### COGS1

**Fall 2018**

**Section A**

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<tr>
<th>Instructor</th>
<th>Email</th>
<th>Day</th>
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Important information

- **Quizzes**
  - Graded quizzes at the end of every section (~15mins)
  - Lowest quiz score will be dropped

- **Extra Credit**
  - EC quizzes on readings on TED
  - SONA - up to 4 EC units (4 units = 1% final grade)

- **Section procedure**
  - I will present a pool of topics we can discuss. Because we might not have time to go over everything, we will take a vote over which material you want to go over the most.

- **Piazza**
  - [https://piazza.com/ucsd/fall2018/cogs1](https://piazza.com/ucsd/fall2018/cogs1)
  - Ask questions (& answer others’ questions)
  - Please make your questions are public (unless they are about a private matter)
  - Please make sure your questions haven’t been answered before
Topics of last 2 weeks

• Lecture 1: What is Cognitive Science
• Lecture 2: Circadian Rhythms and Cognition
• Lecture 3: Your Brain on Swearing
Lecture 1 | Review questions

1. What is Cognitive Science –
   a. What are the main objectives of the field?
   b. How are the disciplines related?
2. The ability to learn and understand language is an extremely complex process. Is there something intrinsic in the human brain that enables language or is it experience?
3. What does it mean to “read the mind?” What is BCI?
4. What was special about the robotic hand?
5. How does cognitive science differ from computer science, neuroscience, philosophy, psychology, and linguistics?
1a. What is Cognitive Science, and what are the main objectives of the field?

- Cognitive science is the **interdisciplinary scientific study** of the mind and its processes (e.g. emotion, language, reasoning, memory, perception).

- Cognitive science investigates **how information is represented and transformed** in terms of behaviour and thought.
1b. CogSci subdisciplines & how they are related

How does neural activity represent, store information and how does it translate to behavior?

How is meaning/information represented and conveyed?

Defines key questions: What is reasoning, meaning?

Create systems that simulate cognitive processes and output.
2. Language: Nature v. Nurture?

This is what some linguists study and argue about! Some main positions:

- Language is the way it is b/c of an innate language-specific ability - the language instinct (e.g. Pinker)
- Language is the way it is b/c of general properties of human cognition - (e.g. Elman)
3. “Reading Minds” | Brain Computer Interface

- **Brain Computer Interface (BCI)**
  - Field of research that uses **sensors** to decode electrical activity of the brain, which the **computer** decodes in order to control an **external/implanted device**
  - Example: Treatment of Parkinson’s Disease
4. Bionic Hand

What was special about the bionic hand shown in class video?

- Patients’ sense of touch was restored for the first time through the prosthetic.
- The prosthetic stimulates nerves, producing texture, fragility feedback so hand applies appropriate pressure to grab objects.
5. How does cognitive science differ from computer science, neuroscience, philosophy, psychology, and linguistics?

Cognitive Science incorporates aspects of all of these disciplines, as it is an interdisciplinary field.
Lecture 2 | Review questions (1 of 2)

1. What are the consequences of sleep deprivation?
2. What is the role of melatonin and light in regulating circadian rhythms?
3. What is the SCN? What does it do?
4. How human circadian rhythm work?
   a. What does it do?
   b. What will happen when this rhythm is disrupted?
5. What are the other internal clock systems that we’ve talked about in the class?
6. How blood sugar is regulated in our body?
7. Every cell has its own clock, for example, skin cell.
   a. What is the clock of skin cells?
   b. What does this tell us about the importance of circadian rhythms?
8. What factors are associated with our ability to go to sleep?
9. What is “social jet lag”?
10. What is so important about blue light?
11. What are the effects of chronic sleep deprivation? (REM sleep behavior disorder, sleep apnea, etc.)
12. What is sleep inertia?
13. What is the cognitive and physical performance of someone who has not slept in a 24 hour period?
14. What is sleep hygiene? Compare the effects of good and bad sleep hygiene. What are the components of good sleep hygiene?
15. Can sleeping aids overcome the effects of poor sleep hygiene? Why? Why not?
# What are the consequences of sleep deprivation?

**Short term** sleep deprivation leads to:

- Cognitive and behavioral changes
- Decreased ability to concentrate
- Decreased short-term memory
- Paranoia and hallucinations

**Long term** sleep deprivation leads to:

- Cardiovascular stress (elevated heart rate and blood pressure)
- Disruption of the glymphatic system and thus build up of toxins
- Impaired executive functions
- Impaired emotional responses
- Impaired decision making

In children chronic sleep deprivation may lead to hyperactivity and impaired interpretation of social cues.
1. What are the consequences of sleep extension?

- Stanford Basketball Study
  - Investigate effects of sleep extension over multiple weeks on specific measures of athletic performance as well as reaction time, mood, and daytime sleepiness
    - For 6 weeks, minimum of 10 hrs sleep/night
  - Results:
    - More accurate shooting
    - Faster reaction time
    - Increased mental health
    - Increased physical well-being
2. What are the roles of melatonin and light in regulating circadian rhythms?

Sleep wake cycle is regulated by the circadian system.
3. What is the SCN? What does it do?

- The **superchiasmatic nucleus (SCN)** is the tiny region of the brain in the **hypothalamus**.
  - The “master clock” of the brain used to **coordinate and synchronize** most of the body clocks in the periphery.
4. How human circadian rhythm work? What does it do? What will happen when this rhythm is disrupted?

- One oscillation of circadian rhythm is on avg. 24 hours.
- The brain synchronizes clocks in various cells of the body.
  - Genes direct the production of proteins at different times of day, which ramp up or inhibit biological processes.

If the sleep wake cycle is disrupted it can cause metabolic dysregulation
- Metabolic disruption
- Obesity
- Impaired immunity
- Cognitive malfunction
5. What are the other internal clock systems that we’ve talked about in the class?

- Pancreas
- Skin Cells
6. How blood sugar is regulated in our body?

- **Insulin** stimulates the liver to remove glucose from the blood and stores it as glycogen.
- Beta cells release **INSULIN**.
- Tissues take up glucose from blood.
- Lowers glucose levels in blood.

*Figure adapted from Kaidanovich-Beilin, O. et al. 2012*
6. How blood sugar is regulated in our body?

**Glucagon** stimulates the conversion of stored glycogen in the liver into glucose. When blood glucose levels are low, **Alpha cells** release **GLUCAGON** which increases glucose levels in blood. In this process, glycogen is converted to glucose, which is then released into the bloodstream to increase blood glucose levels.
7. Every cell has its own clock, for example, skin cell. What is the clock of skin cells?
8. What factors are associated with our ability to go to sleep?

- Previous activities such as food and alcohol consumption
- Genetic components
- Environmental lights
  - Photoreceptors linked to regulating our circadian rhythms
  - Blue light
- The time we go to sleep
19. What is a “social jet lag”?  

- Social jet lag is a result of circadian disruption  
  - Exacerbated by drastic difference in wake times throughout the week  
- Effects of circadian disruption on students  
  - Affected executive function and emotional responses, decision making, mental health, and may be linked to rise of ADHD diagnoses  
  - Schools with healthier start times saw increases in attendance, test scores, GPAs, and health
20. What is so important about blue light?

- Light on the short-wave AKA blue light is interpreted by our circadian systems as daylight.
- Blue light is emitted by televisions, computers, phones, etc.
  - Postpones the signal to brain to go to sleep
  - Subsequently affects the release of melatonin
21. What are the effects of chronic sleep deprivation? (REM sleep behavior disorder, sleep apnea, etc.)

**REM-sleep behavior disorder**
- Paralysis during REM sleep does not occur → dreams are acted out
- Increased risk for neurodegenerative diseases

**Sleep apnea**
- Breathing pauses for seconds to minutes during sleep → body briefly jolts to continue breathing
- Cognitive impairments
- Increased risk for diabetes, cardiovascular diseases
22. What is sleep inertia?

- Sleep inertia refers to a general feeling of grogginess immediately after sleep
  - Can be prevented by good sleep hygiene
  - Typically dissipates quickly when fully rested, but can last throughout day when without sleep
23. What is the cognitive and physical performance of someone who has not slept in a 24 hour period?

- The physical performance someone who has not slept in 24 hours is similar to that of someone with a BAC of 0.1%.

- **Short term effects:**
  - Decreased perception and motor skills
  - Emotional control
  - Learning, memory, simple arithmetic and reasoning tasks

- **Long term effects:**
  - More prone to metabolic and endocrine problems
  - Increased risk of diabetes
  - Decreased immune function
  - Increased risk of cancer
  - Increased risk of dementia
24. What is sleep hygiene?

Five things that stop a good night’s sleep

[Image: Cartoon of a bedroom with various items that disrupt sleep, such as light, noise, alcohol, caffeine, busy mind, hot room, heavy meal, and alcohol]

http://www.bbc.co.uk/science/0/20427553
25. Can sleeping aids overcome the effects of poor sleep hygiene?

- Existing sleeping aids may not be enough to counteract effects of overstimulation
- Sleep from medicine may not be as effective as regular sleep
- Risk of parasomnia -- behaviors like eating/leaving the house while asleep with no memory of it
Lecture 3 | Review Questions (1 of 2)

1. What makes a word taboo?
2. What are the different categories of profanity?
3. Are there any linguistic characteristics that are associated with taboo words (eg. word length, syllable structure, etc.)?
4. How are Tourette’s, swearing and the basal ganglia related?
5. Are there any cross cultural differences in what is considered to be profane? Do profane words go in or out of fashion? Cite examples for each.
6. Are speech errors evidence of repressed subconscious thoughts?
7. What are word interference tasks? What do these tasks reveal? Give an example used in Bergen’s lecture.
8. How and when did the nickname for Richard change in the United States?
Lecture 3 | Review Questions (2 of 2)

9. Who was Jacques Lordat?

10. What happened to patient EC? Why is he important to research regarding profanity?

11. What is automatic aphasia? What is coprolalia?

12. Are there any physical consequences when a person swears?

13. Where is Broca’s Area? Wernicke’s Area?
   a. What aspects of language do they generally process?
   b. Which area of the brain is associated with inhibitory control?
1. What makes a word taboo?

**WHAT MAKES PROFANITY**

A cultural belief that some words are bad (in some contexts).

That belief applied to specific words.
- That are likely to be drawn from certain semantic fields
- That may pattern together in sound

Cultural structures for reinforcing those norms (punishment, censorship, etc.)
2. What are the different categories of profanity?

1. Religion (out of religious context)
2. Copulation
3. Body/bodily functions
4. Slurs

Note: There are others categories (e.g. animals or diseases), but these four are the most widespread and can be found in many languages.
3. Are there any linguistic characteristics that are associated with taboo words?

**Syllable Structure in Profanity**
- Open (C*V)
  - spoo
  - pee?
  - poo?
  - screw?
  - Jew?
- Closed (C*VC+)
  - cunt
  - fuck
  - bitch
  - ass

**English Orthographic Word Length**

< 5% of profane English monosyllabic words

**Profane Monosyllables**
4. How are Tourette’s, swearing and the basal ganglia related?

- Tourette syndrome:
  - motor/vocal tics
  - often associated with coprolalia (from Greek kopros ‘dung’ + lalia ‘speech’)

Part of **limbic system**, strongly associated with emotional processing.
5. Are there any cross cultural differences in what is considered to be profane? Do profane words go in or out of fashion?

- Some languages/cultures seem (based on reports) to not have a class of words equivalent to profanity
  - E.g. Japanese - “baka” (fool) or “chin-chin” (wee-wee) is as bad as it gets

- Languages differ in terms of what type of taboo words is the most offensive
  - Russian - copulation/body functions
  - Italian/Quebecois French - religious words
  - Contemporary USA English - slurs

- Differences across time
  - In English, words for copulation/body functions used to be the most profane

- Differences in terms of policy
  - Afghanistan - severe crime
  - France - profane words are not even bleeped on TV, politicians sometimes use them
  - USA - somewhere in between
6. Are speech errors evidence of repressed subconscious thoughts?

**Speech Errors**

Speech is peppered with errors

Errors may reflect otherwise unstated and repressed thought (Freud, 1901)

If these repressed thoughts are more likely to be about taboo topics than not, then speech errors should be more likely to result in taboo language than not.
6. Are speech errors evidence of repressed subconscious thoughts?

**Speech Errors**

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**Speech Errors**

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**Mean Speech Errors Per Participant**

Motley et al., 1981; 1982
7. What are word interference tasks? What do these tasks reveal? Give an example used in Dr. Bergen’s lecture.

Read aloud one word (taboo or neutral), while ignoring the other (represented by image).

Which word is easier to suppress?
FUCK
7. What are word interference tasks? What do these tasks reveal? Give an example used in Bergen’s lecture.
8. How and when did the nickname for Richard change in the United States?
9. Who was Jacques Lordat?

After he had a stroke and had temporary aphasia, he dedicated his studies to this impairment. One patient of his was a Parish priest who had Broca’s aphasia and could only say the French equivalent of
- “I” (je) and
- “fuck” (fous/foutre)
9. What happened to patient EC? Why is he important to research regarding profanity?

Usually we have two hemispheres

LH: lateralized for language

Patient EC: whole left hemisphere removed (b/c tumor)

“E.C.’s attempts to reply to questions immediately after operation were totally unsuccessful. He would open his mouth and utter isolated words, and after apparently struggling to organize words for meaningful speech, recognized his inability and would utter expletives or short emotional phrases (e.g., 'Goddamit!'). Expletives and curses were well articulated and clearly understandable.”

Smith, 1966
11. What is automatic aphasia?
What is coprolalia?

**Automatic Aphasia**

"could not provide the correct expletive for situations described to him nor could he complete a curse"

Speedie et al., 1993

**Coprolalia**

Associated with Tourette Syndrome (10%-50% incidence)

Characteristic, attested phrases (Lancker & Cummings, 1999)

- fuck
- shit
- cunt
- mother-fucker
- prick
- dick
- cocksucker
- nigger
- cockey
- bitch
- pregnant-mother
- bastard
- tits
- whore
- f u . . .
- doody
- penis
- queer
- pussy
- coitus
- cock
- ass
- shi . . .
- bowel movement
- homosexual
- screw
- fag
- faggot
- schmuck
- blow-me
- wop
- God damn it
- damn fool
- fuck my your
- fucking
- fucking
- fucking
- cunts
- fuck
- shit
- ass
- bitch
- cock
- fart
- suck
- you fucking idiot
- asshole
- fuck you
- shit on you
- fucka
- fu . . .
12. Are there any physical consequences when a person swears?

- Heart rate
- Sweat
- Perceived pain
12. Are there any physical consequences when a person swears?

Physiological responses observed when hearing/reading/saying profane words:
- ↑ adrenaline
- ↑ blood pressure / blood flow to extremities
- ↑ sweat (measured through skin conductance)
- ↑ pupil dilation
13. Where is Broca’s Area? Wernicke’s Area?

a. What aspects of language do they generally process?

b. Which area of the brain is associated with inhibitory control?
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.

- Bubble in this section
- Please have your student ID out when you turn in your quiz!
Write and circle in your PID

Write down your name here

UC SAN DIEGO – DEPARTMENT OF COGNITIVE SCIENCE

STUDENT PID NUMBER

A/U

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Last NAME, First NAME

COURSE NUMBER

COGS 1

WINTER 2018

Dr. Mary ET Boyle

Quiz I

Oct 8 – Oct 12, 2018

Quiz VERSION

A B C D E F G H

Section you are taking this quiz:

Please Bubble only one!

[1] ○ Monday @ 3 Zoe
[2] ○ Monday @ 4 Lauren
[3] ○ Monday @ 5 Alexis
[4] ○ Monday @ 6 Kenny
[5] ○ Friday @ 9 Sandhya
[6] ○ Friday @ 10 Arturs
[7] ○ Friday @ 11 Subatha
[8] ○ Friday @ 12 Elizabeth

COGS 1: QUIZ I -Choose the best answer. Please bubble in your answers to the right →

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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.

YOUR ANSWERS GO HERE

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