Excel Literacy in the Classroom and for the Future

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1. Introduction

This poster describes research that seeks to establish a baseline of Excel proficiency among undergraduates in a Principles of Economics course at a large U.S. public university. Data literacy is an important skill for the economics curriculum (Halliday 2019, Hoyt and McGoldrick 2017), and is in demand by employers of college graduates (Marshall and Underwood 2020). According to Conerly 2017 and Barreto 2015, Microsoft Excel is the most widely used program for data analysis in industry and is a recommended skill to be taught in undergraduate economics programs.

We administered an IRB approved survey in large lecture classes of Principles of Microeconomics to measure proficiency in several fundamental Excel commands. The respondents are asked to analyze MLB data using Excel functions and respond to the questions while reporting their degree of confidence for each correct answer. An image of the data and questions are shown below.

2. Overall Results

Table 1: Descriptive Statistics of Variables

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Percent Correct	468	0.476	0.287	0.000	0.286	0.714	1.000
Percent Correct Log	468	0.370	0.204	0.000	0.251	0.539	0.693
Average Confidence	468	2.459	0.683	1.000	2.143	2.857	4.000
Cumulative GPA	468	3.587	0.411	0.817	3.400	3.862	4.000
Male	468	0.421	0.494	0	0	1	1
Female	468	0.579	0.494	0	0	1	1
Asian	468	0.122	0.327	0	0	0	1
Black	468	0.038	0.193	0	0	0	1
Hispanic	468	0.083	0.277	0	0	0	1
Multiracial	468	0.049	0.216	0	0	0	1
Non-Resident Alien	468	0.030	0.171	0	0	0	1
White	468	0.677	0.468	0	0	1	1

Percent Correct and Degree of Confidence per Question

Degree of Confidence Response: 0.25–do not know; 0.50–unsure; 0.75–pretty confident; 1.00–confident
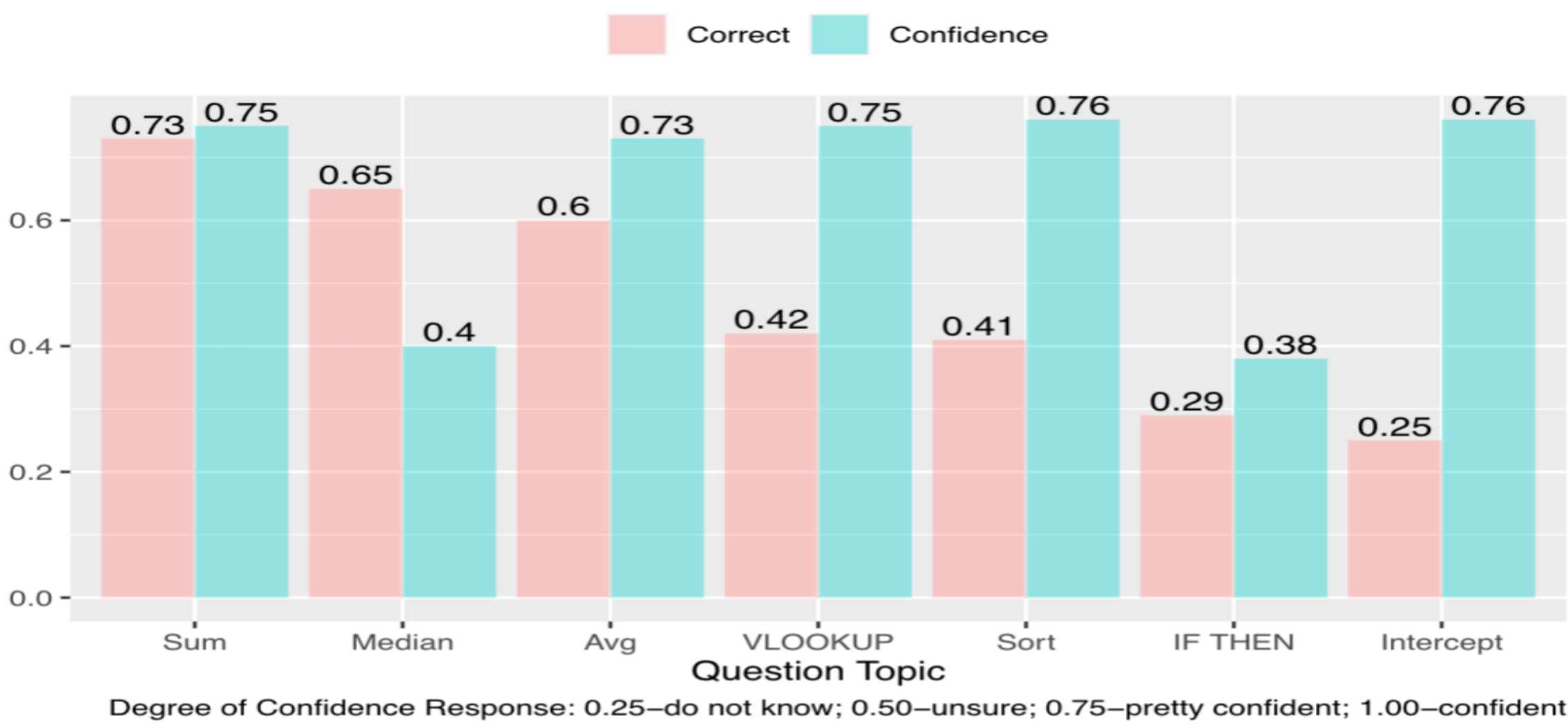
3. Heterogeneity by Gender and Ethnicity

Preliminary Results

- Findings indicate that, as expected, the percentage of correct responses decline significantly from the relatively simple Excel function of SUM to the more complex REGRESSION function. The results suggest significant gender differences in percentage correct and degree of confidence. The output also suggests significant heterogeneity among ethnic groups.

Violins of Gender Heterogeneity

Bar Graph of Gender Heterogeneity

Violins of Ethnicity Heterogeneity
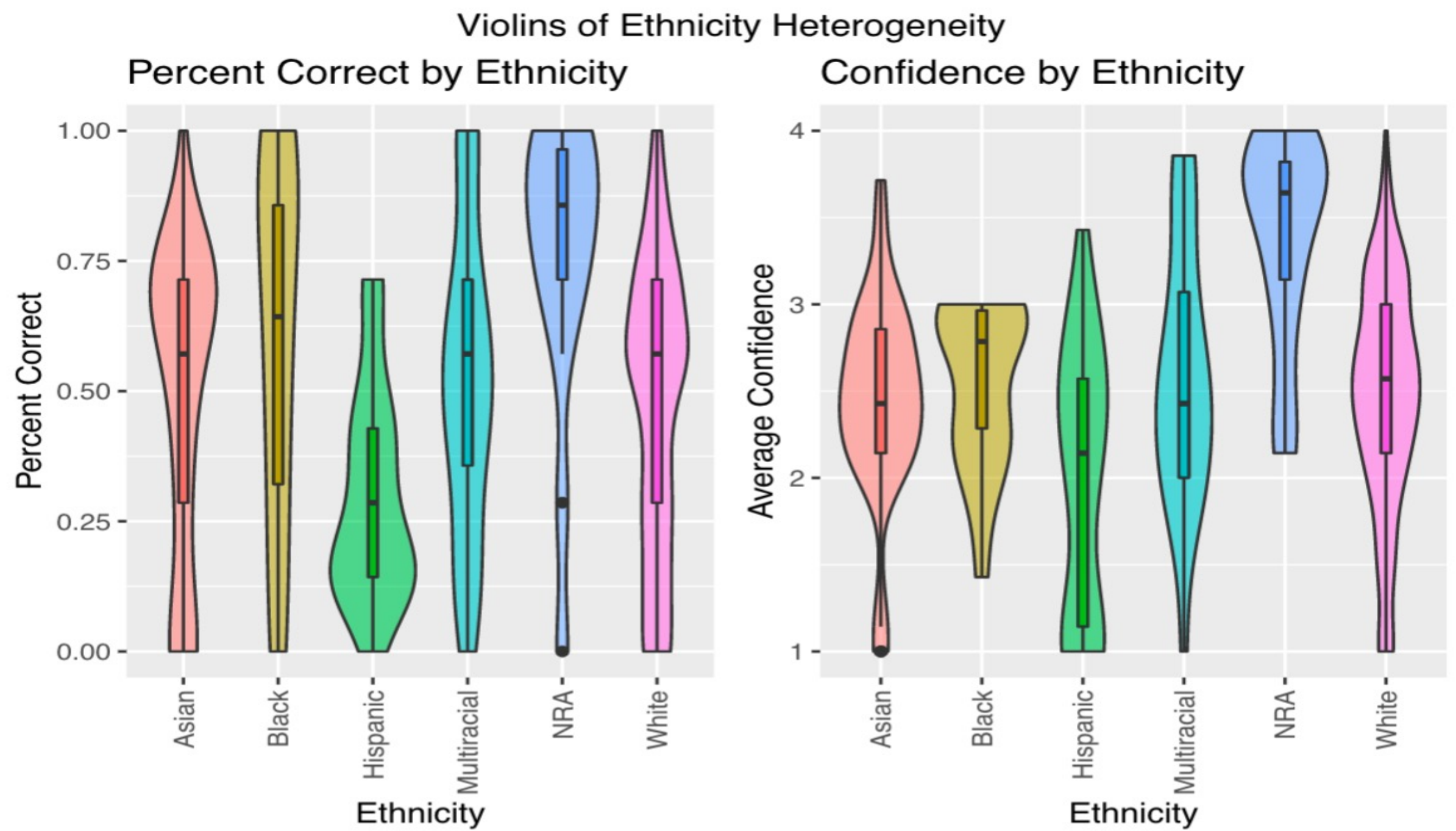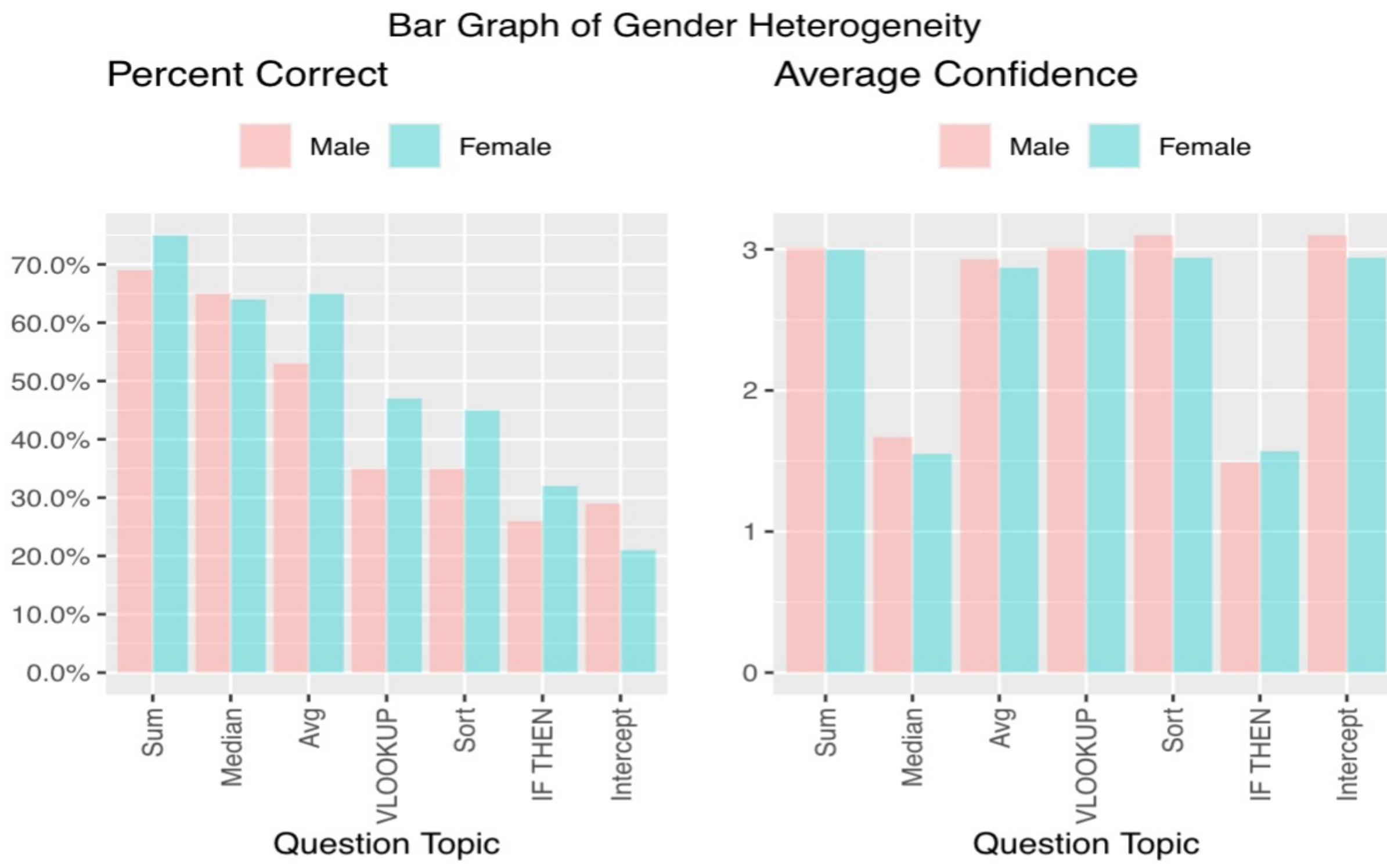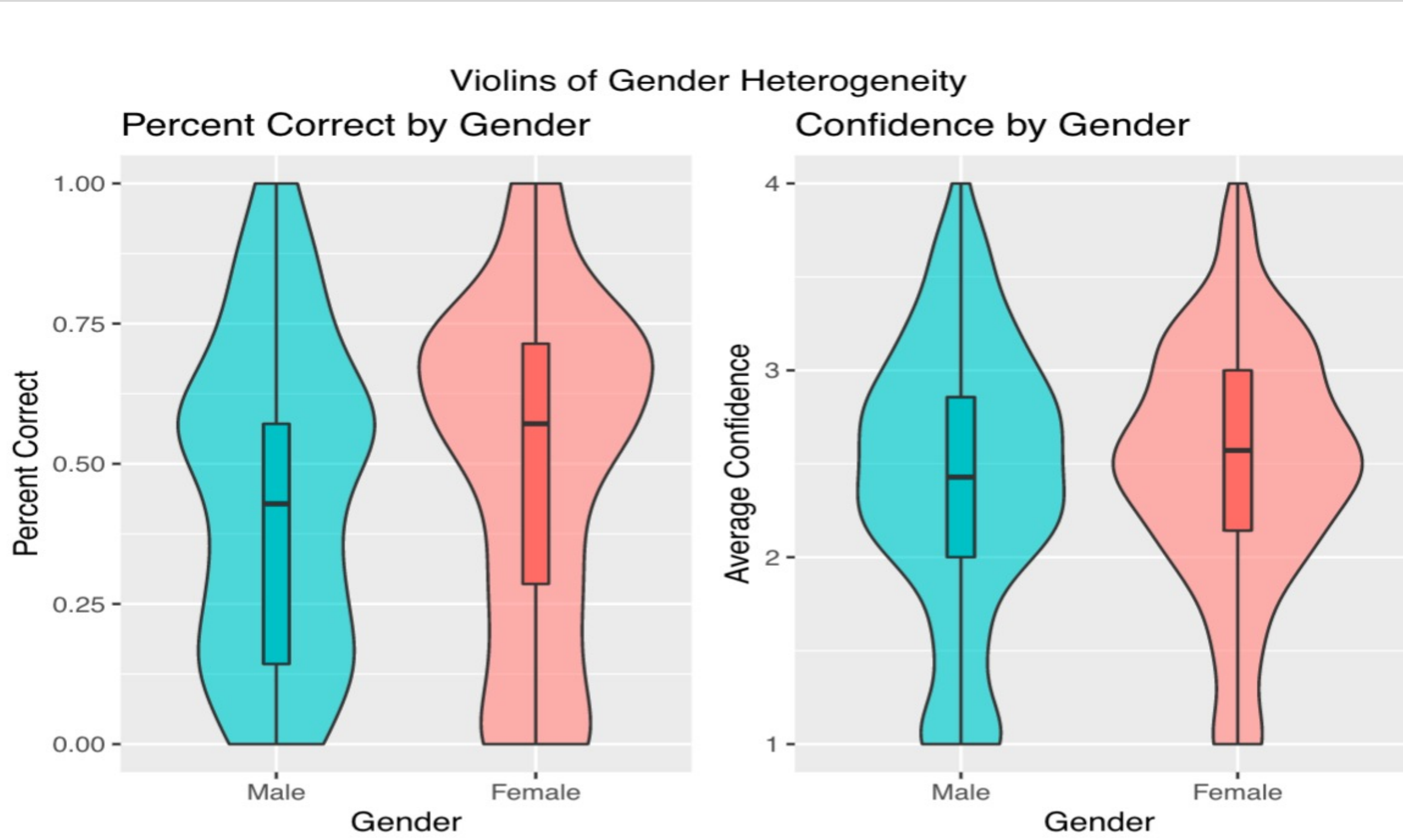
4. Regression Results

- All Ethnic groups are compared against the Asian group, which was dropped to avoid multicollinearity. Similarly, students reporting self confidence of one are the baseline for comparison of confidence factors.

Table 2: Regression of Correct Percent Log on Covariates

	Dependent variable:
	Percent Correct Log
Cumulative GPA	0.075***
	(0.018)
Male	−0.013
	(0.015)
Black	0.090**
	(0.043)
Latino	−0.043
	(0.033)
NRA	0.028
	(0.050)
Multiracial	0.0004
	(0.038)
White	−0.015
	(0.022)
Confidence 2	0.212***
	(0.025)
Confidence 3	0.361***
	(0.025)
Confidence 4	0.491***
	(0.041)
Intercept	−0.155**
	(0.073)
Observations	468
R^2	0.445
Adjusted R^2	0.433
Residual Std. Error	0.154 (df = 457)
F Statistic	36.651*** (df = 10; 457)
Note:	*p<0.1; **p<0.05; ***p<0.01

Future Research

- Future research plans include developing homework exercises for Principles of Microeconomics where students reinforce learning the fundamental economic concepts by analyzing data with Excel. Then using a randomized experimental design, and administering a pre/post-survey, investigate their effectiveness of promoting Excel and data literacy. We will also explore a multinomial logit model to better understand the determinants of factors influencing each degree of confidence selected. An LPM model will also be examined to evaluate covariate probabilities of a correct response.

5. References

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