Announcement

- Midterm next Monday in class. (Week 1-3 material)
- Review section this Friday in class.
- There will still be a quiz next week. (Week 4 material)
- Use Piazza!
- Last week quiz grades are up.
- Go to **ANY** TA’s office hour to view your quiz.
- If you got a zero on the last week’s quiz, either you didn’t sign the Academic Integrity box, **didn’t write your name on the scantron** or the scantron machine didn’t read your test. Either way, go to **ANY** TA’s office hour.
Brief review for the topics of last week

• Lateralization of the Brain - Dr. Seana Coulson
• Language Development - Dr. Sarah Creel
• Sign language & Aphasia
Lateralization of the Brain
Review questions

1. What are gyrus and sulcus?
2. What is corpus callosum made of?
3. Know the location of four cerebral lobes and the two major sulci.
4. Know the major functions of four lobes.
5. What does lateralization of function mean?
1. What are “gyri” and “sulci”?
2. What is the corpus callosum made of?
3. Know the location of the four cerebral lobes and the two major sulci.
3. Know the location of the four cerebral lobes and the two major sulci.
4. Know the major functions of the four lobes.
5. What does lateralization of function mean?

Definition: The tendency of a hemisphere to be more dominant in/intrinsic to the performance of a certain process

For example:

Left side
- Language
- Cause & effect reasoning
- Schema
- Visual search task
- Local-level visual stimulus processing

Right side
- Face
- Emotion
- Visuomotor task
- Global-level visual stimulus processing
Review questions - continued

6. What does the word ‘homunculus’ mean? What are motor and somatosensory homunculi?
7. Where is somatosensory cortex? What’s the function of it?
8. What is the Wada Test? What’s the purpose of it?
9. Know the major symptoms of Broca’s Aphasia and Wernicke’s Aphasia.
10. What are Brodmann’s Areas?
6. What does the word ‘homunculus’ mean? What are motor and somatosensory homunculi?
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Which is somatosensory and which is motor?
6. What does the word ‘homunculus’ mean? What are motor and somatosensory homunculi?
7. Where is somatosensory cortex? What’s the function of it?
8. What is the Wada Test? What’s the purpose of it?
9. Know the major symptoms of Broca’s Aphasia and Wernicke’s Aphasia.

- **Broca’s Aphasia:**
  - Stutter, omit some words and cannot finish a whole sentences
  - [Real example from UK](#)

- **Wernicke’s Aphasia**
  - Fluent but meaningless of the sentences
  - [Real example](#)
10. What are Brodmann’s Areas?

A patch of cortex that cytoarchitectonically distinct from its neighbors. Namely, they with regards to the arrangement of their cells.
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A patch of cortex that cytoarchitectonically distinct from its neighbors. Namely, they with regards to the arrangement of their cells.
Language development
Review questions

1. What is a chatbot? Why are they not good at generating normal-sounding speech comparing to humans?

2. Re-watch the video ‘Star Wars According To A 3 Year Old.’ ([https://www.youtube.com/watch?v=EBM854BTGL0](https://www.youtube.com/watch?v=EBM854BTGL0)). Know what languages at age 3 is like, and how those characteristics are represented in the video.

3. What are the stages of language development? Know the approximate ages and signature behaviors of each stages regarding to language production and comprehension, respectively?
1. What is a chatbot? Why they are not good at generating normal-sounding speech comparing to humans?
2. Know what language at age 3 is like, and how those characteristics are represented in the video.

- Overregularization the grammar e.g. blowed out
- Frozen phrases e.g. “Don’t talk back to Darf Vader, he’ll get ya!”
- Phoneme error e.g. “Darf Vader” instead of Darth Vader
- Gestures
3. What are the stages of language development? Know the approximate ages and signature behaviors of each stage regarding to language production and comprehension, respectively?

- **Speech sounds**
  - Babbling onset: 6-8 months

- **Words**
  - Say first words: 10-12 months

- **Grammar**
  - “Word spurt”: 10-12 months

- **Social context**
  - Take a while to learn this
Sign language/Aphasia
Review questions

1. Where is primary motor cortex (MI)? What will happen if you stimulate a sub-region on the motor homunculus?
2. Where is primary auditory cortex? What the function of it? What is a tonotopic map?
3. Broca’s area is physically close to which sub-region of the motor homunculus? How does this fact contribute to the symptoms of Broca’s Aphasia?
4. Broca’s area is physically close to what brain area? How does this fact contribute to the symptoms of Wernicke’s Aphasia?
1. Where is primary motor cortex (MI)? What will happen if you stimulate a sub-region on the motor homunculus?
2. Where is primary auditory cortex? What the function of it? What is a tonotopic map?
3. Broca’s area is physically close to which sub-region of the motor homunculus? How does this fact contribute to the symptoms of Broca’s Aphasia?
4. Wernicke’s area is physically close to what brain area? How does this fact contribute to the symptoms of Wernicke’s Aphasia?
Review questions - continued

5. What is the functional ‘hub’ in the brain? Where is it?
6. What is LGN? What role does it play in visual information processing?
7. Know the trajectories and functions of two visual processing pathways.
8. What happens to sign-language processing when a hemisphere is damaged? Know the different consequences of left hemisphere damage and right hemisphere damage.
9. Are sign-language and spoken language processed by the same cortical substrates in brain?
5. What is the functional ‘hub’ in the brain? Where is it?

Hint: the place receiving sensory information (with the exception of the olfactory system) from different modalities and then projecting it to related cortical areas

Thalamus!!
6. What is LGN? What role does it play in visual information processing?

- The lateral geniculate nucleus
- Located in the thalamus
- For the visual pathway
7. Know the trajectories and functions of two visual processing pathways.

Dorsal where/how pathway

Ventral what pathway
8. What happens to sign-language processing when a hemisphere is damaged? Know the different consequences of left hemisphere damage and right hemisphere damage.

1. Signers with (LHD) left hemisphere brain damage have sign-language deficits.
2. Wernicke’s area damage → comprehension problems.
3. Broca’s area damage → production problems.
9. Are sign-language and spoken language processed by the same cortical substrates in brain?
Week 3 Reading
Review questions

1. Know the fact that just by looking at the surface of the brain, one cannot see the four “lobes” of each half of the brain.
2. What is hemispheric asymmetry?
3. What is Anomia?
4. How the memory of concepts, like ‘elephant’ is stored in the brain?
5. Know the fact that there is a subgroup difference of language organization between men and women.
6. Know the anatomy of the brain and the nervous system.
1. Know the fact that just by looking at the surface of the brain, one cannot see the four “lobes” of each half of the brain.
2. What is hemispheric asymmetry?

Differ in structures
● The average brain is skewed
● Right side is often a bit wider than the left side
● The sylvian fissure is usually long and straight on the left side

Differ in functions
● Language lateralized to the left hemisphere
  ○ (See “What is lateralization” slide for more examples)
3. What is Anomia?

The inability to name objects is referred to “Anomia”.
4. How is the memory of concepts, like ‘elephant’, stored in the brain?
5. Know the fact that there is a subgroup difference of language organization between men and women.

- Object-naming task
- Hand-movement selection task

Women: Fewer naming sites in the frontal lobe
6. Know the anatomy of the brain and the nervous system.
6. Know the anatomy of the brain and the nervous system.
Review questions-continued

7. Know the anatomy of neuron.
8. What is neurotransmitter? Know the common neurotransmitters introduced by this chapter and their major function.
9. Know the main findings and implications of the study in the reading, “Mandarin Makes you more Musical”.
10. What is infant babbling? What are the benefits of patents being interactive with infant babbling?
7. Know the anatomy of neuron.
8. What is neurotransmitter? Know the common neurotransmitters introduced by this chapter and their major function.

- Neurotransmitter: the brain’s chemical messengers
  - Acetylcholine
  - Amino Acids
  - Catecholamines
  - Serotonin
  - Peptides
  - Trophic Factors
  - Hormones
  - Gases
8. What is neurotransmitter? Know the common neurotransmitters introduced by this chapter and their major function.

- Neurotransmitter: the brain’s chemical messengers
- Acetylcholine
- Amino Acids: GABA
- Catecholamines: Dopamine, norepinephrine
- Serotonin
- Peptides
- Trophic Factors
- Hormones
- Gases
9. Know the main findings and implications of the study in the reading, “Mandarin Makes you more Musical”.

- Tonal language v.s non-tonal language e.g. different tones of /ma/ in Mandarin convey different meanings

  媽: mother  麻: weed  馬: horse  罵: blame

- The Mandarin speakers significantly outperformed on pitch
- Absolute pitch perception v.s relative pitch perception
- Chinese lesson v.s Music lesson
10. What is infant babbling? What are the benefits of parents being interactive with infant babbling?

Parents’ respond to their children’s babbling shape infants communicate in a good way:

- Accelerate their infant’s vocalizing
- Accelerate their infant’s production of words
- Accelerate their infant’s production of gestures
Review questions-continued

11. What is sign language? What are the similarities that sign and spoken language share?
12. What will happen to late-learners of sign language?
13. What are the major function of left and right hemisphere in language (both spoken and sign)?
14. What are some misconception of sign language?
11. What is sign language? What are the similarities that sign and spoken language share?

Sign language is a language system that communicates meaning through:

- Hand gestures
- Movement of fingers, arms or body
- Facial expression

Sign languages maintain linguistic structure found in spoken language, such as:

- Phonology
- Morphology
- Syntax
12. What will happen to late-learners of sign language?

Accent!
13. What are the major function of left and right hemisphere in language (both spoken and sign)?

**Local-level perception**
- Difficulty in selecting appropriate sounds and words
  - (In sign language, same issues as in spoken language (slips, inability to understand, etc.))

**Global-level perception**
- Frequently ramble from one subject to another
  - (In sign language, difficulty referencing a character in a narrative by spatial location)
14. What are some misconceptions of sign language?

- Compared to spoken language, sign language is less systematic or structured
- There is a universal sign language across different language systems
- Sign languages are just simple versions of the spoken languages
Quiz time!

- No talking, signing, or communicating of any kind.
- Put away your books, notes, computers, phones, etc.
- Pen or pencil is okay (just make sure it’s a black pen and you press hard with a pencil).
- Write your name in the “Name” box, write and circle in your PID, and sign the academic integrity agreement.
- Circle this section
- Please have your student ID out when you turn in your quiz!
Please write down and bubble your PID and circle A or U

Please write down your full name here

UC SAN DIEGO – DEPARTMENT OF COGNITIVE SCIENCE

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Last NAME, First NAME

COURSE NUMBER

COGS 1

WINTER 2018

Dr. Mary ET Boyle

Quiz C

Jan 29 – Feb 2, 2018

Quiz VERSION

A B C D E F G

Section you are taking this quiz:

Please Bubble only one!

[1] Monday @ 12 Sylvia
[2] Monday @ 4 Kevin
[3] Wednesday @ 12 Jason
[4] Wednesday @ 2 Zoe
[5] Friday @ 11 Elena
[6] Friday @ 12 Angelica
[7] Friday @ 2 Kevin

YOUR ANSWERS GO HERE

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ACADEMIC INTEGRITY

By taking this quiz, you agree that you will follow ALL UCSD ACADEMIC INTEGRITY policies. It is YOUR responsibility to know and understand all of the policies. Failure to follow all UCSD Academic Integrity policies could result in expulsion from UCSD.

Signature Date

Your signature above certifies that you will follow and that you know that you will suffer the consequence for ANY academic integrity violation.

You need to bubble ALL your answer to the scantron.

You MUST sign here, or you would get ZERO on your quiz.

Bubble THIS section, not the one you registered.