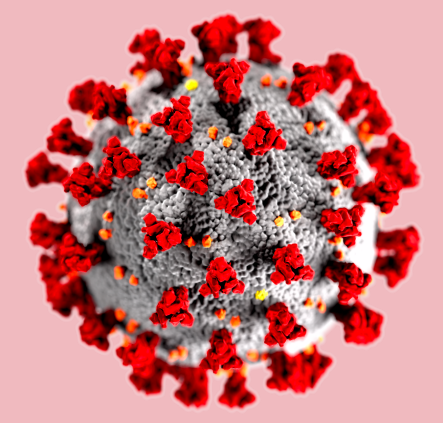


# MAKING FACTUAL CONNECTIONS: HOW WELL DO UNDERGRADUATE STUDENTS

## UNDERSTAND THE BIOLOGY OF THE SARS-CoV-2 VIRUS?



The Students in BIO 1013-002 in Autumn 2021 (Prof. S.J. Mullin)  
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### INTRODUCTION

- The organism responsible for the Covid-19 pandemic behaves similarly to other viruses in that it relies on the host cells in order to replicate and spread throughout the population [3,4].
- The global impacts of the pandemic caused by the virus have been both sociological and economic [5,6]. Because of its small size, however, an accurate public understanding of the biology of the virus — as well as efforts to combat it — has been lacking.
- Quantifying the accuracy of public understanding of a phenomenon can provide predictive insights about future patterns of behavior of the human hosts [1].

### OBJECTIVES

- To gauge the level of understanding about the biology of the SARS-CoV-2 virus, we conducted a survey of the student population at Arkansas State University.
- We tested the null hypotheses that the accuracy of survey responses did not vary as a function of demographic traits of the participants, and their area of academic focus.

### METHODS

- Students enrolled in a biology-focused section of the First Year Experience (FYE) course developed questions relating to the science of the Covid-19 pandemic.
- Demographic questions were added to examine response accuracy across different groups of participants.
- From 20–24 October 2021, each FYE student administered surveys to 10 undergraduate students. Participants were instructed to use only their own knowledge when responding.
- Data were compiled and analyzed using appropriate statistical methods.

Table 1. Demographic parameters for the undergraduate students (n = 190) at A-State who provided responses to a survey conducted from 20-24 October 2021, that assessed the level of scientific understanding of the SARS-CoV-2 virus.

Parameter	Percent of respondents					
	Male	Female	non-binary			
Gender	52.6%	46.3%	1.1%			
Residency	Arkansas		non-Arkansas			
	79.0%	21.0%				
Age (yr)	18	19	20	21	22	23
	32.6%	37.9%	19.0%	7.9%	2.1%	0.5%
	STEM discipline		non-STEM discipline			
	27.4%		72.6%			

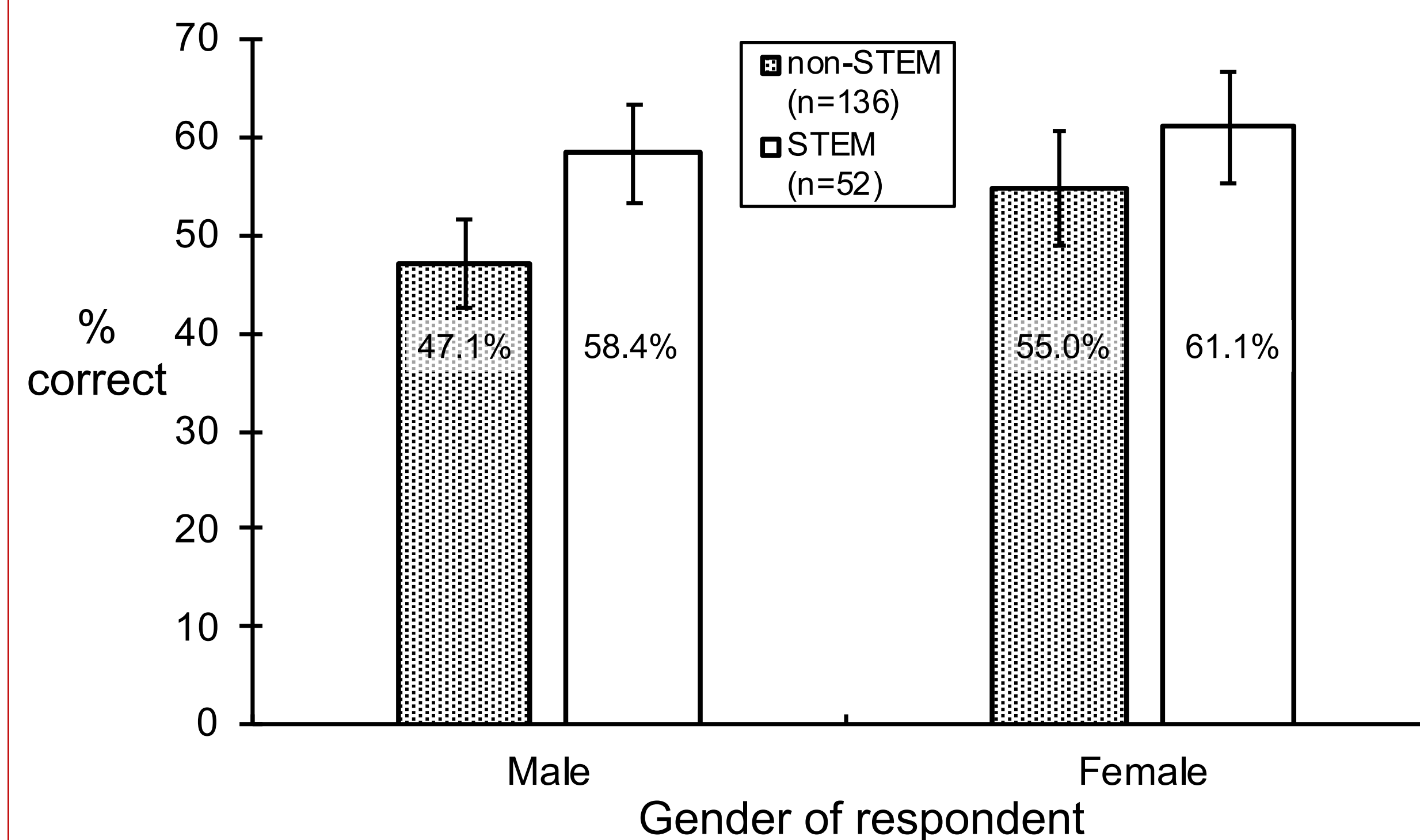


Fig. 1 – Mean response accuracy ( $\pm 1$  SE) of A-State undergraduates to survey questions concerning the biology of the SARS-CoV-2 virus, as a function of gender and field of study. Response means are similar (2-way ANOVA).

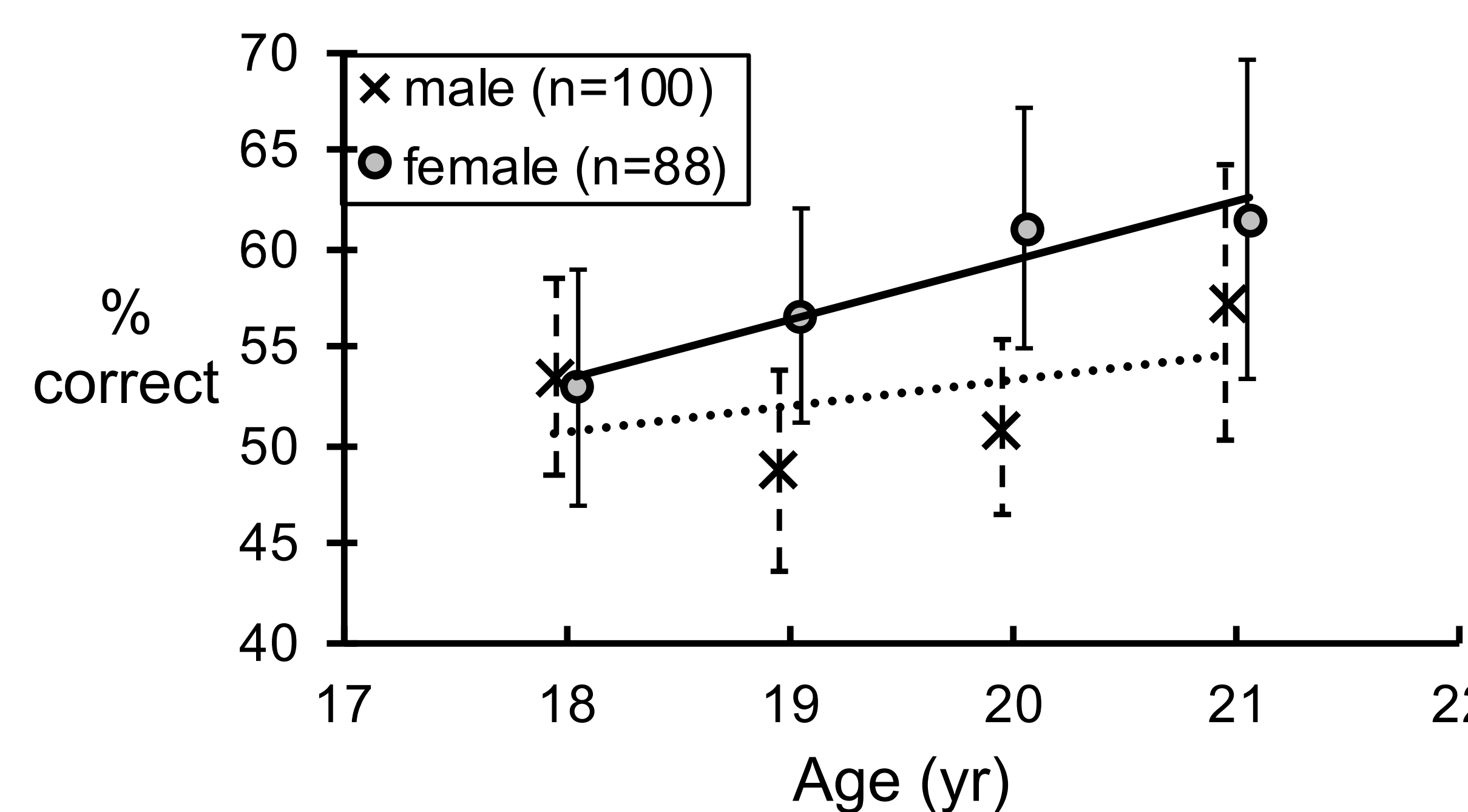


Fig. 2 – Mean response accuracy ( $\pm 1$  SE) of A-State undergraduates to survey questions concerning the biology of the SARS-CoV-2 virus, as a function of age and gender. Coefficients of correlation ( $R^2$ , based on linear regression) equal 0.22 and 0.93 for male and female participants, respectively.

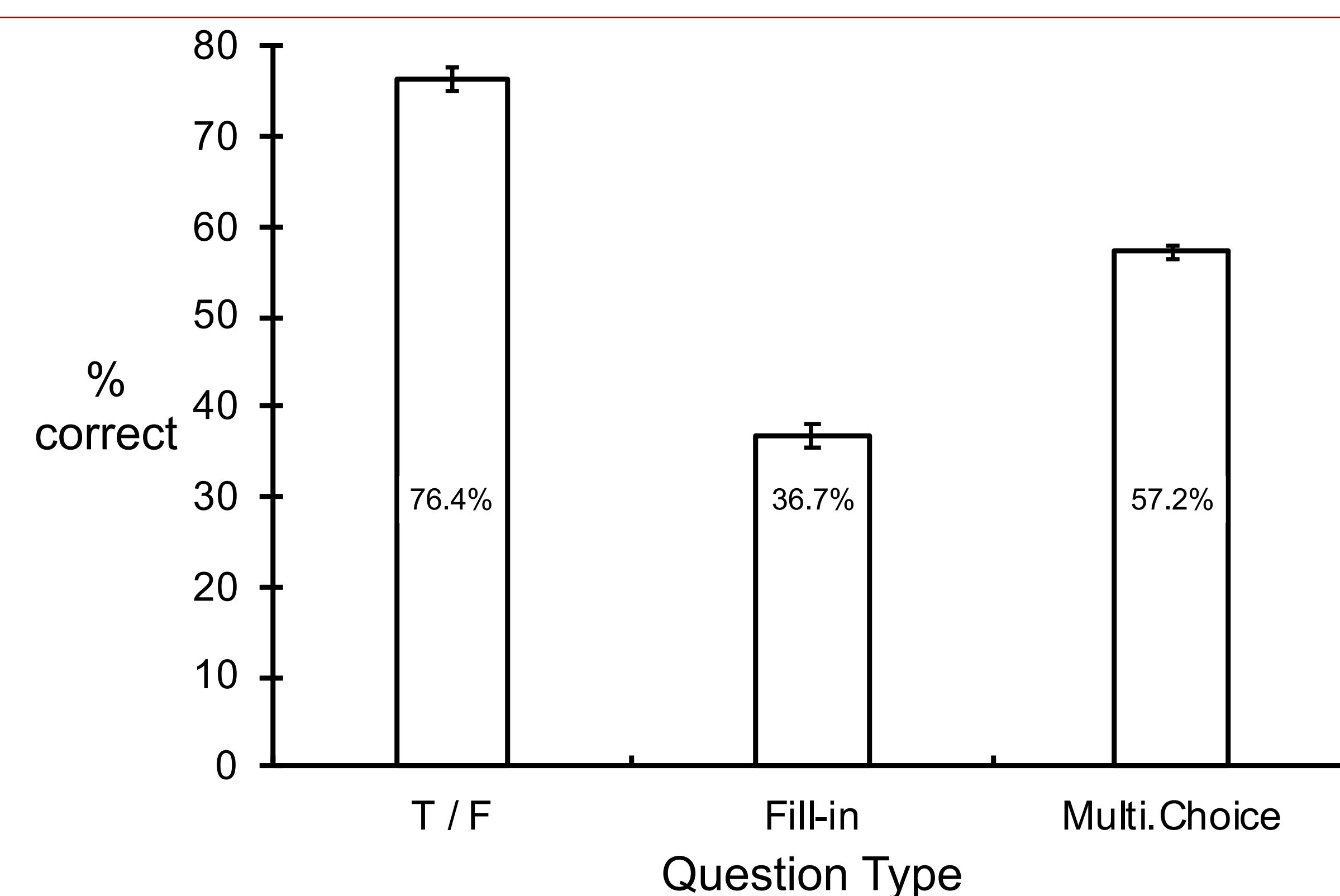


Fig. 3 – Mean response accuracy ( $\pm 1$  SE) of A-State undergraduates (n=190) to survey questions concerning the biology of the SARS-CoV-2 virus, as a function of the question type. Response means are statistically different (Kruskal-Wallis test).

### RESULTS

- The majority of respondents were underclassmen who reside in Arkansas, and represent areas of study outside the STEM disciplines (Table 1; 30 different majors were represented).
- Participants majoring in a STEM-related field tended to respond more accurately than those in non-STEM disciplines (Fig. 1;  $F = 2.72$ ,  $p = 0.11$ ).
- Overall accuracy averaged 55.4%. When compared to male participants, females tended to respond more accurately (Fig. 1;  $F = 1.00$ ,  $p = 0.32$ ), and their accuracy tended to increase with age (Fig. 2).
- Across all participants, response accuracy was the lowest when questions asking for a numerical value (Fig. 3;  $H = 19.59$ ,  $p < 0.001$ ).

### DISCUSSION

- The objective nature of scientific research means that repeatable results should not be subject to alternate explanations [1,2].
- The level of understanding among undergraduates at A-State appeared to be higher among those students having more experience, and whose major provides greater exposure to scientific reasoning.
- A person's ability to correctly understand scientific findings is often linked to quantitative aptitude, which could explain the low response accuracy for the fill-in question type [7].
- An improved understanding of the biological causes of the pandemic might change student behavior [2], such that the instructional environment at A-State can resemble what was practiced pre-pandemic.

### References

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