

week_4_lab

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2/23/2022

Question 1

It is important to randomize the teachers in addition to the students because teachers could have significant impacts on the results of the study. For example, if we didn't randomize teachers and good teachers happened to be more likely to teach small classes than bad teachers, then we would get a result that tells us small classes produce better results than large classes, but the driving force behind that finding would be teacher quality and not class size.

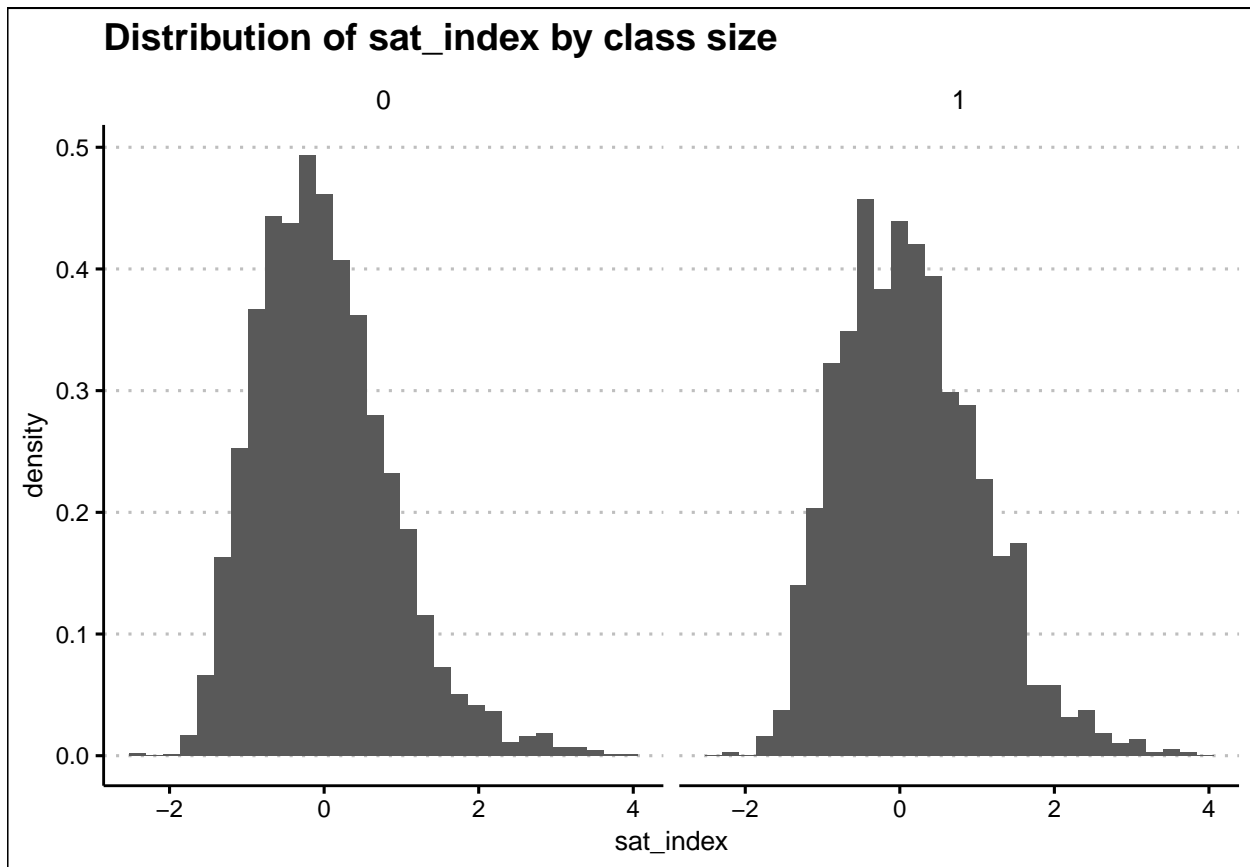
Question 2

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## 'summarise()' ungrouping output (override with '.groups' argument)
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small	avg_class
0	22.52320
1	15.09576

The average class sizes are shown in the table above. As expected, class sizes are smaller in the classes assigned to be small than in the classes assigned to be large.

Question 3



The histograms look very similar to each other. The treatment group histogram may be shifted slightly to the right, but it is difficult to tell.

Question 4

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## 'summarise()' regrouping output by 'teacher_id', 'small', 'school_id', 'teacher_masters', 'teacher_w
```

% Table created by stargazer v.5.2.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvard.edu
 % Date and time: Mon, Feb 28, 2022 - 15:21:30

	<i>Dependent variable:</i>			
	teacher_experience	teacher_masters	teacher_white	teacher_black
	(1)	(2)	(3)	(4)
small	-0.411 (0.665)	-0.041 (0.054)	0.043 (0.042)	-0.038 (0.041)
Constant	9.434*** (0.416)	0.364*** (0.034)	0.823*** (0.026)	0.172*** (0.026)
Observations	325	325	325	325
R ²	0.001	0.002	0.003	0.003
Adjusted R ²	-0.002	-0.001	0.0002	-0.001
Residual Std. Error (df = 323)	5.849	0.477	0.367	0.364
F Statistic (df = 1; 323)	0.382	0.565	1.057	0.835

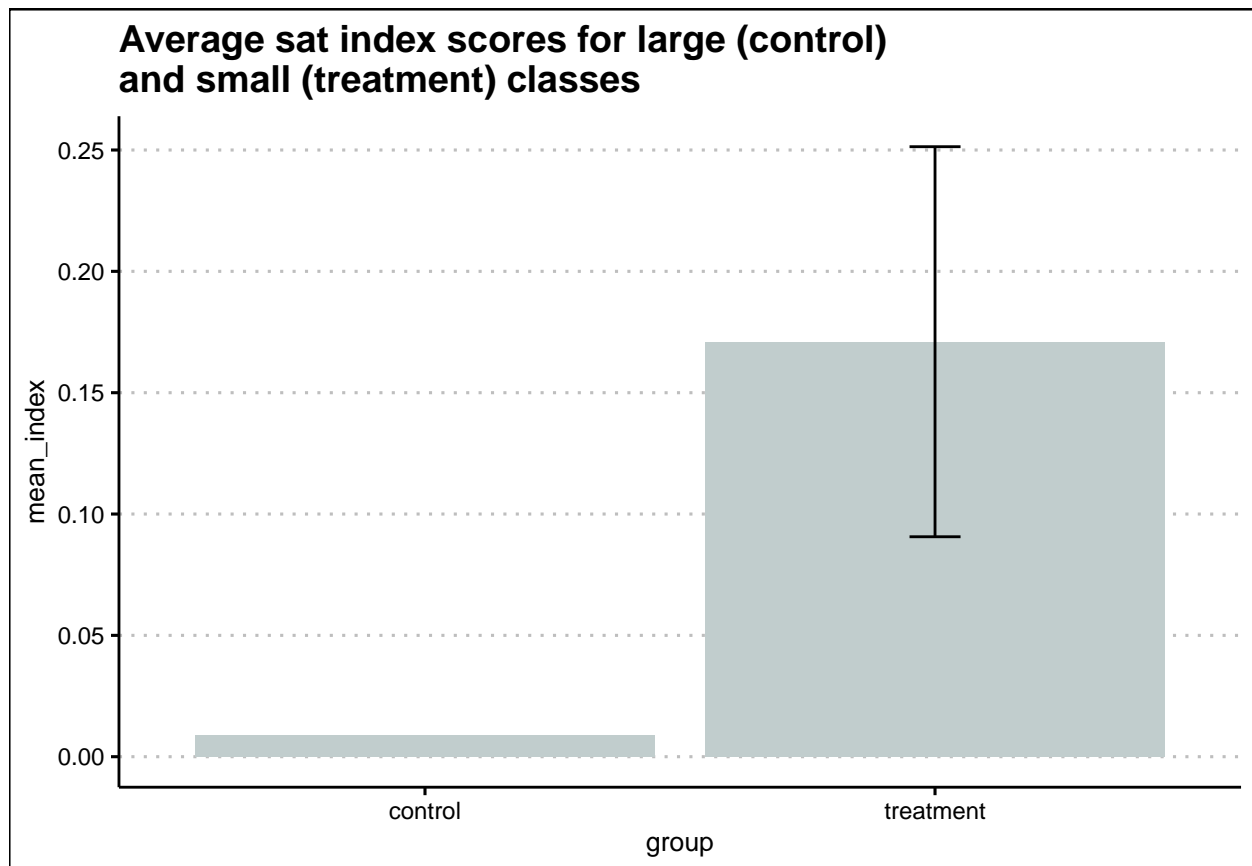
Note:

*p<0.1; **p<0.05; ***p<0.01

- teacher_experience: The standard error for the small coefficient = .6649. $1.96 \times .6649 = 1.303$. The resulting 95% confidence interval of the coefficient = -0.4107 ± 1.303 . Or $[-1.7137, .8923]$.
- teacher_masters: The standard error for the small coefficient = .05426. $1.96 \times .05426 = .1063$. The resulting 95% confidence interval for the coefficient = $-0.0408 \pm .1063$. Or $[-.1471, .06554]$
- teacher_white: the small standard error = .04174. The small coefficient = .04291. The 95% confidence interval = $.04291 \pm 1.96 \times .04174$ or $[-.0389, .1247]$
- teacher_black: the small standard error = .04143. The small coefficient = -.03786. The 95% CI = $-.0376 \pm 1.96 \times .04143$ or $[-.119, .0433]$
- The differences in teacher characteristics in small vs. large class sizes are not statistically significant for any of the characteristics we looked at above. This means that statistically the randomization was successful in balancing teacher characteristics. From the practical standard, the values for teacher_experience do not seem practically significant because they refer to a difference of about 1 year which doesn't seem like a lot. The teacher masters seems to be more practically significant, as the lower bound of the confidence interval implies about a 15% difference between the two groups of teachers. Both the teacher_white and teacher_black results also seem a bit practically significant because the greatest bounds of the confidence intervals suggest a 12.5% and 11.9% difference in groups, respectively. However, overall these differences do not seem overly troubling to me and I think we still have comparable teacher groups.

Question 5

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## 'summarise()' ungrouping output (override with '.groups' argument)
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- The coefficient estimate for small = .162. The SE = .041. The 95% CI = [.082, .224]. This value is statistically significant. This means that on average, small classes had average sat_index scores .162 higher than not small classes, holding all else constant. The standard deviation for the average sat_index in the data set = .5. Our estimate is within this one standard deviation, so it does not seem very practically significant to me.