Effects of COVID-19 Anxiety and Anxiety Sensitivity on Working Memory Capacity

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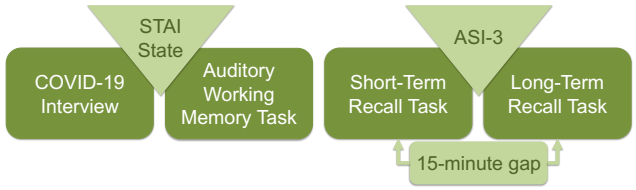
Introduction

- Previous research has indicated that anxiety can impair memory ability (Garibbo et al., 2019)
  - Specifically, working memory capacity (Sari et al., 2017; Angelidis et al., 2019)
- Such impairment in memory may impede learning, which is consistent with some past research on undergraduate students:
  - 33% of a sample of undergraduate nursing students reported that anxiety affected their learning and ability to perform (Beischel, 2013)
  - In a general biology class, students with higher anxiety reported lower course grades (England et al., 2017)
- The adverse effect of anxiety on memory and learning may currently be compounded by the ongoing COVID-19 pandemic
  - This may be especially true for more anxiety-sensitive students who may attend to anxiety sensations more closely (Reiss & McNally, 1985)

Hypotheses

1) Increased levels of state COVID-19-related anxiety will have a negative impact on working memory, immediate recall, and delayed recall.
2) The relationship between state COVID-19-related anxiety and working memory, immediate recall, and delayed recall will be moderated by anxiety sensitivity, with the negative impacts of anxiety on memory being present in individuals with high, as opposed to low, levels of anxiety sensitivity.

Procedure



Method

PARTICIPANTS

- 70 first-year undergraduate students (75.7% female, *M*age = 19.9 [*SD* = 1.5])

MEASURES

State-Trait Anxiety

- State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983)
  - State α = .95, Trait α = .91

Anxiety Sensitivity

- Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007)
  - Composed of three sub-scales: Physical Concerns, Cognitive Concerns, Social Concerns
  - Physical α = .87, Cognitive α = .90, Social α = .82, Total α = .93

TASKS

COVID-19 Interview

- Participants engaged in a one-on-one interview with the researcher in which the researcher asked questions relating to the COVID-19 pandemic. These questions were intended to induce anxiety in participants.

Auditory Working Memory Task

- The Auditory Working Memory subtest from the Woodcock-Johnson III Tests of Cognitive Abilities (Woodcock, McGrew, & Mather, 2001)

Short- and Long-Term Recall Tasks

- Ask participants to recall as many words as possible from the Auditory Working Memory Task
- Short-term administered immediately after Auditory Working Memory Task
- Long-term administered 15 minutes after completing the Short-Term Recall Task

Limitations and Future Directions

- Limitations
  - Only examined undergraduate students from a small Midwestern liberal arts college
  - Lack of ethnic diversity (*n* = 70, 88.6% white)
  - Lack of internal validity related to COVID-19 Interview and state anxiety level
- Future directions
  - While anxiety sensitivity did not play a role, future studies should investigate other potential risk factors to identify who may be more vulnerable to the negative effects of COVID-19-related anxiety on memory abilities
  - Future research may also include more direct observations of student anxiety as it relates to learning outcomes

Results

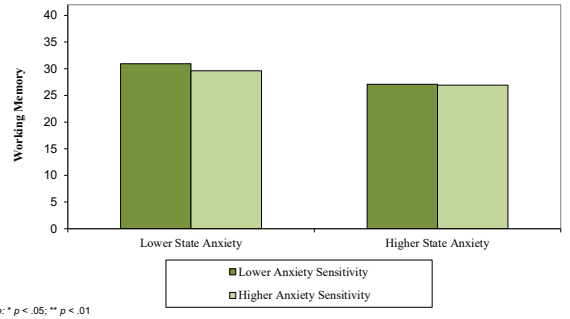
Table 1: Associations of Memory Abilities with State COVID-19-Related Anxiety and Anxiety Sensitivity

	State COVID-19-Related Anxiety	Anxiety Sensitivity
Working Memory	-.31**	-.19
Short-Term Recall	-.07	-.03
Long-Term Recall	-.08	.11

Table 2: State Anxiety and Anxiety Sensitivity's Associations with Working Memory, Short-Term Recall, and Long-Term Recall

	Working Memory		Short-Term Recall		Long-Term Recall	
	β	*ΔR*	*β*	*ΔR*	*β*	*ΔR*
Step 1		.10		.00		.03
State Anxiety	-.28*		-.07		-.15	
Anxiety Sensitivity	-.07		-.00		.17	
Step 2		.00		.00		.00
State Anxiety x Anxiety Sensitivity	.05		-.07		-.07	

Figure 1: Interactive Effect of State Anxiety and Anxiety Sensitivity on Working Memory



Note: * $p < .05$; ** $p < .01$

Conclusions

- Increased state anxiety relating to COVID-19 could have a negative impact on working memory capacity in college students
  - However, anxiety sensitivity does not place students at greater risk for these difficulties
- While no effects of anxiety on short- and long-term memory were found, negative impacts on working memory capacity could affect students' abilities to perform well in the classroom through deficits in holding and manipulating new course material, as well as concentrating and paying attention during class
- Additional considerations should be taken so that college students can access resources to combat anxiety in order to lessen the degree of harm it may cause on their working memory capacity and potentially their academic performance