

Quiz #2

Name: _____

Title: “Hyperscans” Show How Brains Sync as People Interact

Lead: Social neuroscientists ask what happens at the level of neurons when you tell someone a story or a group watches movies

Opening paragraphs: The vast majority of neuroscientific studies contain three elements: a person, a cognitive task and a high-tech machine capable of seeing inside the brain. That simple recipe can produce powerful science. Such studies now routinely yield images that a neuroscientist used to only dream about. They allow researchers to delineate the complex neural machinery that makes sense of sights and sounds, processes language and derives meaning from experience.

But something has been largely missing from these studies: other people. We humans are innately social, yet even social neuroscience, a field explicitly created to explore the neurobiology of human interaction, has not been as social as you would think. Just one example: no one has yet captured the rich complexity of two people’s brain activity as they talk together. “We spend our lives having conversation with each other and forging these bonds,” neuroscientist Thalia Wheatley of Dartmouth College says. “[Yet] we have very little understanding of how it is people actually connect. We know almost nothing about how minds couple.” (From: <https://www.scientificamerican.com/article/hyperscans-show-how-brains-sync-as-people-interact/>)

1. Describe at least one principle of Science Communication that this headline, lead sentence, and opening paragraph(s) get right and one principle that they get wrong. [2 pt; SciComm]

2. "Perceiving machines" are used by the U.S. Postal service to "read" the addresses on letters and sort them quickly to their correct destinations. Sometimes, these machines cannot read an address, because the writing on the envelope is not sufficiently clear for the machine to match the writing to an example it has stored in memory. Human postal workers are much more successful at reading unclear addresses, most likely because of [1 pt; Perception/Attention]

- A. Bottom-up processing
- B. Top-down processing
- C. Their in-depth understanding of principles of perception
- D. Repeated practice at the task

3. Imagine that U.S. lawmakers are considering changing the driving laws and that you have been consulted as an attention expert. Given the principles of divided attention, in which of the following conditions would a person have the most difficulty with driving and therefore pose the biggest safety risk on the road? [1 pt; Attention]

- A. When the driver has to drive work early in the morning
- B. When the driver is stuck in stop-and-go traffic
- C. When the driver has to park in a crowded parking garage
- D. When the driver is driving an unfamiliar vehicle that is more difficult to operate

4. With practice, people can become better at a task, which, over time, means performing the task is automatic. Previous research by Schneider and Shiffrin established that “automatic processing” happens without intention and only uses some of a person’s cognitive resources. How the switch to “automatic” happens is still being researched, but this is why driving is often considered a (relatively) automatic behavior.

Now let’s apply that concept to the papers on attention that you’ve read. [3 pts; Attention]

- A) If you’re driving and music is playing, what does the Middlebrooks et al. paper suggest would happen to your driving performance? Now, one limitation of the Middlebrooks paper was that folks were told to ignore the different types of music. What would happen to your cognitive or driving performance if you *couldn’t* ignore the music—say, it was an audiobook you’ve wanted to listen to, and it captures your attention; what then?
- B) If you’re driving and no one is around, and the next curve in the road isn’t for some time, what does the Seli et al. paper (clock) suggest you may do until you reach the next curve? How would you test this?
- C) Are any of your hypotheses qualified by the population tested? For instance, would any of your hypotheses depend on certain demographic or psychological characteristics of who was driving?
- D) “Life, Interrupted” discussed the idea of “deep work.” Let’s say that researchers are interested in understanding the different attentional states that might underlie “deep” vs. superficial work. What is one of the two paradigms that you learned about that researchers could use to investigate how people shift their attention between tasks? What behavior might you expect a participant to show?

5. Identify a problem with defining emotion by just one of the four criteria that comprise its main components. Draw on your readings, podcast, and class discussion to give an example of why that criterion cannot define emotion alone. [1 pt; Emotion]

6. First describe what two different theories of emotion predict in terms of how an emotion is generated. Then describe how you might differentiate between these two theories, i.e., what might one theory predict that the other wouldn't? You can draw on your readings, the podcast, or class discussions for this question. [2 pts; Emotion]

7. Describe at least two possible strategies (with concrete examples and definitions) that the Gross model of emotion regulation suggests that someone could take in managing their emotions. [1 pt; Emotion]

8. Which of the below theories is best captured by the following statement: "The bodily response to an emotional stimulus precedes and informs our feelings about the stimulus"? [1 pt; Emotion]

- A. Cannon-Bard Theory
- B. Psychological Constructive Theory
- C. James-Lange Theory
- D. All of the above

9. Apply either sparse, population, or specificity coding to one of the topics that we have studied so far, giving specific examples either from class discussions or your readings as to why each behavioral result might be coded in the brain that way. [bonus point; Sensory Coding]