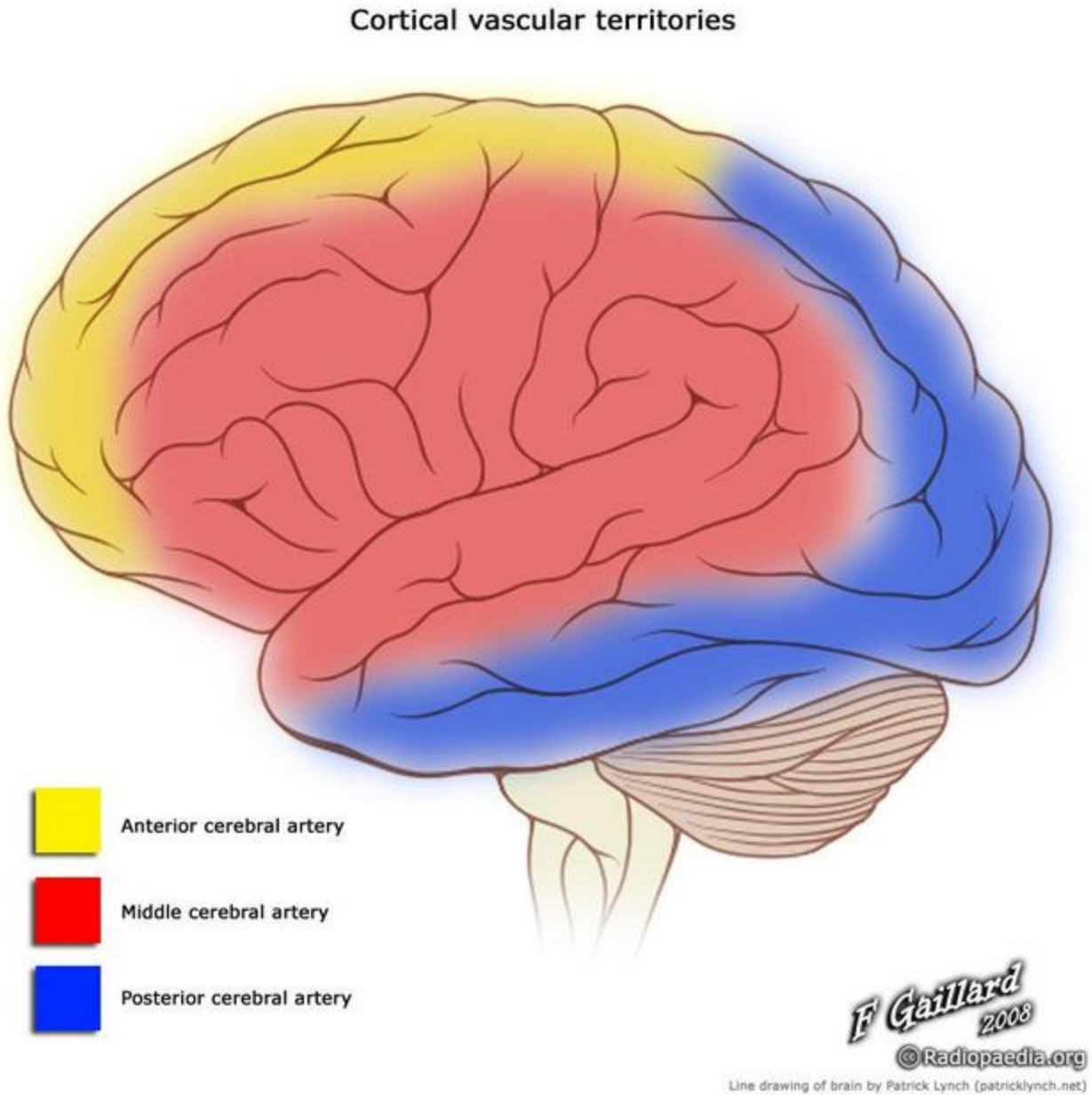
Cerebral Blood Supply



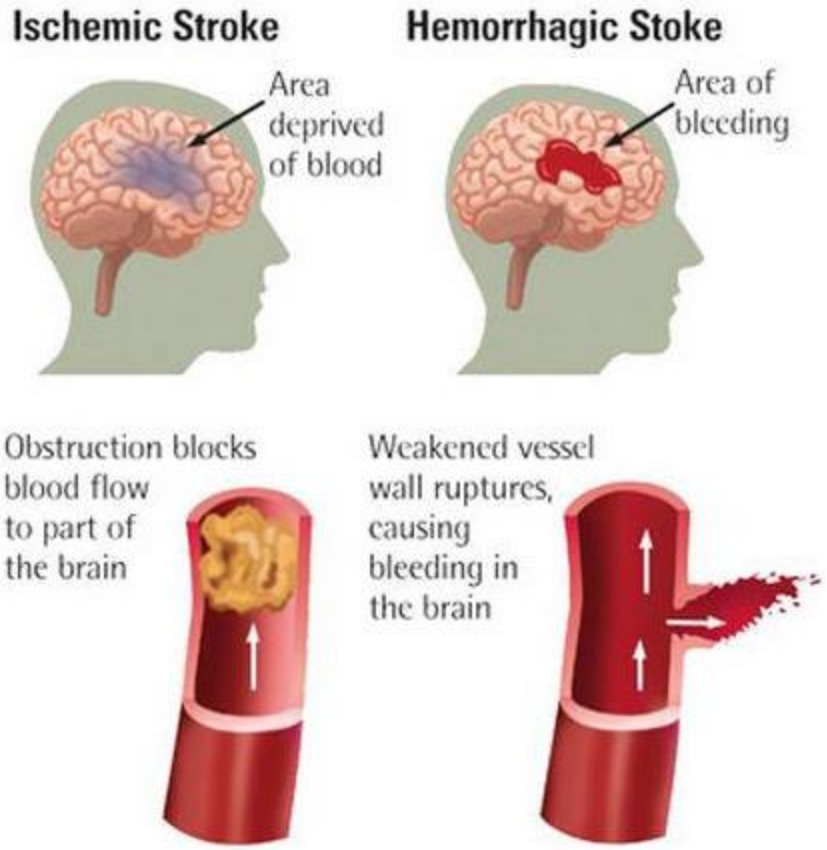


Taken from:http://www.nlm.nih.gov/medlineplus/ency/imagepages/9441.htm


Cortical vascular territories
Anterior cerebral artery
Middle cerebral artery
Posterior cerebral artery
F Gaillard 2008
©Radiopaedia.org
Line drawing of brain by Patrick Lynch (patricklynch.net)

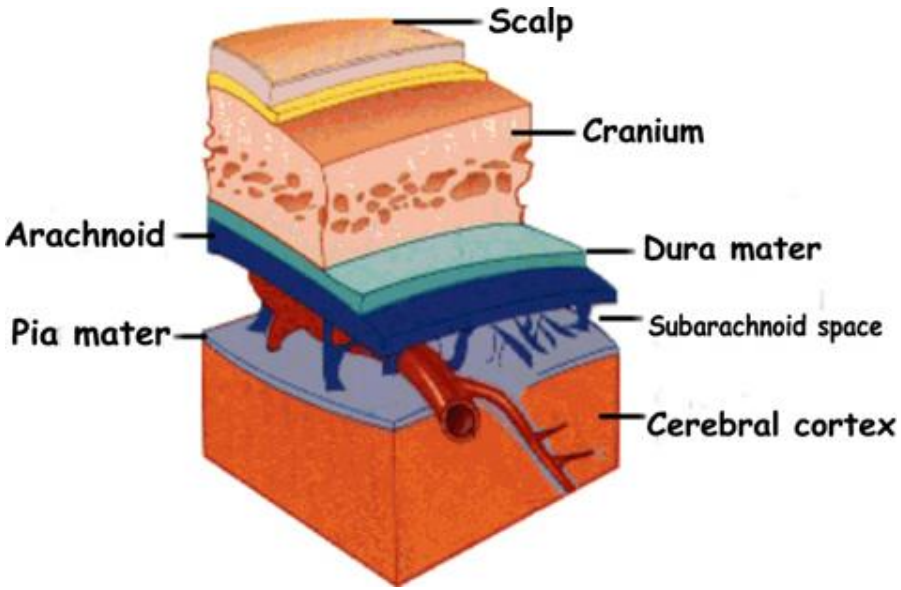
Stroke Types

- Ischemic (87%)
  - Thrombosis (stenosis)
  - Thrombo-embolic
- Intracerebral Hemorrhage (10%)
- Subarachnoid Hemorrhage (3%)

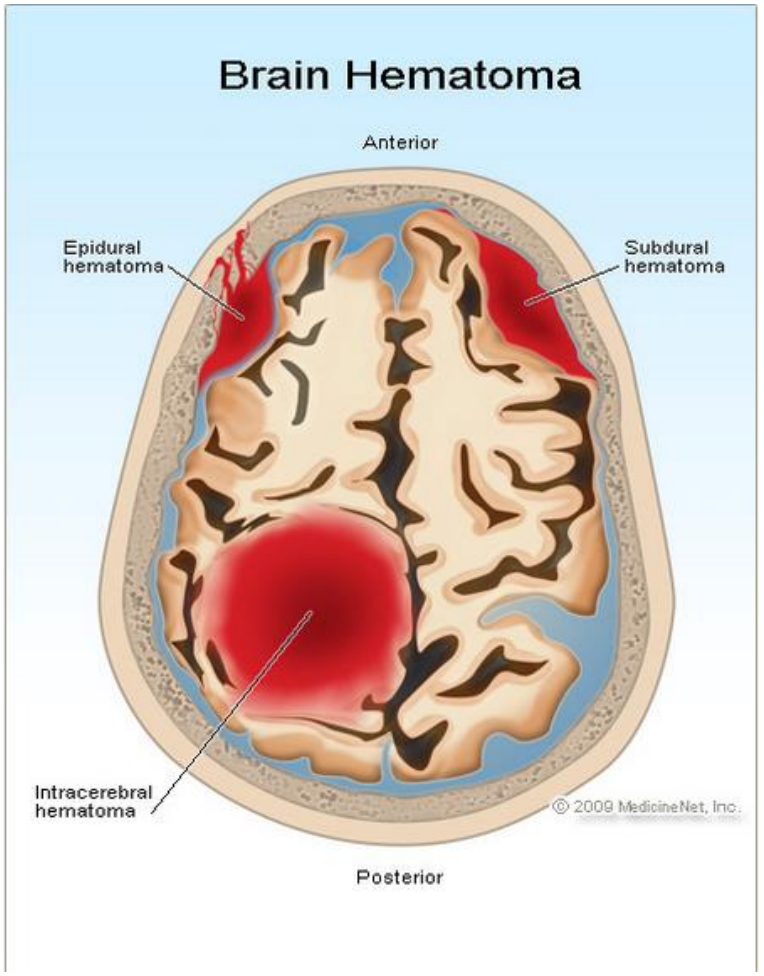


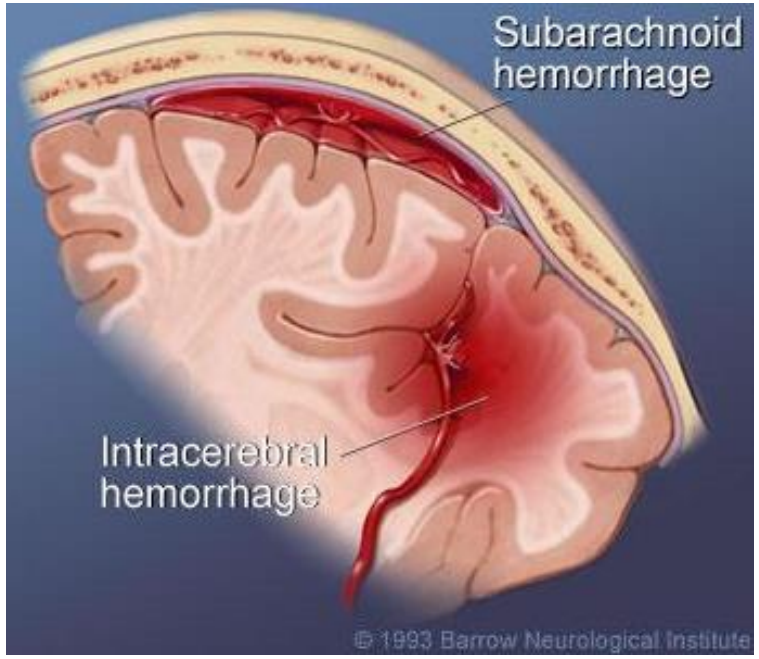
Primary Cause of Aphasia

Hemorrhage Locations



www.thewellingtonneurosurgeryunit.com475 × 310





Definitions and Key Concepts in Aphasia

Definition: Aphasia

- Aphasia is an ***impairment of language, affecting the production or comprehension of speech and the ability to read or write.*** Aphasia is ***always due to injury to the brain-most commonly from a stroke***, particularly in older individuals. But brain injuries resulting in aphasia may also arise from ***head trauma***, from ***brain tumors***, or from ***infections***.

Definition: Aphasia

- Aphasia is a consequence of stroke, affecting 21–38% of acute stroke patients (Berthier, ML. (2005). Poststroke aphasia : epidemiology, pathophysiology and treatment. Drugs Aging, 22(2):163-82.

- Aphasia affects about ***one million Americans -or 1 in 250.***
- More than 200,000 Americans acquire the disorder each year. However, ***most people have never heard of it.***
    - National Aphasia Association http://www.aphasia.org/

Key Concept: Cerebral Dominance

- Left hemisphere dominant for language in right handed adults
- Mirror image concept for left handed adults
- Studies of language dominance
  - Sodium amytal (Milner,1975)
  - Restrospective chart reviews (Naeser & Borod, 1986)

Key Concept: Handedness

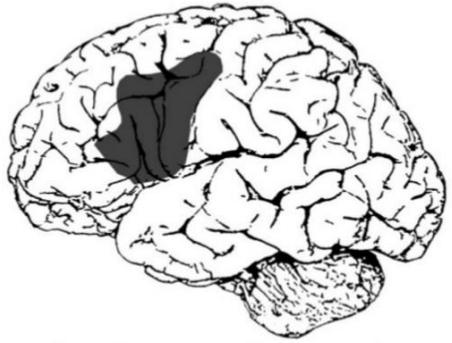
- >90% of the population is right handed
- Left hemisphere is dominant for language in 99% of right-handed individuals
- Left hemisphere is dominant for language in 70% of left-handed individuals
  - 15% right hemisphere dominant
  - 15% bilateral
- Left hemisphere is dominant for language in 97% of all individuals

Key Concepts: Dominance Conclusions

- Most adults regardless of handedness rely on left hemisphere for language
- Left-handers brains may be more flexible about which hemisphere gets language responsibility
- Left-handers who become aphasic seem to have less severe aphasia and recover better regardless of which hemisphere is affected

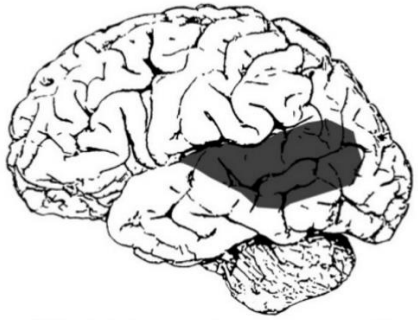
Localizationist Models of Aphasia

Broca's Aphasia



- Damage to Broca's area alone is not enough to produce Broca's aphasia
- Usually involves Broca's area + surrounding areas including M1 & insula.

Wernicke's Aphasia

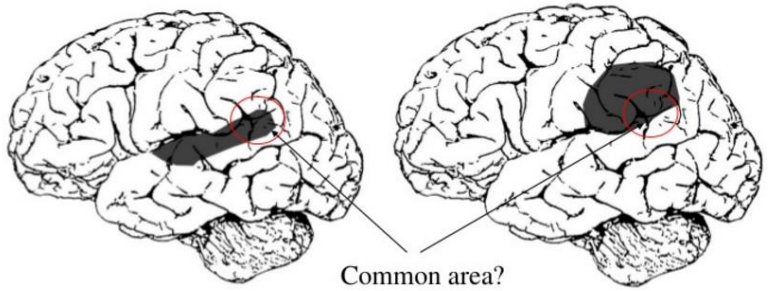


- Damage to Wernicke's area alone is not enough to produce Wernicke's aphasia
- Usually involves Wernicke's area + surrounding areas including MTG & angular gyrus.

Global Aphasia

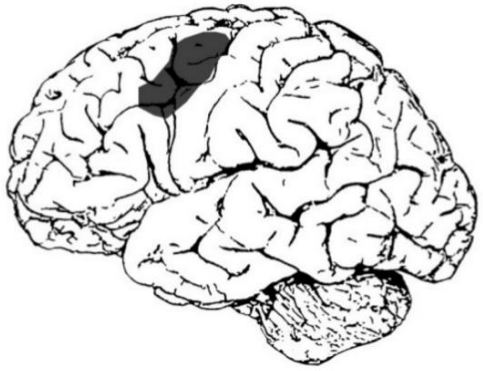
- Tend to be large "peri-Sylvian" lesions
- But smaller lesions can also cause global aphasia

Conduction Aphasia



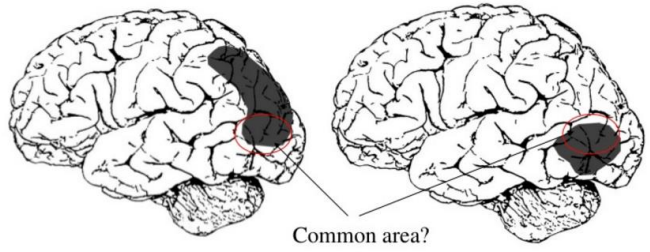
- Damage to the arcuate fasciculus has not been associated with conduction aphasia
- Usually two lesion patterns: posterior STG (wernicke's areas) and/or SMG

Transcortical Motor Aphasia



•Damage often anterior and/or superior to Broca's area

Transcortical Sensory Aphasia



- Variable lesion patterns, mostly posterior to Wernicke's area
- Deficit tends to be transient evolving into anomic aphasia

Connectionist Models of Aphasia

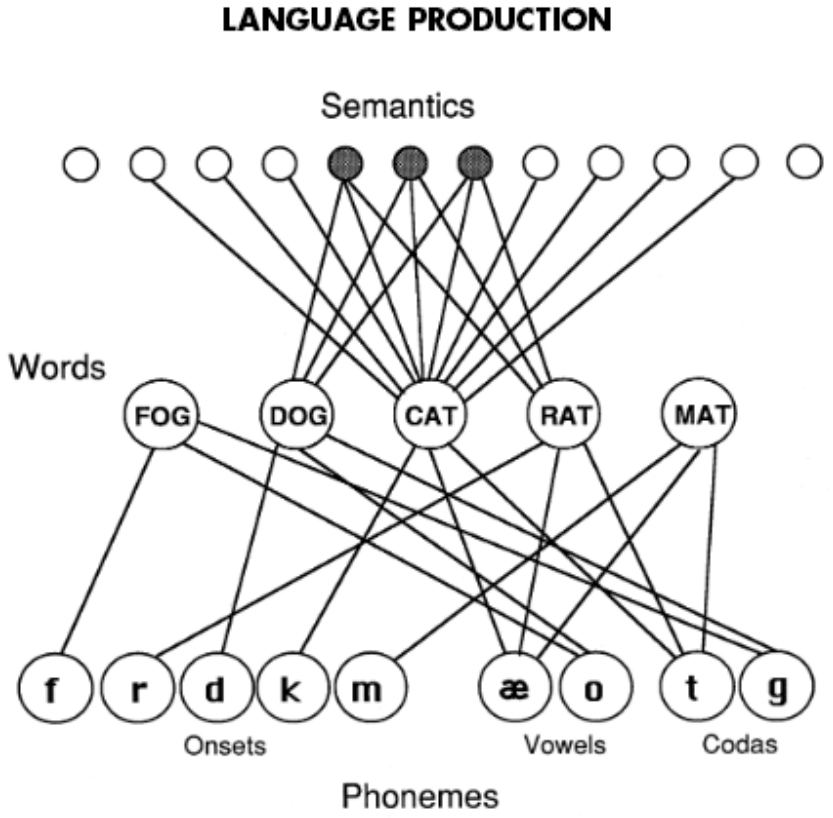


Figure 1. The aphasia model. Connections are excitatory and bidirectional.

- Three layers of units: semantic features, words, and phonemes.
- Each word corresponds to a single unit in the word layer.
- Bidirectional excitatory connections link words to their semantic features and phonemes.
- Each word is connected to semantic features and phonemes.
- Lexical access is achieved by interactive spreading activation.
- Semantic units are activated, this activation spreads throughout the network, and ultimately the sounds of the intended word are retrieved.

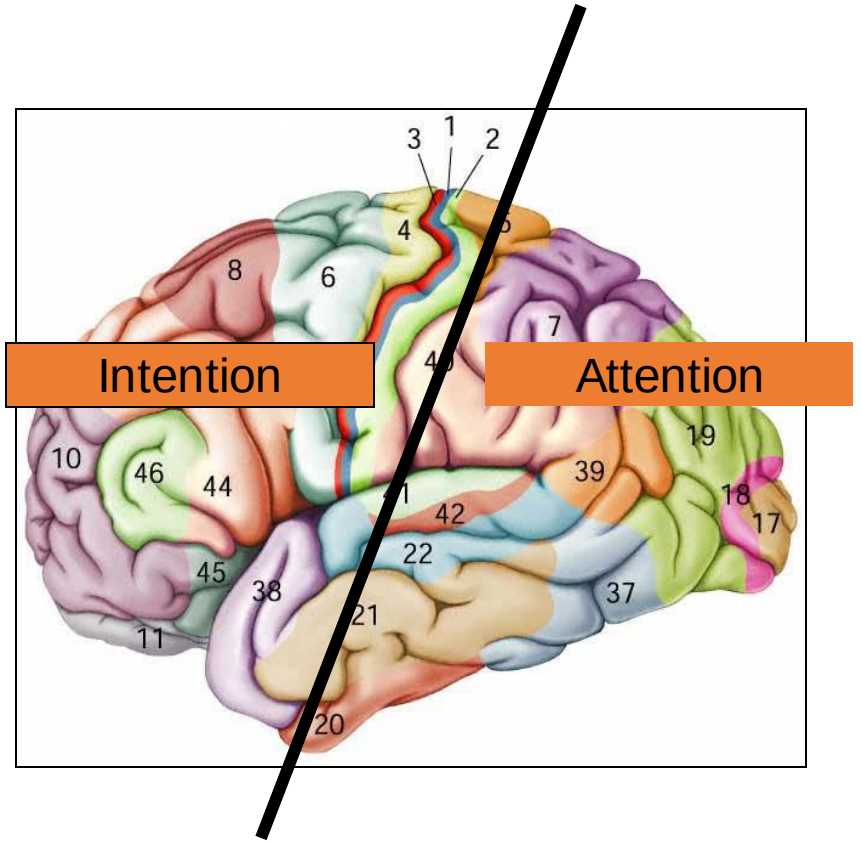
COGNITIVE SCIENCE Vol 23 (4) 1999, pp. 517–542

Aphasia Patterns of Impairment

- Speech fluency
- Paraphasia
- Repetition
- Language Comprehension

Fluency

- Nonfluent Aphasia
  - Anterior to Central Sulcus
- Fluent Aphasia
  - Posterior to Central Sulcus



Non-fluent vs Fluent

- Non-fluent
  - Slow, labored speech
  - Grammatical constructions are restricted
  - Intonation reduced or absent
  - Function words omitted
  - Rely on a lot on nouns
- Fluent
  - Normal/near normal speech rates
  - Variety of grammatical constructions
  - Intonation patterns present and usually appropriate
  - Function words present
  - Syntax appropriate

Non-fluent vs Fluent

- Non-fluent
  - 3-4 words per breath group
  - Associated with agrammatism
- Fluent
  - > 5-6 words per breath group
  - Can be associated with paragrammatism
    - “word salad”
    - “grammatically incorrect sentences

Aphasia Fluency

- Non-Fluent
  - Broca's
  - Global
- Fluent
  - Wernicke's
  - Conduction
  - Anomic
  - Transcortical Motor**
  - Transcortical Sensory

**TMA can be fluent but sparse

Broca's p.194

- Description of "cookie theft picture"; BDAE.
- uh…mother and dad…no…mother…and and disses…uh…runnin over…and waduh…and floor…and they …uh…wipin disses…and…uh…two kids…uh…stool…and cookie…cookie jar…uh…and uh … cabinet and stool…uh…tippin over…and…uh…bad…and somebody…uh…somebody gonna get huht.

Wernicke's pp.195-196

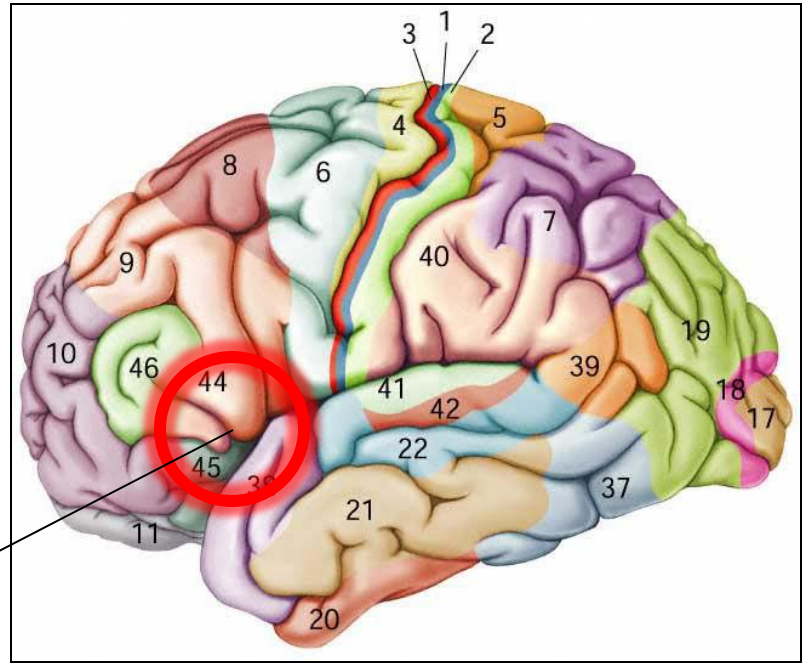
- **Clinician:** Tell me about where you live.
- **Patient:** Well, it's a meender place and it has two…two of them. For dreaming and pinding after supper. And up and down. Four of down and three of up…
- **Clinician:** What's the weather like today?
- **Patient:** Fully under the jimjam and on the altigrabber.

- **Clinician:** Tell me what you do with a comb.
- **Patient:** What do I do with a comb…what I do with a comb. Well a comb is a utensil or some such thing that can be used for arranging and rearranging the hair on the head both by men and by women. One could also make music with it by putting a piece of paper behind it and blowing through it. Sometimes it could be used in art; in sculpture, for example, to make a series of lines in soft clay. It's usually made of plastic and usually black, although it comes in other colors. It is carried in the pocket until it's needed, when it is taken out and used, then put back in the pocket. Is that what you had in mind?

Types of Aphasia

Broca's Aphasia

- Expressive Aphasia
- Motor Aphasia
- Anterior Aphasia
- Non-fluent Aphasia



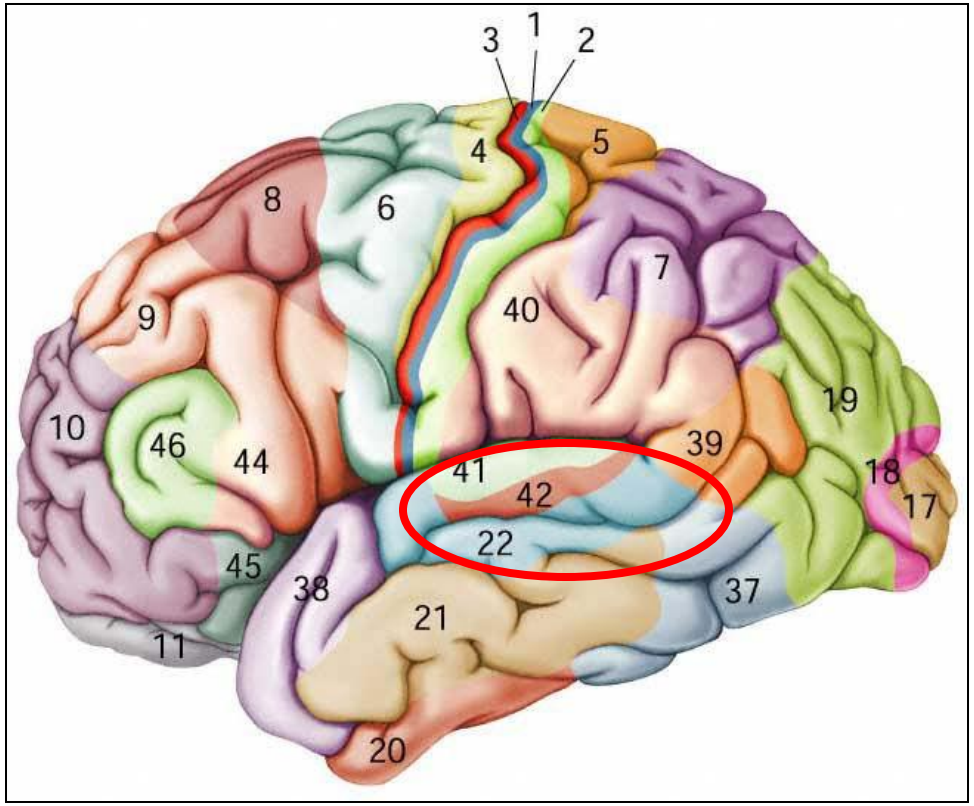
Frontal Operculum

Broca's Aphasia

- Non-fluent
  - Words are slow, laborously and halting
  - Frequent pausing (syllables, words)
- Agrammatic output (telegraphic)
- Comprehension relatively preserved > expression
- Poor, nonfluent Repetition
- Preserved self monitoring
- Writing similar to verbal output
  - Agrammatic; large, absent of function words

Wernicke’s Aphasia

- Sensory Aphasia
- Receptive Aphasia
- Posterior Aphasia
- Fluent Aphasia

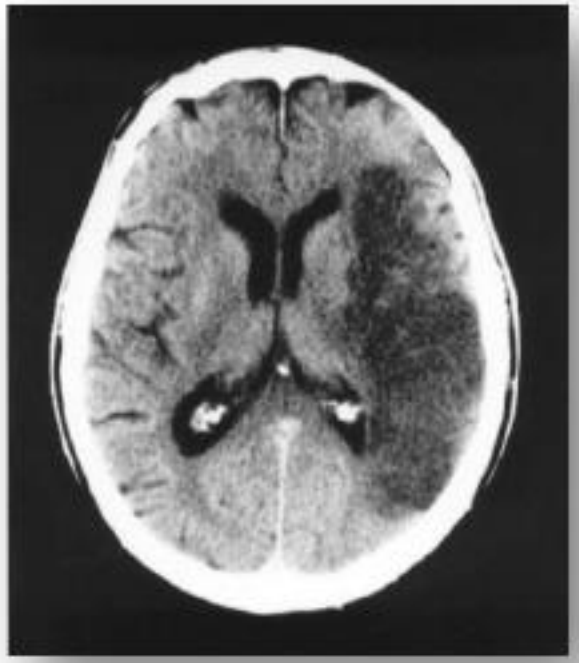


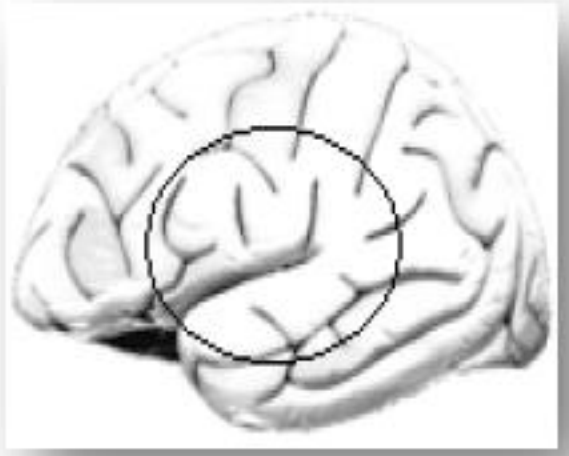
Wernicke's Aphasia

- Fluent
  - Smooth, effortless output
  - Long syntactically well formed sentences with normal intonation and stress patterns
- Frequent literal and occasional literal paraphasias
- Paragrammatism
- Jargon (strings of neologisms with connecting words)
- Handwriting mirrors verbal output
  - Small with significant word errors
- Impaired Repetition
- POOR comprehension
- POOR self monitoring
- Anosognosia

Global Aphasia

- Severe impairments in all language functions
- Difficulty with basic comprehension deficits
- Some respond in conversation suggesting basic comprehension skills
- Limited verbal output; some stereotypical output





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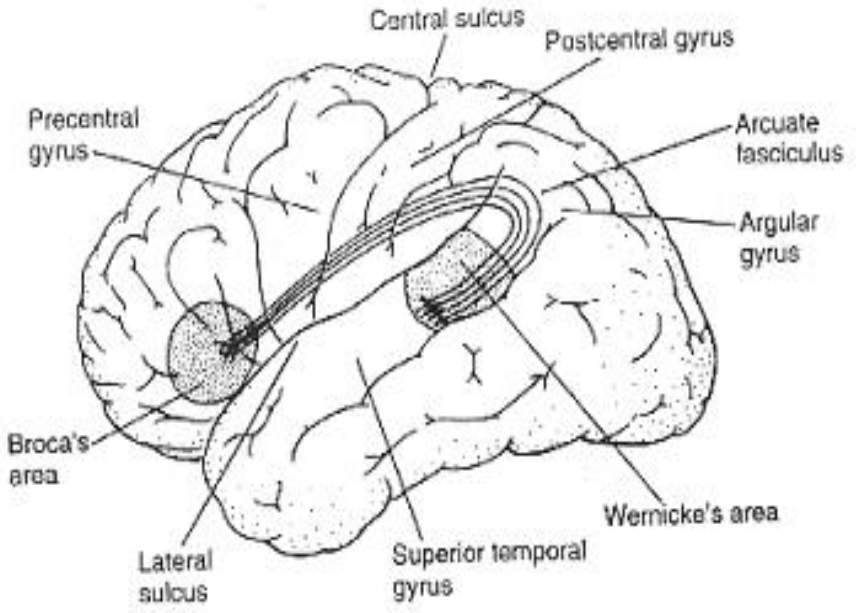
Conduction Aphasia

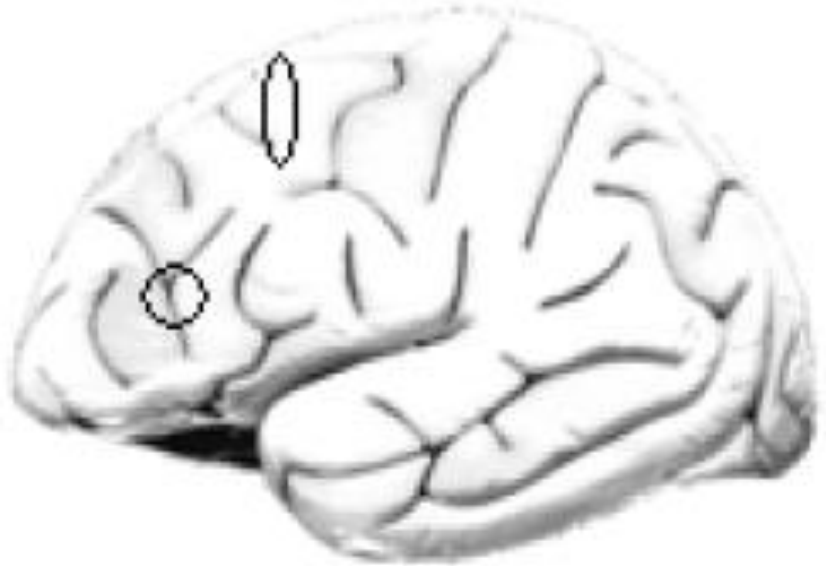
- Lesions in upper temporal lobe, lower parietal lobe or insula that damage the arcuate fasiculus but spare Broca's and Wernicke's

- Fluent verbal output with occasional verbal paraphasias
- Grossly impaired repetition
- *Relatively preserved* language comprehension
- Poor oral reading
- Handwriting typically functional – can be variable



Transcortical Motor Aphasia

- Damage to anterior superior frontal lobe of language dominant hemisphere
- Reduced speech output
- Good repetition
- Good auditory comprehension



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Transcortical Sensory Aphasia

- Posterior Isolation syndrome
- Damage to high parietal lobe in dominant language hemisphere
- Poor comprehension (listening and reading)
- Good repetition
- Fluent, empty speech with paraphasias

Anomic Aphasia

- Word retrieval in verbal output and writing are the only obvious symptoms
- Fluent and grammatically correct spontaneous output
- Unusual pausing and circumlocutions
- Residual state of many aphasic syndromes *AFTER* time of improvement

Classification Summary

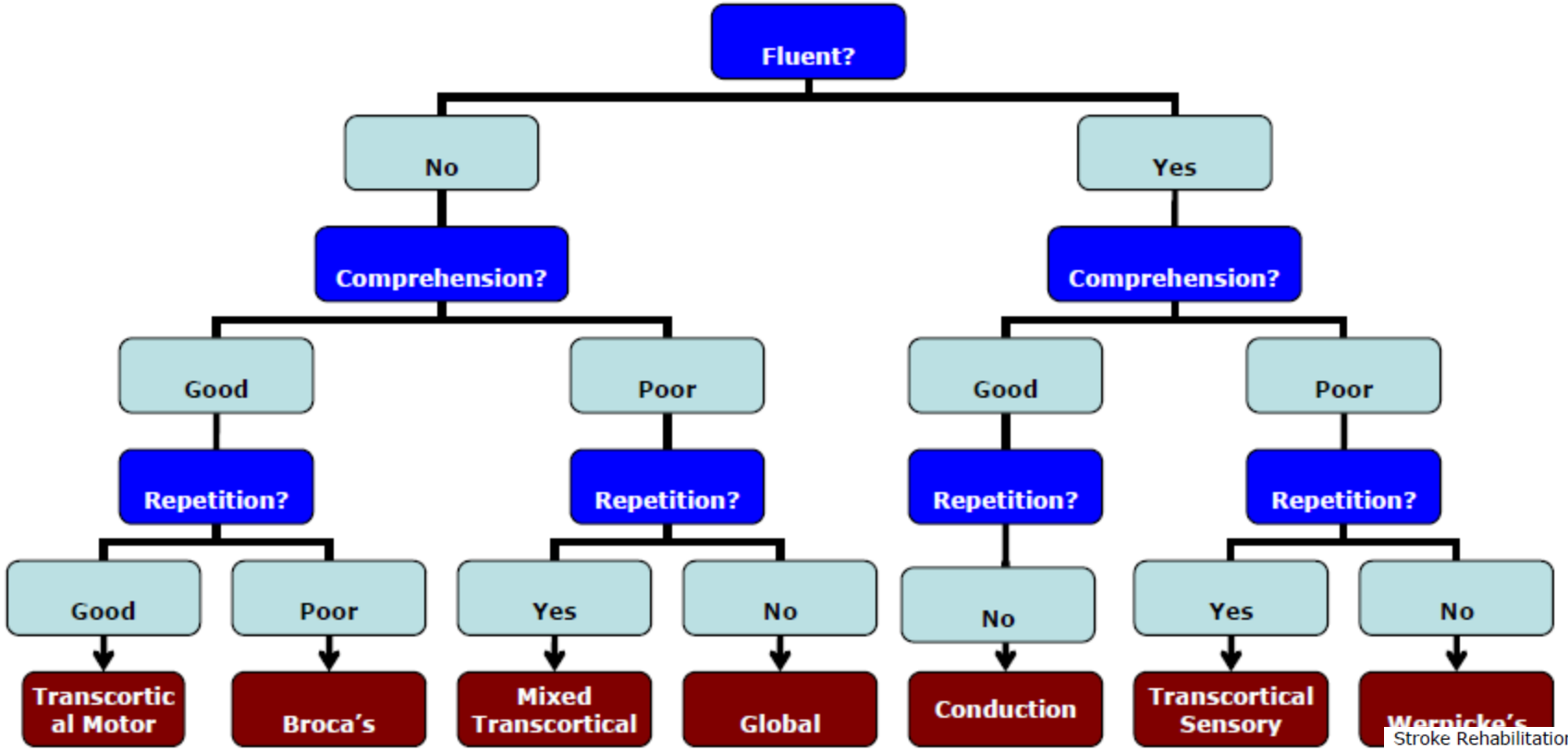

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Figure. Classification of Aphasia

Aphasia Assessment

Areas of assessment

- Auditory Comprehension
- Verbal Expression
- Reading
- Writing

*Cognition

Aphasia Batteries

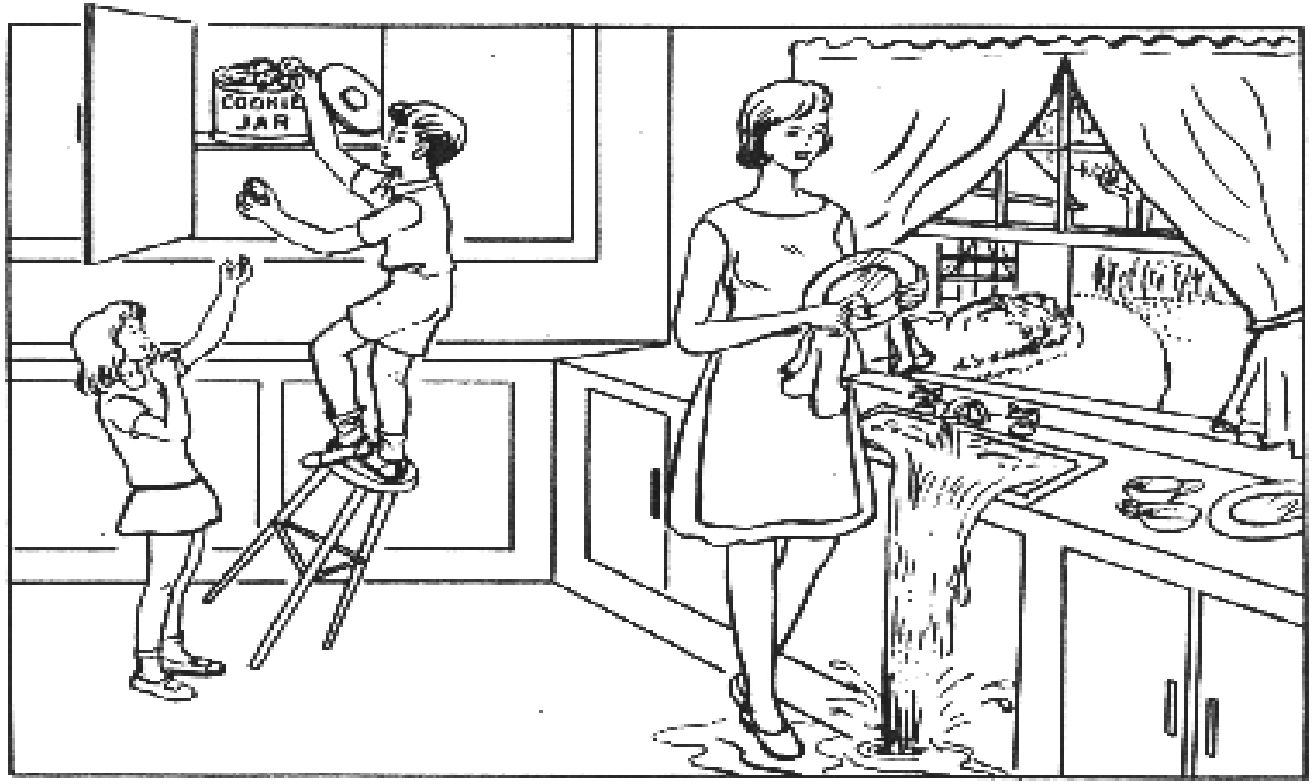
- Aphasia Language Performance Scales
- Aphasia Diagnostic Profiles
- Neurosensory Center Comprehensive Examination for Aphasia
- Examining for Aphasia
- Communicative Abilities of Daily Living
- Comprehensive Aphasia Test
- Boston Assessment of Severe Aphasia
- Minnesota Test for Differential Diagnosis of Aphasia (MTDDA)
- Porch Index of Communicative Ability (PICA)
- Revised Token Test (RTT)
- Psycholinguistic Assessments of Language Processing
- Aachen Aphasia Test (AAT)
- Boston Diagnostic Aphasia Exam (BDAE)
- Western Aphasia Battery (WAB)

Boston Diagnostic Aphasia Exam-3rd Edition

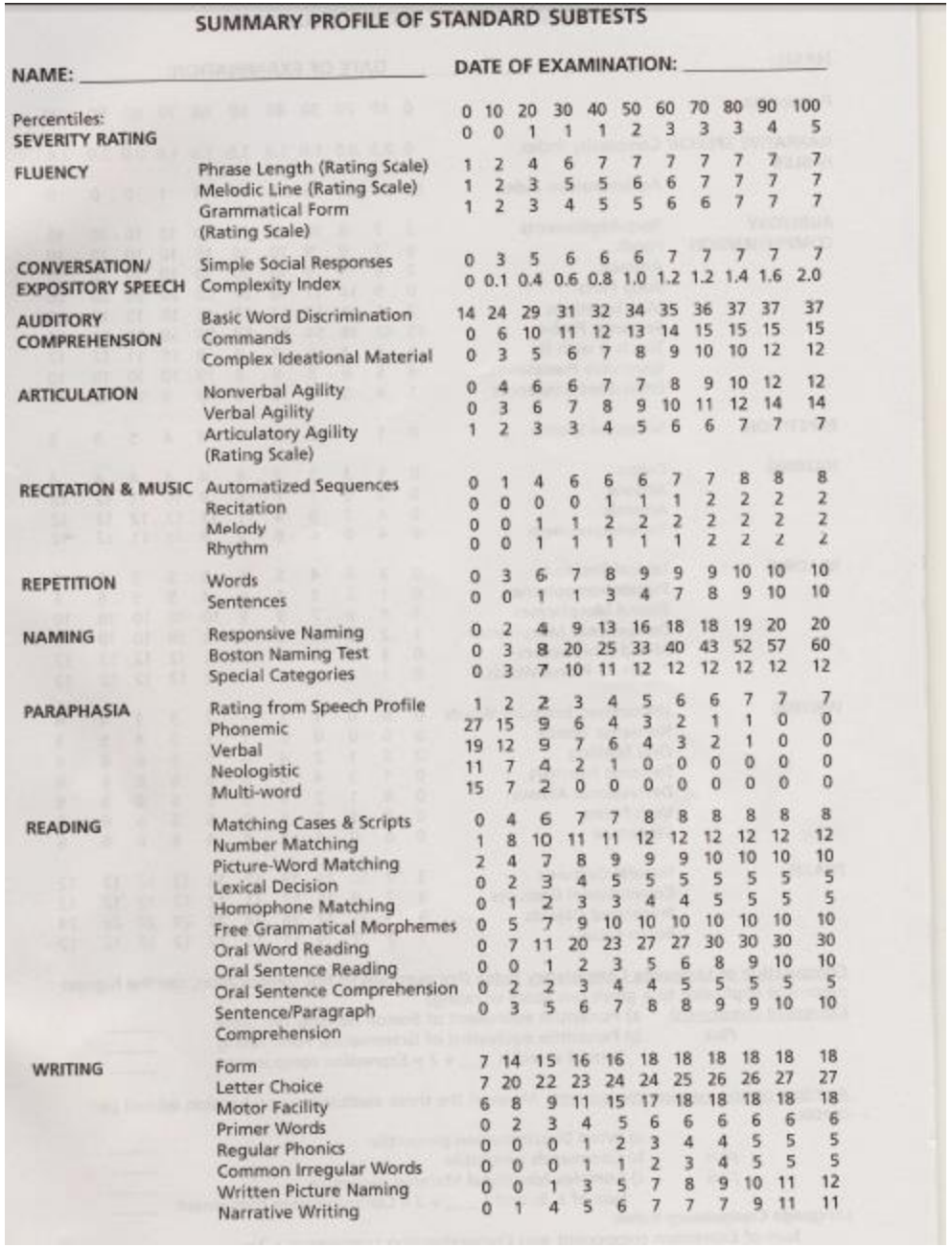
- Harold Goodglass, Edith Caplan
- Assigns patients to classic aphasia syndromes
- Standard form; structured interview, 27 subtests, BNT (60 items), 9 rating scales
- Administration time 2 hours (avg.)
- Subtest summary profile

BDAE Cookie Theft Picture

Picture Description: (For Short, Standard, and Extended testing)
Present the 'Cookie Theft' picture on card 1 and say, "TELL ME EVERYTHING YOU SEE GOING ON IN THIS PICTURE." Point to neglected features of the picture and ask for elaboration if the patient's response is skimpier than his/her apparent potential. Write verbatim as much as possible. For Standard and Extended administration, tape recording and transcription are recommended in order to facilitate scoring.



Boston Diagnostic Aphasia Examination



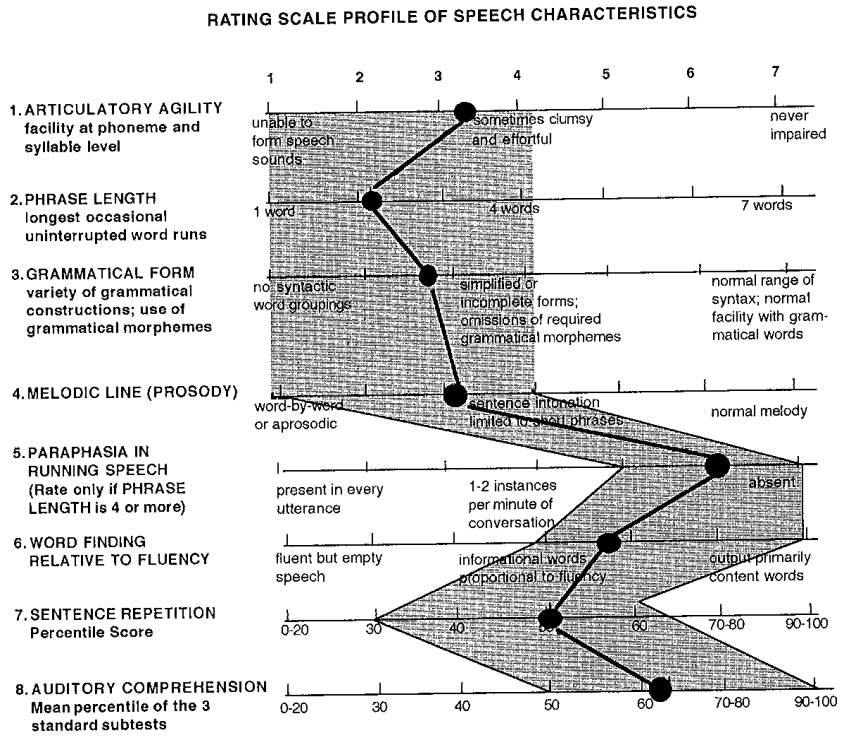
SUMMARY PROFILE OF STANDARD SUBTESTS

NAME: _____ DATE OF EXAMINATION: _____

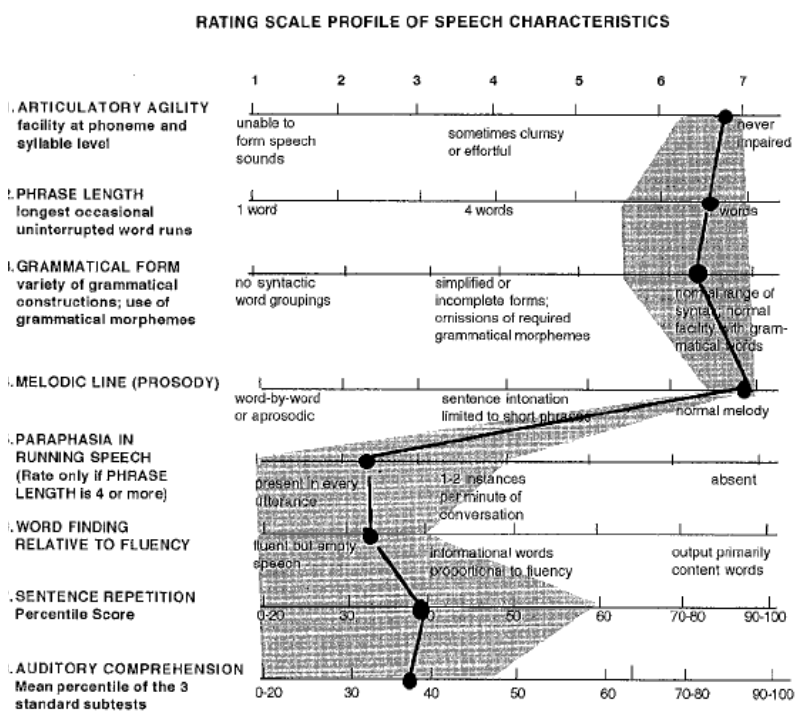
		0	10	20	30	40	50	60	70	80	90	100
Percentiles: SEVERITY RATING		0	0	1	1	1	2	3	3	3	4	5
FLUENCY	Phrase Length (Rating Scale)	1	2	4	6	7	7	7	7	7	7	7
	Melodic Line (Rating Scale)	1	2	3	5	5	6	6	7	7	7	7
	Grammatical Form (Rating Scale)	1	2	3	4	5	5	6	6	7	7	7
CONVERSATION/ EXPOSITORY SPEECH	Simple Social Responses	0	3	5	6	6	6	7	7	7	7	7
	Complexity Index	0	0.1	0.4	0.6	0.8	1.0	1.2	1.2	1.4	1.6	2.0
AUDITORY COMPREHENSION	Basic Word Discrimination	14	24	29	31	32	34	35	36	37	37	37
	Commands	0	6	10	11	12	13	14	15	15	15	15
	Complex Ideational Material	0	3	5	6	7	8	9	10	10	12	12
ARTICULATION	Nonverbal Agility	0	4	6	6	7	7	8	9	10	12	12
	Verbal Agility	0	3	6	7	8	9	10	11	12	14	14
	Articulatory Agility (Rating Scale)	1	2	3	3	4	5	6	6	7	7	7
RECITATION & MUSIC	Automatized Sequences	0	1	4	6	6	6	7	7	8	8	8
	Recitation	0	0	0	0	1	1	1	2	2	2	2
	Melody	0	0	1	1	2	2	2	2	2	2	2
	Rhythm	0	0	1	1	1	1	1	2	2	2	2
REPETITION	Words	0	3	6	7	8	9	9	9	10	10	10
	Sentences	0	0	1	1	3	4	7	8	9	10	10
NAMING	Responsive Naming	0	2	4	9	13	16	18	18	19	20	20
	Boston Naming Test	0	3	8	20	25	33	40	43	52	57	60
	Special Categories	0	3	7	10	11	12	12	12	12	12	12
PARAPHASIA	Rating from Speech Profile	1	2	2	3	4	5	6	6	7	7	7
	Phonemic	27	15	9	6	4	3	2	1	1	0	0
	Verbal	19	12	9	7	6	4	3	2	1	0	0
	Neologistic	11	7	4	2	1	0	0	0	0	0	0
	Multi-word	15	7	2	0	0	0	0	0	0	0	0
READING	Matching Cases & Scripts	0	4	6	7	7	8	8	8	8	8	8
	Number Matching	1	8	10	11	11	12	12	12	12	12	12
	Picture-Word Matching	2	4	7	8	9	9	9	10	10	10	10
	Lexical Decision	0	2	3	4	5	5	5	5	5	5	5
	Homophone Matching	0	1	2	3	3	4	4	5	5	5	5
	Free Grammatical Morphemes	0	5	7	9	10	10	10	10	10	10	10
	Oral Word Reading	0	7	11	20	23	27	27	30	30	30	30
	Oral Sentence Reading	0	0	1	2	3	5	6	8	9	10	10
	Oral Sentence Comprehension	0	2	2	3	4	4	5	5	5	5	5
	Sentence/Paragraph Comprehension	0	3	5	6	7	8	8	9	9	10	10
WRITING	Form	7	14	15	16	16	18	18	18	18	18	18
	Letter Choice	7	20	22	23	24	24	25	26	26	27	27
	Motor Facility	6	8	9	11	15	17	18	18	18	18	18
	Primer Words	0	2	3	4	5	6	6	6	6	6	6
	Regular Phonics	0	0	0	1	2	3	4	4	5	5	5
	Common Irregular Words	0	0	0	1	1	2	3	4	5	5	5
	Written Picture Naming	0	0	1	3	5	7	8	9	10	11	12
	Narrative Writing	0	1	4	5	6	7	7	7	9	11	11

Profile Comparisons

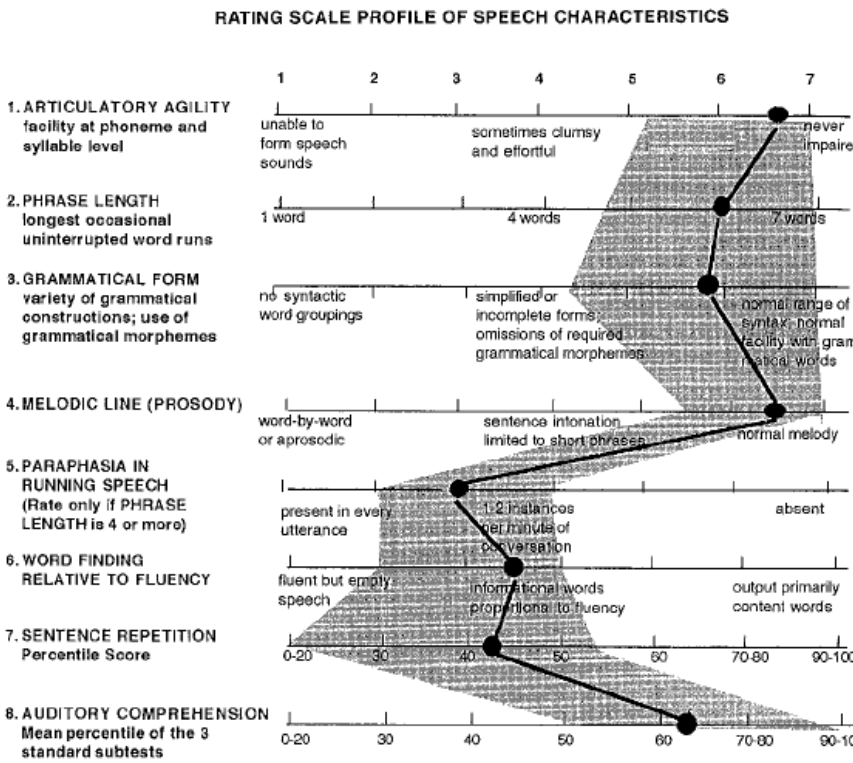
Brocas



Wernickes



Conduction



Western Aphasia Battery (WAB)

- Aphasia Quotient
  - Speech
  - Auditory Comprehension
  - Repetition
  - Naming
- Language Quotient
- Cortical Quotient
  - Entire Test

Western Aphasia Battery

Directions: Turn to page 1 in the Stimulus Book, and say, **Tell me what is happening in this picture.** If the patient lists single words, say, **Try to talk in sentences.** Ask for a more complete response if he or she produces only a few words. Encourage the patient to pay attention to all aspects of the picture. Move the picture toward the patient's intact visual field if necessary.

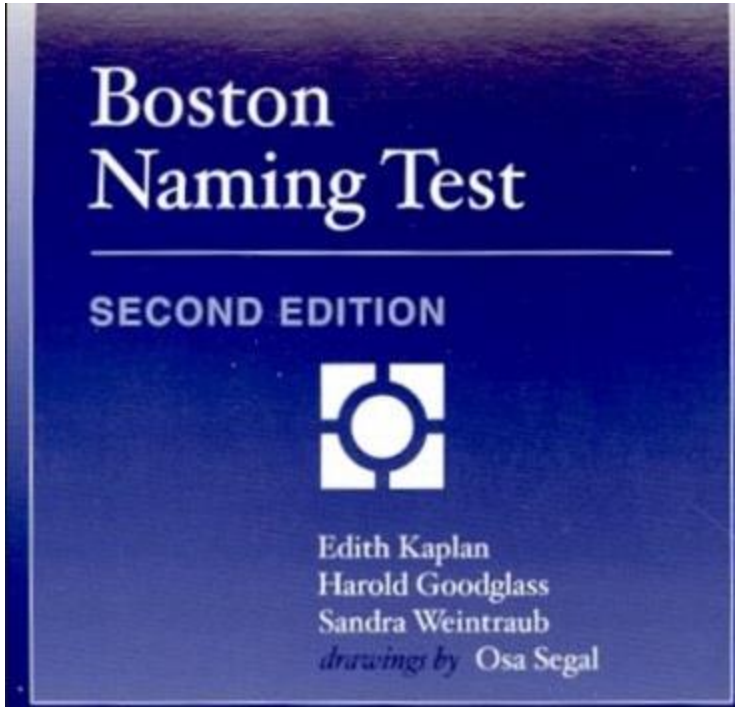
WAB Aphasia Quotient (AQ)

- The WAB AQ is a functional measure of the severity of spoken language deficit in aphasia
- Score range from 0-100
- 93.8 cut-off score for aphasia
- Used as a classification system for type of aphasia

$$\text{Aphasia Quotient (AQ)} = 2\left[\frac{\text{Spontaneous Speech Subtest Score}}{(\text{Fluency Score} + \text{Information Content Score})} \cdot + \frac{\text{Auditory Comprehension Subtest Score}}{20} + \frac{\text{Repetition Subtest Score}}{10} + \frac{\text{Naming Subtest Score}}{10}\right]$$

Boston Naming Test

- 60 item measure of confrontational naming
- 60 line drawings
- BNT items increase in difficulty
- Part of BDAE-2 & 3
- Short version (15 items)



Reading Comprehension Battery for Aphasia-2

- Examines severity and quality of reading after aphasia
- Includes 10 subtest and 10 items in each subtest

Aphasia Treatment

The Goals of Treatment

- Facilitate effective communication despite residual impairments (Schuell)
- Facilitate “communicative competence” – use of language in naturalistic environments (Holland)
- Generalization – the transfer of what is accomplished in the clinic to daily life

Treatment Considerations

- Timing of Treatment
- Candidacy for Treatment
- Time Post Onset
- Intensity of Treatment

Predictors of Aphasia Recovery

- Age
- Handedness
- Education
- Intelligence

* Weak predictors

- Multiple Lesions
- Size of Lesion
- Location of Lesion
- Aphasia Type
- **Initial Aphasia Severity**

*Most powerful predictor

Treatment Techniques

- Sentence Production Program for Aphasia
- Semantic Feature Analysis (SFA)
- Melodic Intonation Therapy (MIT)
- Script Training
- Errorless Learning
- Spaced Retrieval
- Combined Aphasia and Apraxia of Speech Treatment (CAAST)
- Copy and Recall Treatment (CART)
- transcranial direct current stimulation (tDCS)

Traumatic Brain Injury

Definitions and Key Concepts in TBI

Cognition

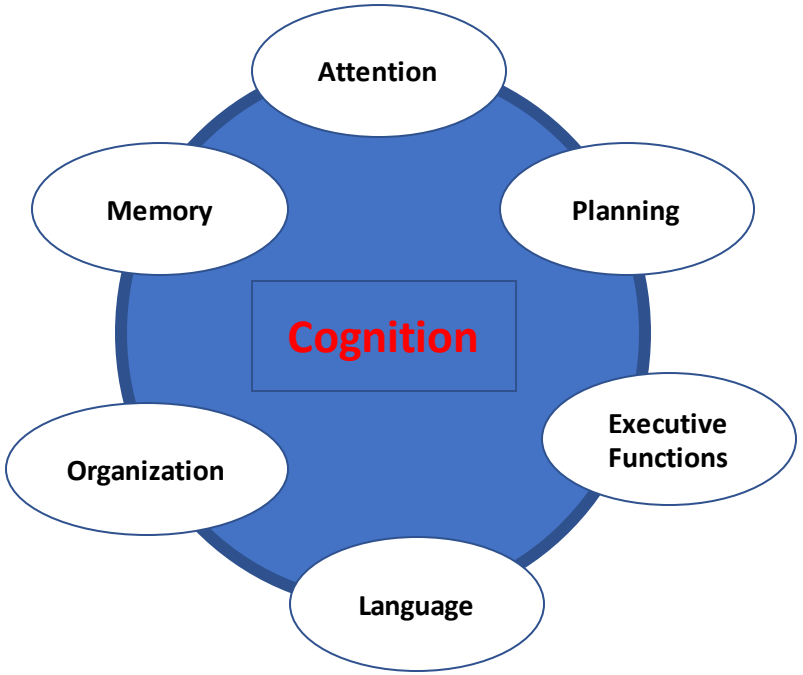
- “An umbrella term for all higher mental processes…….the collection of mental processes and activities used in perceiving, remembering, thinking and understanding (Ashcroft & Radvansky, 2010”
- “The term cognition is used in several loosely related ways to refer to a faculty for the human-like processing of information, applying knowledge and changing preferences…….cognition is closely related to such abstract concepts as mind, reasoning, perception, intelligence, learning, and many others (Science Daily, 2014)

Cognition

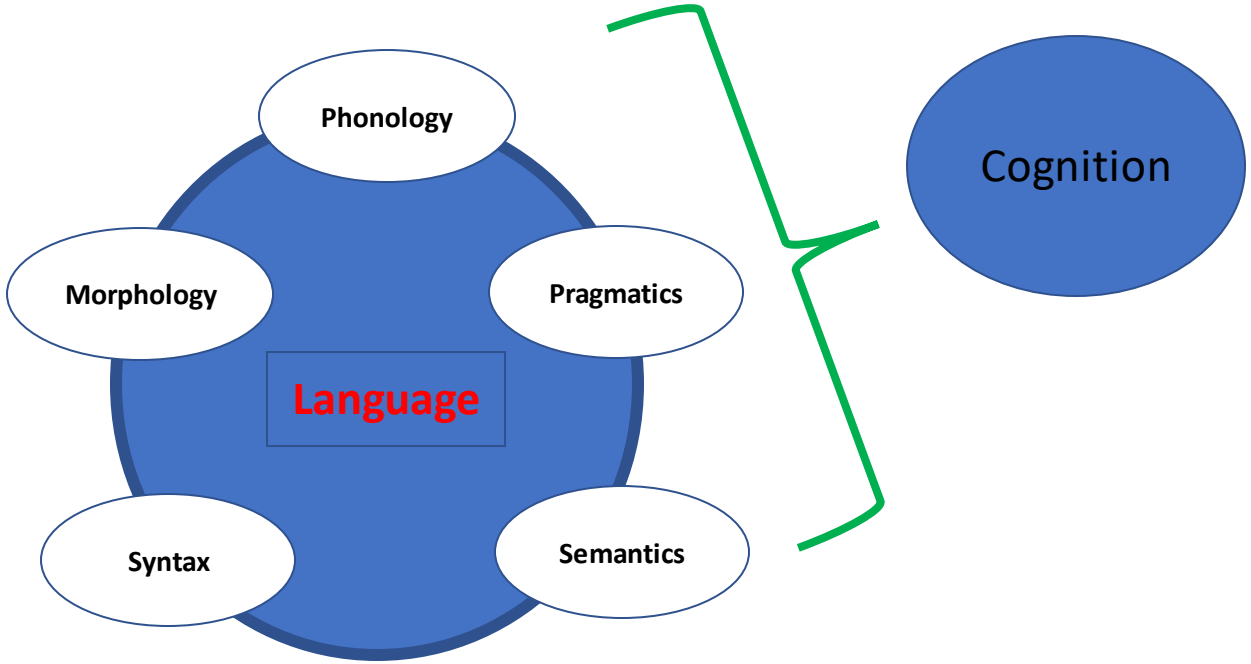
- Attention
- Memory
- Organization
- Planning
- Problem Solving
- Reasoning
- Executive Function
- Language

Models of Cognition and Language

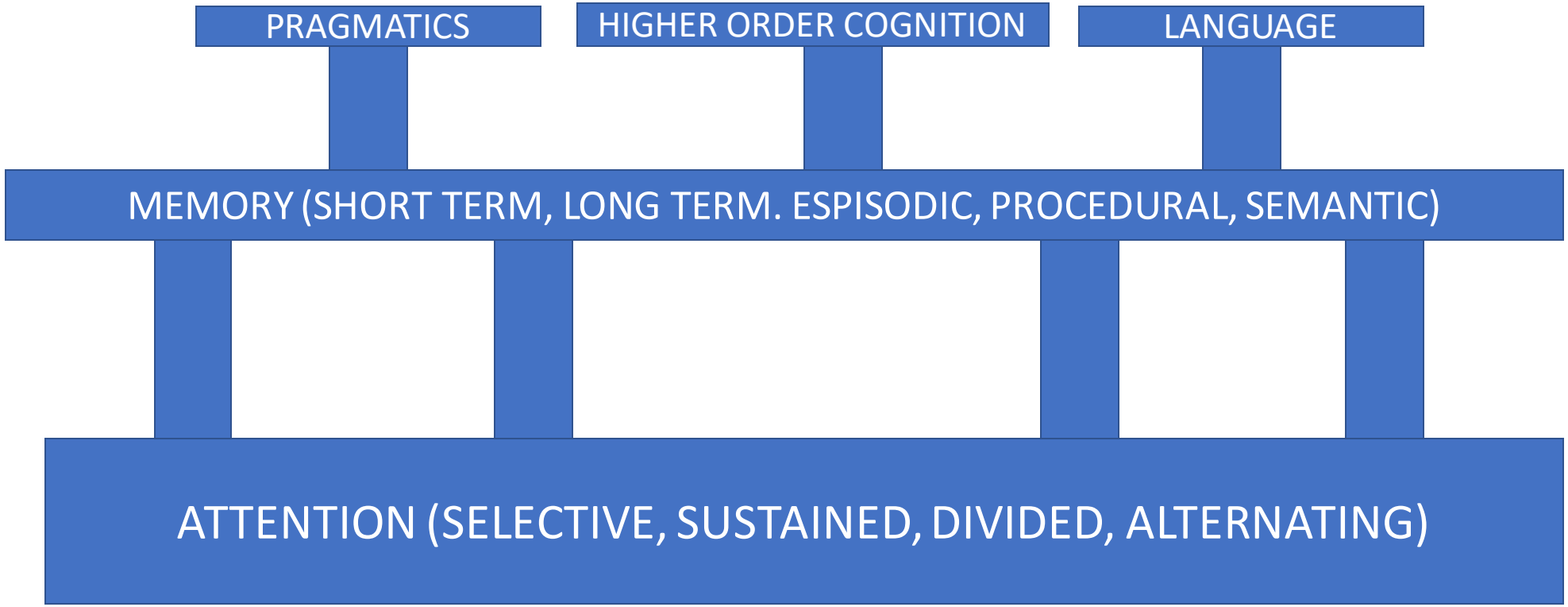
Model A



Model B



My Model Cognition and Language – A Brain Injury Clinician's View

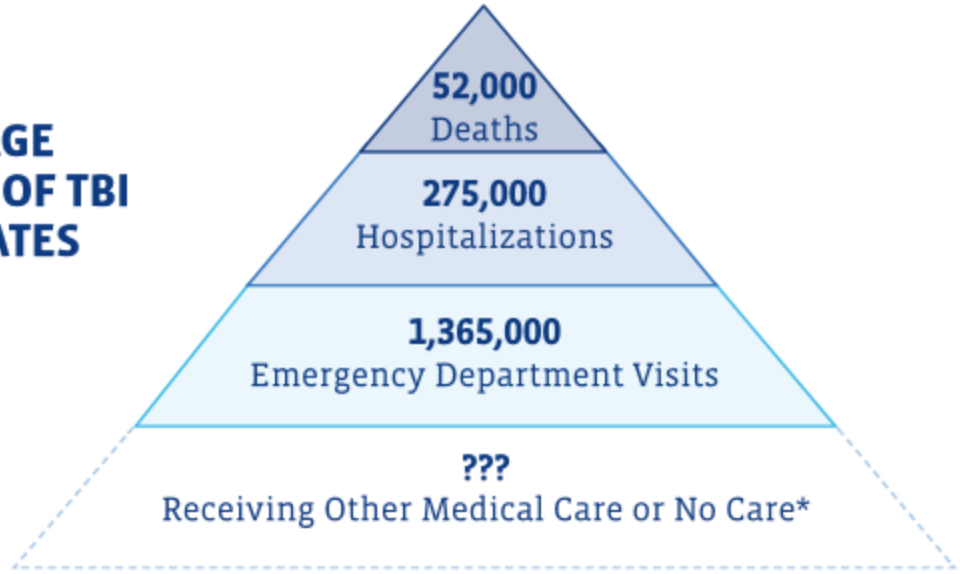


What is a traumatic brain injury (TBI)?

- Brain injuries caused by abrupt external forces acting on the head
  - Penetrating (open head injury)
    - fracture or breach of the skull combined with damage to brain tissue
    - Results in much higher mortality rates than CHI
    - for this type of head injury
  - Non-penetrating (closed head injury)
    - Skull remains relatively intact
    - 90% of all head injuries

TBI in the US

ESTIMATED AVERAGE ANNUAL NUMBER OF TBI IN THE UNITED STATES 2002–2006[1]



* There is no estimate for the number of people with non-fatal TBI seen outside of an emergency department or hospital or who receive no care at all.

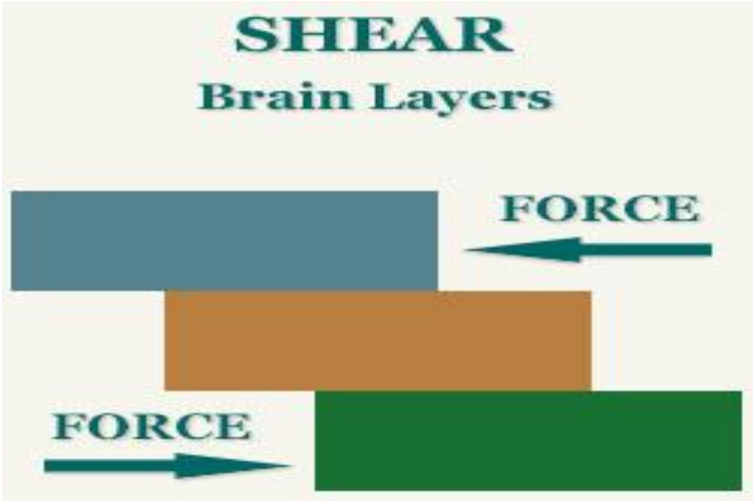
- About 75% of TBIs that occur each year are concussions or other forms of mild traumatic brain injury (MTBI).[2]
- Direct medical costs and indirect costs of TBI, such as lost productivity, totaled an estimated $60 billion in the United States in 2000.[3]

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention

Consequences of TBI

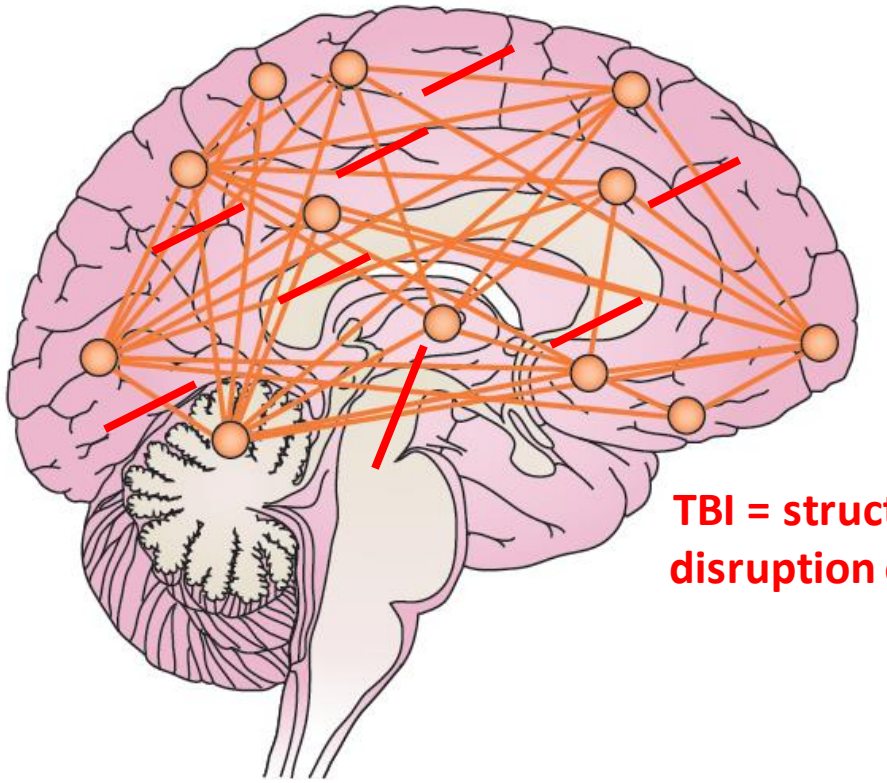
- Cranial Nerve Injuries
- Diffuse Axonal Injury
- Lacerations
  - Cuts primarily occurring in frontal and temporal poles
- Contusions
  - Cerebral bruising

Diffuse Axonal Injury (DAI)



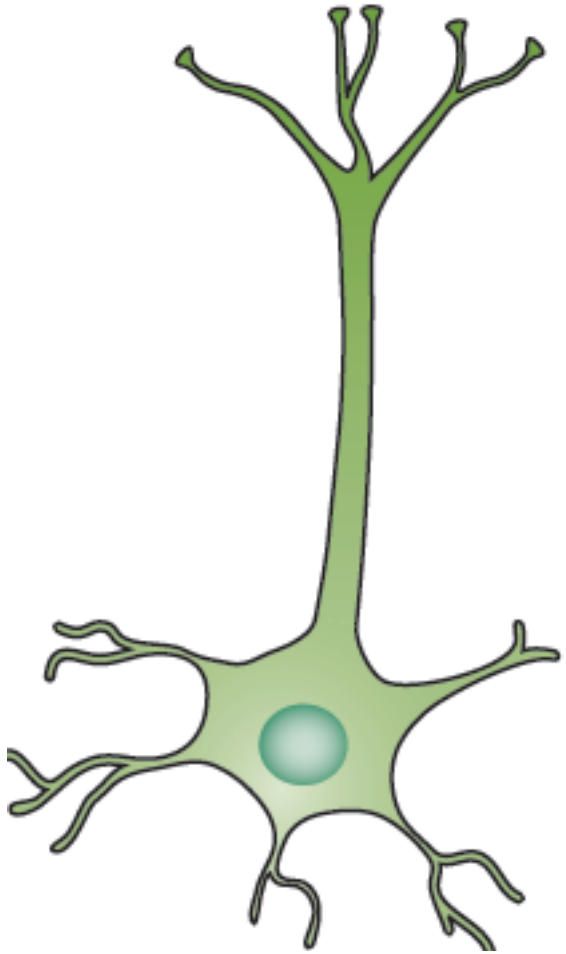
Taken from: http://subtlebraininjury.com/shear1.html

Normal functioning



TBI

TBI = structural disconnection OR disruption of functional networks



Sharp, D. J. *et al. Nat. Rev. Neurol.* **10**, 156–166 (2014); published online 11 February 2014; doi:10.1038/nrneurol.2014.15

TBI Assessment

Severity of Injury – GCS (EMS, Physicians, etc)

- The amount of acute disruption of brain physiology or structure.
- Glasgow Coma Scale (GCS)
  - 3-8 Severe
  - 9-12 Moderate
  - 13-15 Mild

- Greater than or equal to 9 not in coma; 90% ≤ score of 8 are in coma
- 8 is the critical score
- Less than or equal to 8 at 6 hours - 50% die

Ranchos Los Amigos Scale
(A scale of cognitive functioning and recovery)

- Stage I: No response- person appears to be in deep sleep
- Stage II: Generalized response- person responds inconsistently to stimuli and response is non-purposeful.
- Stage III: Localized response- responds inconsistently, but response is specific to the stimulus.
- Stage IV: Confused and Agitated- heightened activity of any stimuli.
- Stage V: Confused-Inappropriate Non-Agitated- patient looks awake, memory impaired, and needs lots of structure.
- Stage VI: Confused-Appropriate- know things going on around them, but answers are inconsistent with question.
- Stage VII: Automatic-Appropriate- person is engaged in a structured life.
- Stage VIII: Purposeful-Appropriate- able to remember more, responses are consistently appropriate and fitting of the question.

(Ferrand and Bloom, 120-122)

Ranchos Los Amigos Scale

- Stage I: No response (total assistance) - person appears to be in deep sleep
- Stage II: Generalized response (total assistance) - person responds inconsistently to stimuli and response is non-purposeful.
- Stage III: Localized response (total assistance)- responds inconsistently, but response is specific to the stimulus.
- Stage IV: Confused and Agitated (maximum assistance)- alert and heightened activity of any stimuli.
- Stage V: Confused-Inappropriate Non-Agitated (maximum assistance)- patient looks awake, memory impaired, and needs lots of structure.
- Stage VI: Confused-Appropriate (moderate assistance)- know things going on around them, but answers are inconsistent with question.
- Stage VII: Automatic-Appropriate (minimum assistance with daily living skills)- person is engaged in a structured life.
- Stage VIII: Purposeful-Appropriate (stand by assistance)- able to remember more, responses are consistently appropriate and fitting of the question.
- Stage IX: Purposeful-Appropriate (stand-by assistance on request)- able to complete tasks accurately for a couple of hours; aware of and acknowledges limitations; uses assistive memory devices
- Stage X: Purposeful-Appropriate (modified independent) - able to handle multiple tasks simultaneously in all environments but may require periodic breaks; anticipates impact of impairments and disabilities

Communication Disorders in TBI

- Communication
  - Listening
  - Speaking
  - Gesturing
  - Reading
  - Writing
    - Verbal and non-verbal
- Cognition
  - Attention
  - Perception
  - Memory
  - Organization
  - Executive function

ASHA Position Statement- Role of SLP in TBI (2005)

Assessment Factors

- Severity of injury
- Current level of cognitive functioning
- Physical injuries
- Emotional state
- Other

Assessment in TBI

- Cognitive domains
  - Alertness/Attention
  - Perception
  - Orientation
  - Memory
  - Organization
  - Reasoning
  - Problem Solving and Judgement

Factors to Consider

- Environment
- Cognitive Level
- Level of Agitation
- Co-existing Medical Complications
- Schedule

Scales of Cognitive Ability in Traumatic Brain Injury (SCATBI)

- Assesses cognitive and linguistic abilities of adolescent and adult patients with head injuries
- Administration time: 30 min – 2 hours
- 5 subtests:
  - Perception
  - Discrimination
  - Orientation
  - Organization
  - Recall and Reasoning
- https://www.youtube.com/watch?v=IhKEctmlqxw

Ross Information Processing Assessment Second Edition (RIPA-2)

- Quickly quantify levels of cognitive-linguistic deficits in TBI victims and compare severity levels in each of 10 areas tested:
  - Immediate Memory
  - Recent Memory
  - Temporal Orientation (Recent Memory)
  - Temporal Orientation (Remote Memory)
  - Spatial Orientation
  - Orientation to Environment
  - Recall of General Information
  - Problem Solving and Abstract Reasoning
  - Organization
  - Auditory Processing and Retention
  - https://www.youtube.com/watch?v=x1Djtye2P4s (rapport building)
  - https://www.youtube.com/watch?v=Ctapj5KaI5g (administration)
  - http://overlake.virtual-space.net/SLP/RG.pdf (scoring)

Brief Test of Head Injury (BTHI)

- Quickly probes cognitive, linguistic, and communicative abilities of patients with severe head trauma.
- Ideal first assessment post-coma
- Administration time 25 to 30 minutes; 10 minutes to score
- Sensitive to small performance changes; useful for tracking recovery patterns during the period of spontaneous recovery
- Subtests: Orientation and Attention, Following Commands, Linguistic Organization, Reading Comprehension, Naming, Memory, and Visual-Spatial Skills

The Test of Everyday Attention (TEA)

Map search - Subjects have to search for symbols on a coloured map. The score is the number out of 80 found in 2 minutes. This subtest is age-sensitive and usable with almost all brain-damaged patients, including those with Alzheimer's disease. It measures selective attention and loads on the same factor as the Stroop Test and the d2 cancellation test.

Elevator counting - Subjects are asked to pretend they are in an elevator whose door-indicator is not functioning. They therefore have to establish which 'door' they have arrived at by counting a series of tape-presented tones. This is an established measure of sustained attention sensitive to right frontal lesions.

Elevator counting with distraction - Subjects have to count the low tones in the pretend elevator while ignoring the high tones. This was designed as a subtest of auditory selective attention.

Visual elevator - Here, subjects have to count up and down as they follow a series of visually presented 'doors' in the elevator. This reversal task is a measure of attentional switching, and hence of cognitive flexibility. It is self-paced and loads on the same factor as the number of categories on the Wisconsin Card Sorting Test.

Auditory elevator with reversal - The same as the visual elevator subtest except that it is presented at fixed speed on tape.

Telephone search - Subjects must look for key symbols while searching entries in a simulated classified telephone directory.

Telephone search dual task - Subject must again search in the directory while simultaneously counting strings of tones presented by a tape recorder. The combined performance on sub-tests 6 and 7 gives a measure of divided attention - a 'dual task decrement'.

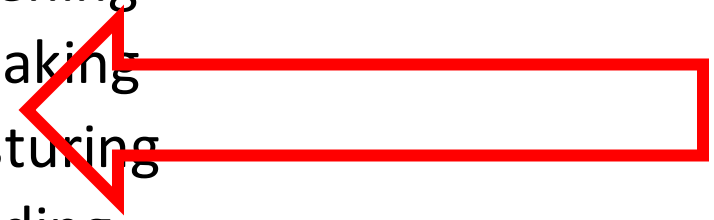
Wechler Memory Scale (WMS-IV)

- Designed to assess learning, memory, and working memory.
- Administration time: 30 - 35 minutes
- 8 primary indexes & 4 supplemental:
  - Auditory Immediate
  - Visual Immediate
  - Immediate Memory
  - Auditory Delayed
  - Visual Delayed
  - Auditory Reception Delayed
  - General Memory
  - Working Memory

TBI Treatment

Cognitive-Communication Disorders in TBI

- Communication
  - Listening
  - Speaking
  - Gesturing
  - Reading
  - Writing



- Cognition
  - Attention
  - Perception
  - Memory
  - Organization
  - Executive function

ASHA Position Statement- Role of SLP in TBI (2005)

Conceptualizing TBI

Skills Impacted by TBI

- Swallowing
- Pragmatics
- Motor Speech - Voice
- Expressive Language
- Executive Functioning
- Problem Solving/Reasoning
- Memory

Attention

Foundation/Support Skill (Roots)

Goal Setting – Considerations

- Focus on cognitive domains and function

1. Specify cognitive domain to be addressed
2. Specify duration when appropriate
   - Seconds, minutes, session length
3. Specific environment (environmental compensation or control)
   - 1:1, group, controlled, normal, office setting, open gym setting
4. Specify level of supervision
   - Constant, intermittent, occasional, independent
5. Specify level of “verbal” cuing
   - Constant verbal cuing, intermittent verbal cuing, occasional verbal cuing, w/o verbal cuing

Ranchos Levels

- Level of alertness
- Responsiveness to stimuli

- Agitation
- Confusion
- Attention duration
- Behavior management
- Responsiveness to stimuli

- Environmental awareness
- Pragmatics
- Executive function
- Level of independence
- Other discharge issues
  - Driving

- Long term planning
- Return to XXX
- Pragmatics
- Executive function
- Community Re-entry
- Other discharge issues
  - Driving
  - Living

I II III IV V VI VII VIII IX X

Instructional Techniques

Direct Instruction

Direct Instruction Components and Activities	
Design of instruction	• Analyze content to identify "big ideas," concepts, rules, and generalizable strategies. • Determine specific skills, including prerequisite skills. • Sequence skills from simple to more complex. • Develop task analyses (i.e., break skills and tasks down into small steps). • Develop and sequence a broad range of training examples to facilitate generalization. • Develop simple, consistent instructional wording and scripts to reduce confusion and focus learner on relevant content.
Delivery of instruction	• Clearly state learning objectives. • Establish high mastery criteria. • Provide models and carefully fade prompts and cues to facilitate errorless acquisition. • "Pre-correct" by instructing prerequisite skills first or isolating difficult steps for instruction. • Provide consistent feedback (e.g., immediately model the correct response after the client makes a mistake). • Provide high amounts of correct, massed practice followed by distributed practice. • Provide sufficient, cumulative review (i.e., integrate new with old material). • Individualize instruction, including instructional pacing. • Conduct ongoing assessment to gauge skill retention.

Taken from:Solberg et al. (2005). Seminars in Speech and Language

Errorless learning

- Goal: to reduce substantially, if not eliminate, errors during the acquisition of learning
- Is achieved by:
  - Breaking down the targeted task into small, discrete steps or units
  - Providing sufficient models before the client is asked to perform the target task
  - Encouraging the client to avoid guessing
  - Immediately correcting error
  - Carefully fading prompts

Taken from:Solberg et al. (2005). Seminars in Speech and Language

Component training

- Remediation of impaired cognitive-linguistic processes
- Most appropriate for Ranchos Level 6-7 and 5 if non-agitated

RANCHO LOS AMIGOS SCALE
AKA Level of Cognitive Functioning Scale (LCFS)

Level I - *No Response.*
Patient does not respond to external stimuli and appears asleep.

Level II - *Generalized Response.*
Patient reacts to external stimuli in nonspecific, inconsistent, and nonpurposeful manner with stereotypic and limited responses.

Level III - *Localized Response.*
Patient responds specifically and inconsistently with delays to stimuli, but may follow simple commands for motor action.

Level IV - *Confused, Agitated Response.*
Patient exhibits bizarre, nonpurposeful, incoherent or inappropriate behaviors, has no short-term recall, attention is short and nonselective.

Level V - *Confused, Inappropriate, Nonagitated Response.*
Patient gives random, fragmented, and nonpurposeful responses to complex or unstructured stimuli - Simple commands are followed consistently, memory and selective attention are impaired, and new information is not retained.

Level VI - *Confused, Appropriate Response.*
Patient gives context appropriate, goal-directed responses, dependent upon external input for direction. There is carry-over for relearned, but not for new tasks, and recent memory problems persist.

Level VII - *Automatic, Appropriate Response.*
Patient behaves appropriately in familiar settings, performs daily routines automatically, and shows carry-over for new learning at lower than normal rates. Patient initiates social interactions, but judgment remains impaired.

Level VIII - *Purposeful, Appropriate Response.*
Patient oriented and responds to the environment but abstract reasoning abilities are decreased relative to premorbid levels.

Pharmacologic management

- Medications may be prescribed for the following:
  - Agitation/aggressive behavior
  - Depression
  - Psychotic conditions
  - Seizures
  - Alertness/attention

Group Treatment

- May occur in inpatient and outpatient facilities
- Ranchos Level V and above
- Addresses cognitive and social skills

Normal Aging

- “Biological aging is not tied absolutely to chronological ageing and it may be possible to slow biological ageing and even reduce the possibility of suffering from age related diseases such as dementia”
    - Peters (2006)

Normal Aging

- Factors
  - Genetics
  - Neurotransmitters
  - Hormones
  - Experience

Physical Changes

- Brain volume and/or weight declines 5% per decade after age 40
- Shrinkage of grey matter due to neuronal cell death
- Changes in dendrite synapses or loss of synaptic plasticity
- White matter may decline with age, the myelin sheath deteriorating after age 40
- Vasculature aging + increases in BP = increase risk of stroke

Aging and Language Production

- Older adults are slower and less accurate in producing names for definitions or pictures
- Older adults produce more ambiguous references and pronouns
- Speech disfluencies such as filled pauses and hesitations increase with age
- Language comprehension generally spared in old age even when compared to decline in other intellectual abilities

Dementias

Mild Cognitive Impairment Incidence

- On average 12-15 per 1000 for people 65 years and older
- 54 per 1000 for people 75 years and older
- In contrast to dementia, higher rates in men than women

Mild Cognitive Impairment (MCI)

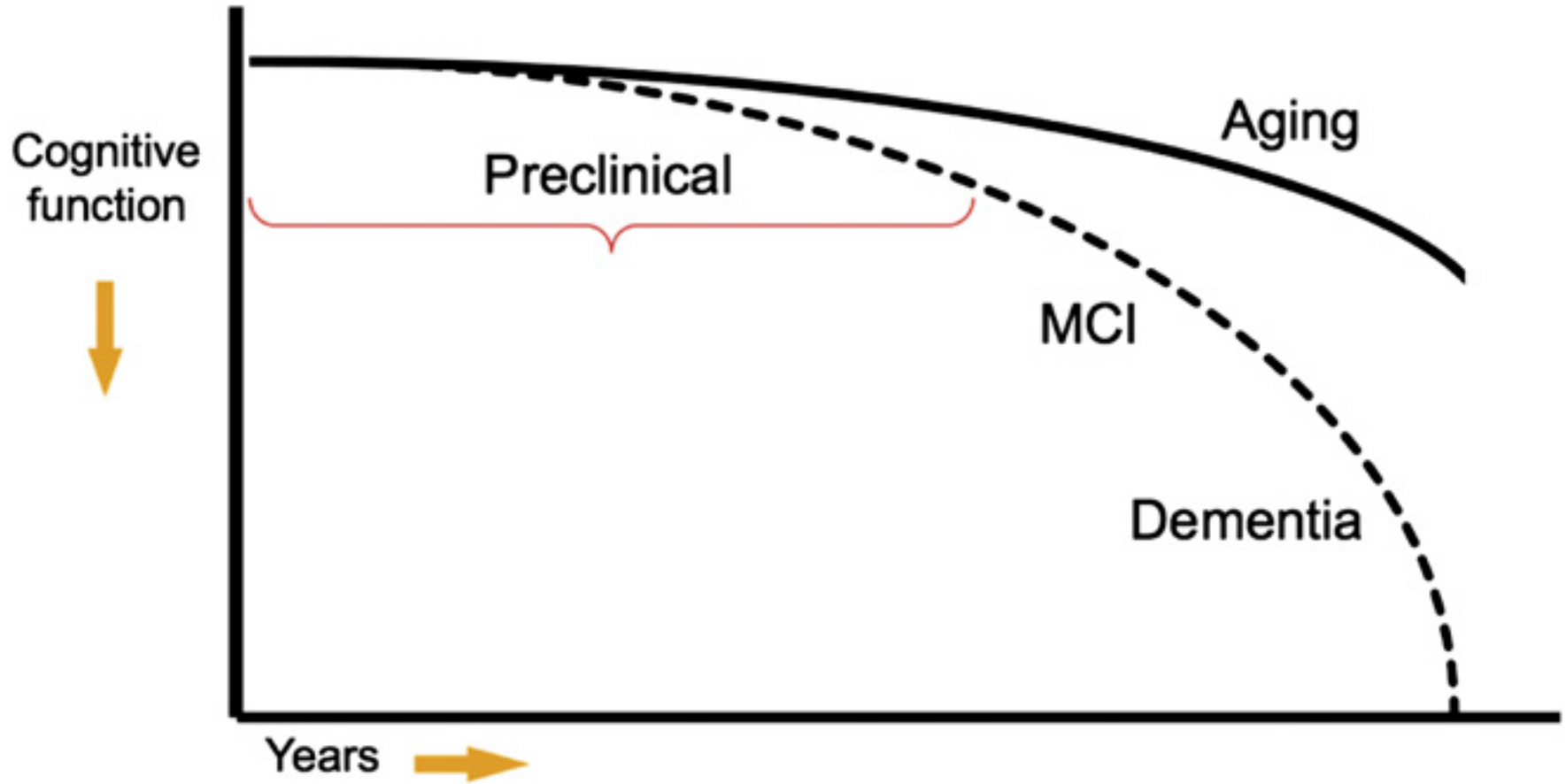
- MCI can be divided into two broad subtypes:
  - Amnestic MCI, significantly affects memory
    - Individuals begin to forget important information they previously recalled very easily, such as appointments, conversations or recent events
  - Nonamnestic MCI, does not significantly affect memory
    - Affects thinking skills other than memory such as ability to make sound decisions, judge the time or sequence of steps needed to complete a complex task, or visual perception.

- Other functions, such as language, attention and visuospatial skills, may be impaired in either type

Causes of MCI

- No single cause of MCI
- No single outcome for the disorder
- Symptoms of MCI may:
  - Remain stable for years
  - Progress to Alzheimer's disease or another type of dementia
  - Improve over time.
- MCI often arises from a lesser degree of the same types of brain changes seen in forms of dementia.
    - Mayo Clinic

Taken from: Visser (2006)


Cognitive function
Aging
Preclinical
MCI
Dementia
Years

What is dementia?

- American Psychiatric Association Diagnostic and Statistical Manual on Mental Disorders (APA, DSM IV)
  - Multiple cognitive deficits, which include memory impairment and at least one of the following: aphasia, apraxia, agnosia or disturbance in executive functioning.
  - Cognitive impairments must be severe enough to cause impairment in social and occupational functioning
  - Deficits do not occur exclusively during the course of a delirium
- *Gradual* and *continuing* course is required
- Condition is not attributable to other CNS or systemic conditions, delirium, depression or other psychiatric illness

Dementia vs MCI

- Dementia
  - Multiple cognitive deficits manifested by both (1) memory impairment and (2) one (or more) of the following cognitive disturbances: (a) aphasia, (b) apraxia, (c) agnosia, (d) disturbance in executive functioning
- MCI
  - A general term most commonly used to describe a subtle but measurable memory disorder

Dementia Taxonomies

- Cortical Dementias
  - Alzheimer's Disease
  - Lewy Body Dementia
  - Frontotemporal Lobar Dementia
  - Vascular Dementia
- Subcortical Dementias
  - Corticobasal Degeneration
  - Parkinson's Dementia
  - Huntington's Dementia
  - Progressive Supranuclear Palsy

Alzheimer's Disease

- Most common form of dementia
- Affects more that 5 million Americans
- Prevalence and incidence increases significantly with age
- Characteristics
  - Insidious onset
  - Progressive course
  - Heterogeneous

Lewy Body Dementia

- Shares common neuropathologic and neurogenetic features with PD
- Distinguished from other neurodegenerative diseases by fluctuating attention, visual hallucinations and parkinsonism
- Characterized by cortical and subcortical disease
- Less medial temporal involvement than AD

Frontotemporal Dementia

- Affects primarily frontal and temporal lobes
  - Reasoning
  - Social behavior
  - Personality
  - Speech/language
  - Movement
  - Memory
- Changes depend on whether damage is primarily on the left or right front of the brain

Vascular dementia

- Vascular dementia is defined as memory decline and at least ***(2)*** additional cognitive deficits:
  - Orientation, Attention, Language, Visuospatial functions, Executive functions, Motor control or praxis
- Typically have history of HTN, heart disease or both; multiple strokes
- Slow stepwise progression results from multiple strokes
- Personality and intellect are preserved until late stages

Primary Progressive Aphasia

- Involves a decline in one or more language functions
- Can occur in individuals under the age of 65
- Begins gradually and initially results in difficulty thinking of common words while speaking or writing
- Memory, reasoning and visual perception are not affected by the disease in early stages
- Increased difficulty thinking of words
    - **Anomia** is most common sign of PPA
- Problems reading or writing

brain.northwestern.edu/ppa/handbook

Dementia Assessment

Standardized Screening Tools

- Mini Mental Status Exam (MMSE)

- Brief, standardized exam of cognitive status
- Administration time = 10 minutes
- Assesses: orientation, attention, immediate and short-term recall, language, and the ability to follow simple verbal and written commands
- Screening gold standard
- Score of <24 indicates cognitive impairment

- Clinical Dementia Rating Scale

- 5-point scale used to characterize six domains of cognitive and functional performance
- Domains examined
  - Memory, orientation, judgment and problem solving, community affairs, home and hobbies, personal care
  - Ratings made by clinician based on patient interview

  - 0 = Normal
    0.5 = Very Mild Dementia
    1 = Mild Dementia
    2 = Moderate Dementia
    3 = Severe Dementia

Arizona Battery for Communication Disorders of Dementia (ABCD)

- 4 Screening Subtests
  - Speech Discrimination
  - Visual Perception and Literacy
  - Visual Field
  - Visual Agnosia
- 14 ABCD Subtests

Cognitive-Linguistic Quick Test

- Use to quickly I.D. strengths and weaknesses in five cognitive domains (attention, memory, executive functions, language, and visuospatial skills)
- Administration time: 5 to 30 minutes
- Can be administered at a table or bedside
- Available in both English and Spanish

Helm-Estabrooks (2001)

Dementia Management

Dementia Management

- “The progressive nature of irreversible dementia rules out restoration of lost abilities as a practical clinical objective for most patients with dementia”
    - Brookshire (2003)

Management Issues

- Early Stages
  - Memory
  - Communication
  - Anxiety and Depression
  - Behavior Changes
  - Denial
  - Sleep Disturbances

- Interventions
  - Collaborative
    - Patient, Caregiver, SLP
  - Compensatory
  - Group Tx
  - Major domains
    - Memory
    - Confusion
    - Communication

Management Issues

- Middle Stages
  - Progressive Behavior Changes
  - Insight, Judgment, Orientation
  - Physical Dependence
  - Communication

- Interventions
  - Collaborative
    - Caregiver & SLP
    - Caregiver Centered
  - Environmental control
  - Major domains
    - Behavior
    - Communication

Management Issues

- Late Stages
  - Caregiver Support

- Interventions
  - Collaborative
    - Caregiver & SLP
    - Caregiver Centered
  - Environmental control
  - Major domains
    - Behavior

Direct Interventions

- Reality Orientation
- Validation Therapy
- Reminiscence Therapy
- Spaced Retrieval Training

Right Hemisphere Syndrome

Right Hemisphere Syndrome

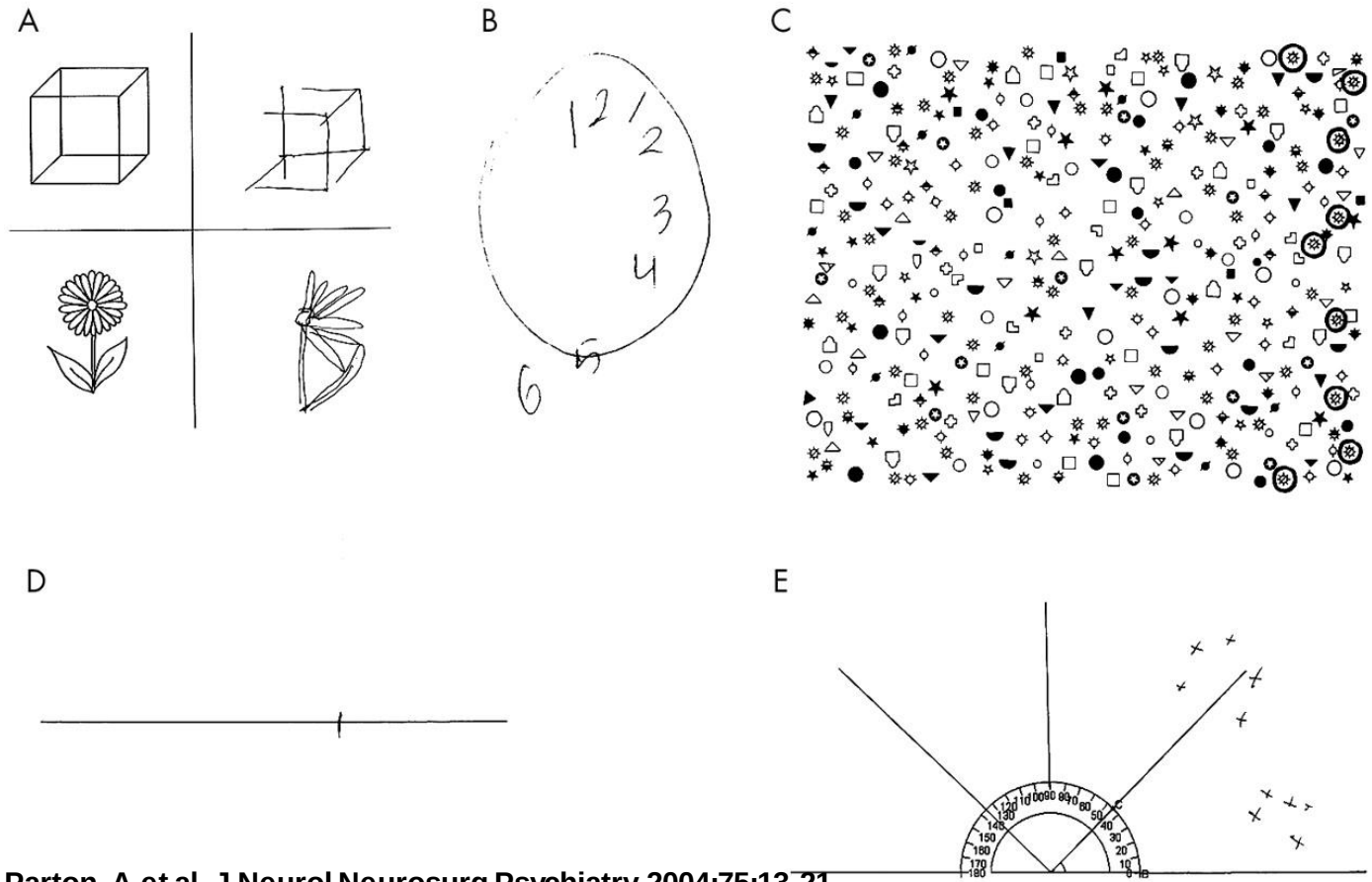
- Patients appear “abrupt, disinterested and insensitive communication partners, who may take little account of social communication conventions, perhaps interrupting and failing to make eye contact, or alternatively as a verbose, rambling communicator whose discourse shows tangential associations”
- They exhibit impairments in the ability to integrate and interpret incoming information may also be impaired, leading to difficulties with some aspects of comprehension”
- “Prosodic, affective and cognitive impairments, including denial, attention deficit and neglect, may accompany and contribute to the communication disorder” (Meyers, 1999)

Characteristics of Right Hemisphere Syndrome

- Left visual neglect
- Difficulty with facial recognition
- Poor awareness of deficits
- Poor self-monitoring
- Impulsive behavior
- Poor initiation and motivation
- Disorientation

LEFT NEGLECT

Figure 1 Typically, right hemisphere patients with left neglect omit elements to their left when copying simple objects (A), drawing a clock face (B), and cancelling targets among distractors (C). They also tend to err to the right when asked to bisect a horizontal line (D). When asked to name objects in their surroundings, they will tend to name only those on the right. Crosses in (E) mark the locations of reported objects with respect to the patient.



Parton, A et al. J Neurol Neurosurg Psychiatry 2004;75:13-21

Pragmatic Deficits

- Turn-taking
- Topic maintenance
- Eye contact
- Interjection of irrelevant, tangential, or inappropriate comments
- Generally insensitive to rules of conversation

Discourse Deficits

- Reduced ability to generate inferences
- Reduced ability to comprehend and produce main concepts and central themes
- Reduced level of informative content
- Reduced ability to manage alternative meanings
- Reduced sensitivity to communicative content

Right Hemisphere Syndrome Assessment

Formal Tests of RHD

- Mini Inventory of Right Brain Injury (MIRBI)
- The Rehabilitation Institute of Chicago Clinical Management of Right Hemisphere Dysfunction (RICE)
- Burns Inventory of Communication and Cognition

Nonstandardized Assessment Procedures

- Visual scanning and visual inattention
- ADLs
- Visual integration
- Higher cognitive and perception functions
- Linguistic and cognitive flexibility

Right Hemisphere Syndrome Treatment

Treatment Approaches

- Reflect principles of accepted practices for treating acquired neurologically based communication disorders
- Reflect accumulated clinical experiences
- Reflect observed deficits and theories about mechanisms that may underlie those deficits

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Treatment Approaches

- Task Oriented Approaches
  - Improve performance on specific activity
- Process Oriented Approaches
  - Address impairment vs disabilities and focus on underlying cause vs symptoms

Treatment of Pragmatics

- Eye Contact
- Conversation turn taking
- Conversational topic maintenance

Questions

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