

The mind

- What do you think cognition means?
- How to study the mind?

The role of neuroscience

Consider the two abstracts below, think about what cognitive process is being addressed in the two abstracts and which paper do you think (just based on the abstracts) has done a better job at investigating this process?

Abstract A

Three studies with 148 university students show that the retrieval process itself causes long-lasting forgetting. Ss studied 8 categories (e.g., Fruit). Half the members of half the categories were then repeatedly practiced through retrieval tests (e.g., Fruit Or). Category-cued recall of unpracticed members of practiced categories was impaired on a delayed test. Exps 2 and 3 identified 2 significant features of this retrieval-induced forgetting: The impairment remains when output interference is controlled, suggesting a retrieval-based suppression that endures for 20 min or more, and the impairment appears restricted to high-frequency members. Low-frequency members show little impairment, even in the presence of strong, practiced competitors that might be expected to block access to those items. Findings suggest a critical role for suppression in models of retrieval inhibition and implicate the retrieval process itself in everyday forgetting.

Abstract B

Retrieving particular information from memory facilitates the later retrieval of that information, but also impairs the later retrieval of related, interfering information. It has been theorized that this retrieval-induced forgetting reflects inhibition of interfering memory representations. We used event-related fMRI to investigate the functional neuroanatomy of this impaired retrieval, at the time the impairment is observed. Neural activity differences between impaired and facilitated information occurred in left ventrolateral prefrontal cortex (VLPFC, BA 45 and 47), precuneus (BA 7), and right inferior parietal lobule (IPL, BA 40). Activity in left anterior VLPFC (BA 47) and left posterior temporal cortex (BA 22), regions implicated in the controlled retrieval of weak semantic memory representations, predicted the degree of retrieval-induced forgetting. In contrast, activity in precuneus and right IPL predicted the degree of retrieval-induced facilitation. Our findings demonstrate that impairment of interfering memories and facilitation of practiced memories involve distinct neural processes, and suggest that the impairment reflects inhibition that weakens interfering memory representations.

The neuro-behavior debate

Break into groups and discuss one of the papers we've read for class today. As a group, write a summary of the main points presented in the paper your group is assigned to and write one discussion question about the other paper. A good discussion question is open-ended, not one with a yes/no answer. For example, you can question theoretical claims or apply a theory to a new issue, draw comparisons or contrasts between readings, or suggest a study that could be done to test a claim.

Group 1

Paper	Niv, Y. (2021). On the primacy of behavioral research for understanding the brain. <i>Behavioral Neuroscience</i>. 135(5), 601-609.
Summary	Neuroscience research methods (ex. fMRI) are overrated and we have not learned much from them. We should focus more on behavioral studies

	for historical reasons of studying the field via behavioral methods. It is also unclear whether the way we interpret brain imaging is correct.
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Paper	Cushman, F. (2021). Is cognitive neuroscience an oxymoron? In A. J. Lerner, S. Cullen, & S.-J. Leslie (Eds.) <i>Current controversies in philosophy of cognitive science</i>. (pg 121-133).
Question	Neuroscience can be a useful source of evidence for developing cognitive theories without being definitive evidence. neuroscience evidence can play an important role in adjusting our assessment of the probability of cognitive theories being correct, even without definitively endorsing or defeating any particular theory.

Group 2

Paper	Niv, Y. (2021). On the primacy of behavioral research for understanding the brain. <i>Behavioral Neuroscience</i>. 135(5), 601-609.
Summary	Niv is trying to say that it is more effective to study the brain and its cognitive functions by looking at behavior than actually looking at brain imaging.

Paper	Cushman, F. (2021). Is cognitive neuroscience an oxymoron? In A. J. Lerner, S. Cullen, & S.-J. Leslie (Eds.) <i>Current controversies in philosophy of cognitive science</i>. (pg 121-133).
Question	

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Group 3

Paper	<u>Cushman, F. (2021). Is cognitive neuroscience an oxymoron? In A. J. Lerner, S. Cullen, & S.-J. Leslie (Eds.) <i>Current controversies in philosophy of cognitive science</i>. (pg 121-133).</u>
Summary	The paper argues that neuroscience research plays an important role in cognitive research. The argument is categorized into three parts after defining the specific topics that are to be argued. The first part is a general overview that uses analogies to connect neuroscience and cognition. The second part is a case study of how one neuroscience experiment advanced the field of cognitive research. The third part explains the quantitative analysis of how neuroscience is important to cognitive research. Specifically, how cognitive research that is directly informed by neuroscience is of superior value.

Paper	<u>Niv, Y. (2021). On the primacy of behavioral research for understanding the brain. <i>Behavioral Neuroscience</i>. 135(5), 601-609.</u>
Question	

Group 4

Paper	<u>Cushman, F. (2021). Is cognitive neuroscience an oxymoron? In A. J. Lerner, S. Cullen, & S.-J. Leslie (Eds.) <i>Current controversies in philosophy of cognitive science</i>. (pg 121-133).</u>
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Summary	<p>While it can be easy for one to dismiss the significance of the study of cognition, cognition maintains a valuable relationship with neuroscience. A prior analysis, case study, and quantitative analysis were all used as evidence that neuroscience can advance cognitive research and that their methods will be pivotal in the future understanding of the different properties of the brain, both physical and computational.</p>
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Paper	<p>Niv, Y. (2021). On the primacy of behavioral research for understanding the brain. <i>Behavioral Neuroscience</i>. 135(5), 601-609.</p>
Question	<p>In what ways can behavioral research be viewed as more significant than neuroscience? Similarly, in what ways can neuroscience research be viewed as more significant than behavior?</p>