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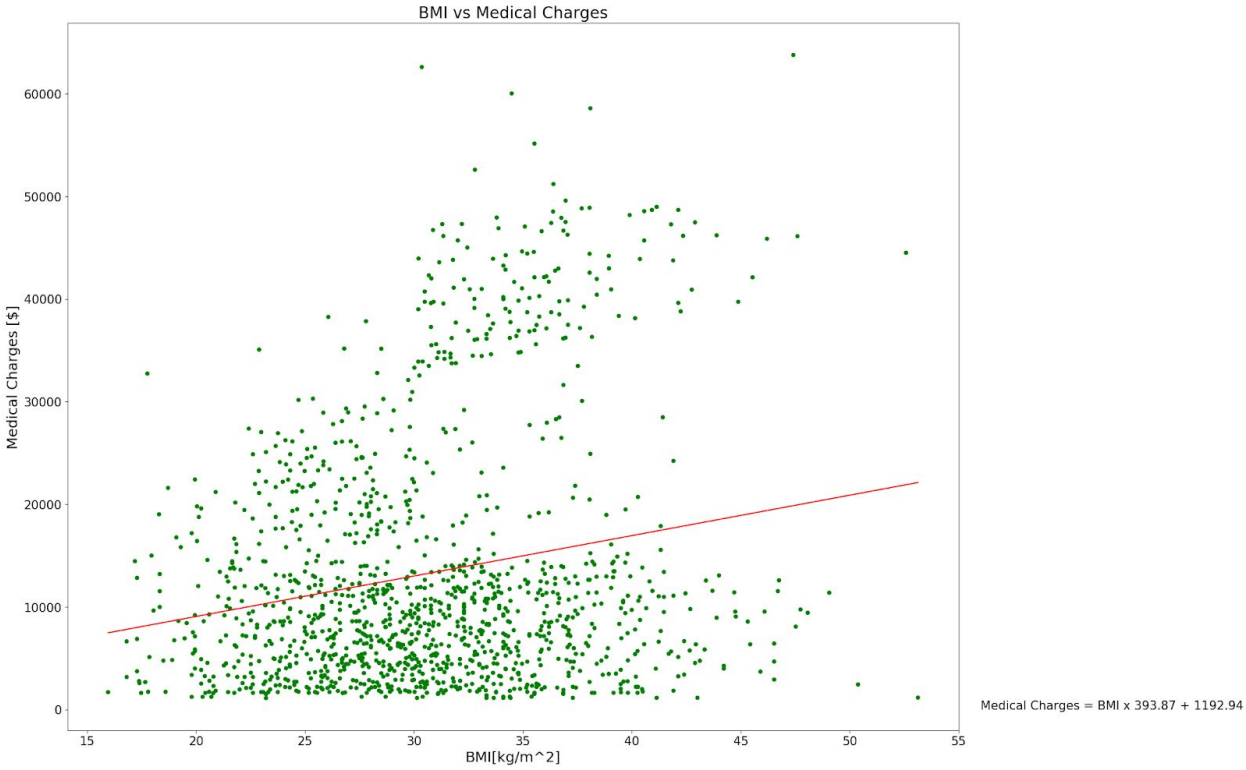
Professor Donoghue
STAT1010
Data Analysis and Main Hypothesis Tests
12/23/20

Appendix

Test 1 (Grade)

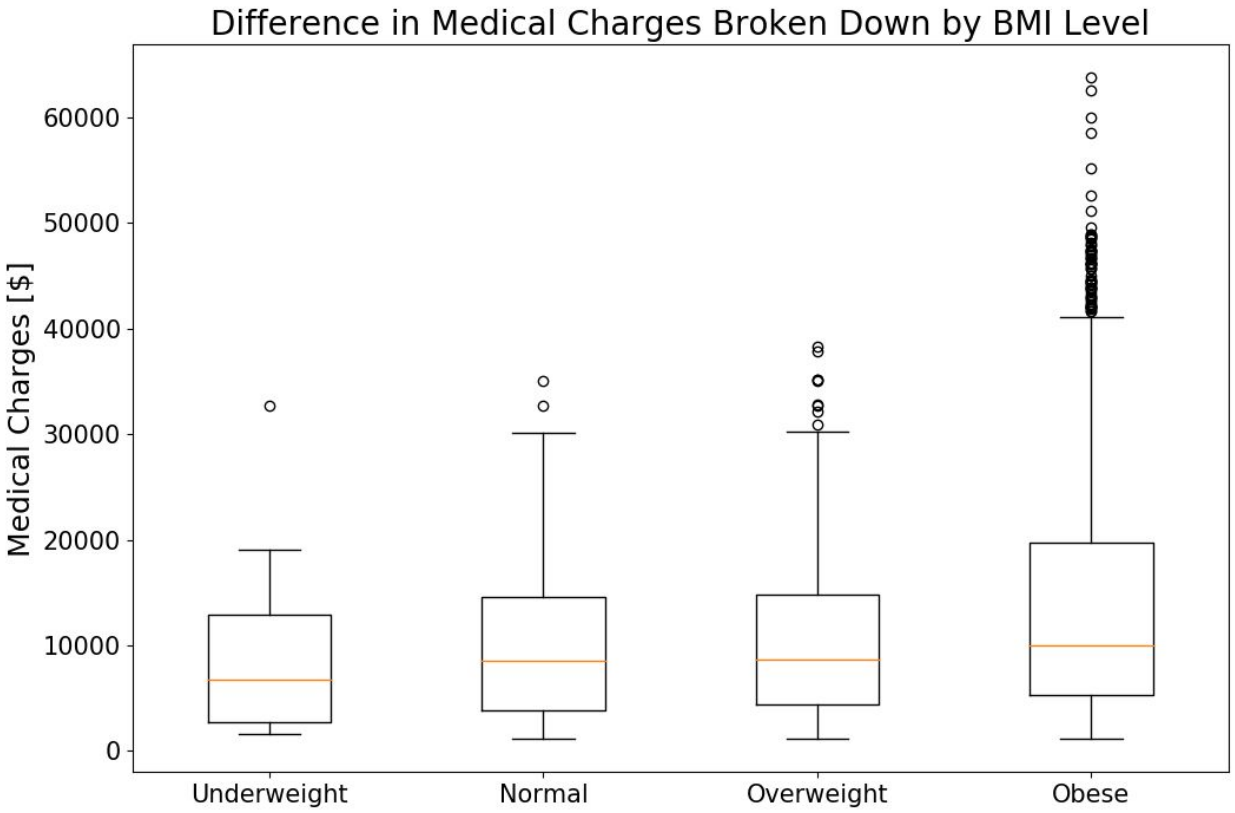
H_O: A higher BMI does not lead to more insurance payments
H_A: A higher BMI does lead to higher insurance payments.



A moderate significant relation was found between BMI and medical charges, r(1336) = .2, p = 2.5E-13. Furthermore, A simple linear regression was calculated to predict income based on BMI. A significant regression was found (F(1,1336)= 54.71, p <.0001), with R^2 of .039. Subjects' predicted medical charges are equal to 393.87 [BMI] + 1192.94 dollars when BMI is measured in kg/m^2. The medical charges are increased by 393.87 (95% CI = 289.41, 498.34])

dollars for each kg/m^2 of BMI. The model is significant but cannot account for much of the variability as the p-value is lower than .001 but R-squared is lower than 50%.

Test 2 (Grade)



The medical charges of the obese tier, overweight tier, normal tier, and underweight tier were compared. When the underweight tier (M = 8852.2, SD = 7735.04) was compared with the obese tier (M = 15560.92, SD = 14563.06), there was a significant difference of $6708.73 (95% CI = [3234.29, 10183.16]; t(723) = 3.7, p = 1E-12. Likewise, when the medical charges of the obese tier (M = 15560.92, SD = 14563.06) were compared with the medical charges of the normal tier (M = 10282.44, SD = 14563.06) , there was a significant difference of $5278.70 (95% CI = [3851.38, 6706.01]. Lastly, when the medical charges of the obese tier (M = 8852.2,

SD = 7735.04) were compared with medical charges of the overweight tier (M =10713.67, SD = 7843.54),there was a significant difference of $4874.26 (95% CI = [3611.15, 6083.87]); t(1334) = 7.68, p = 3.5E-14.

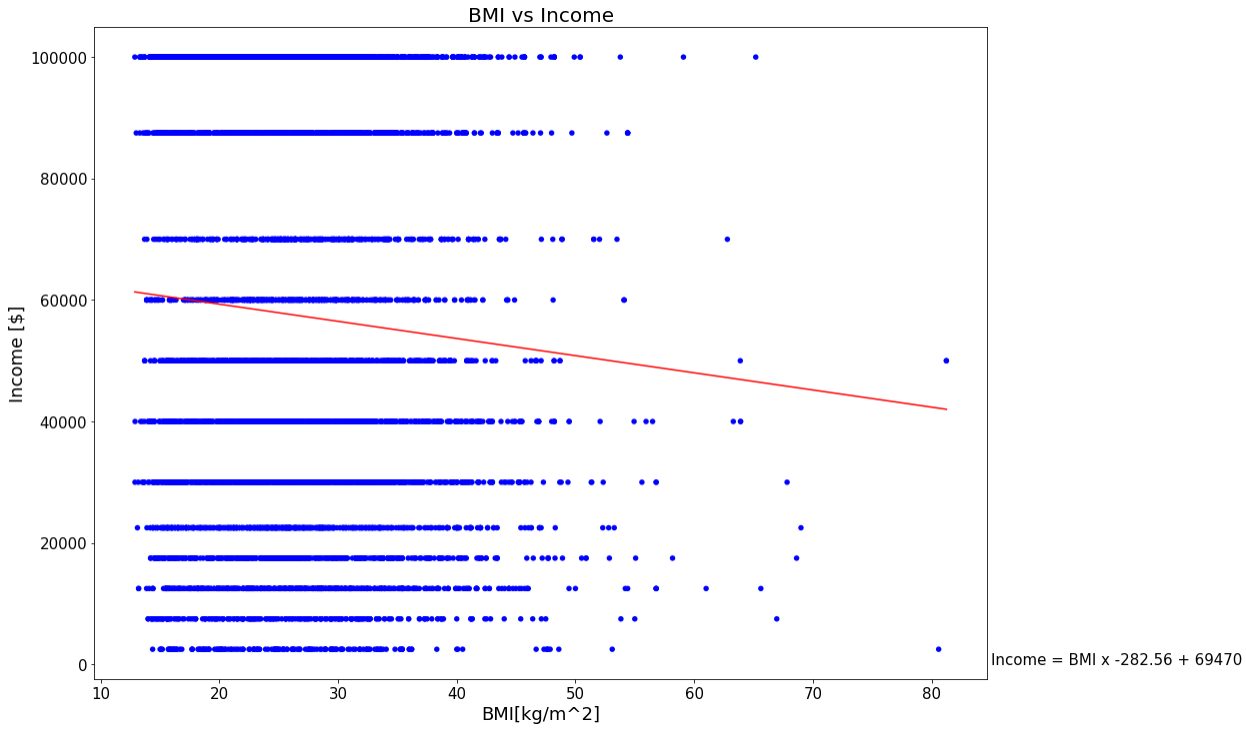
Test 3 (do not grade)

H_O: A higher BMI does not reduce income.
H_A: A higher BMI does reduce income.

Dep. Variable:	HHIncomeMid	**R-squared:**	0.004
Model:	OLS	**Adj. R-squared:**	0.004
Method:	Least Squares	**F-statistic:**	35.89
Date:	Wed, 23 Dec 2020	**Prob (F-statistic):**	2.17e-09
Time:	05:41:20	**Log-Likelihood:**	-1.0464e+05
No. Observations:	8852	**AIC:**	2.093e+05
Df Residuals:	8850	**BIC:**	2.093e+05
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
const	6.497e+04	1306.712	49.719	0.000	6.24e+04	6.75e+04
x1	-282.5644	47.169	-5.990	0.000	-375.026	-190.102

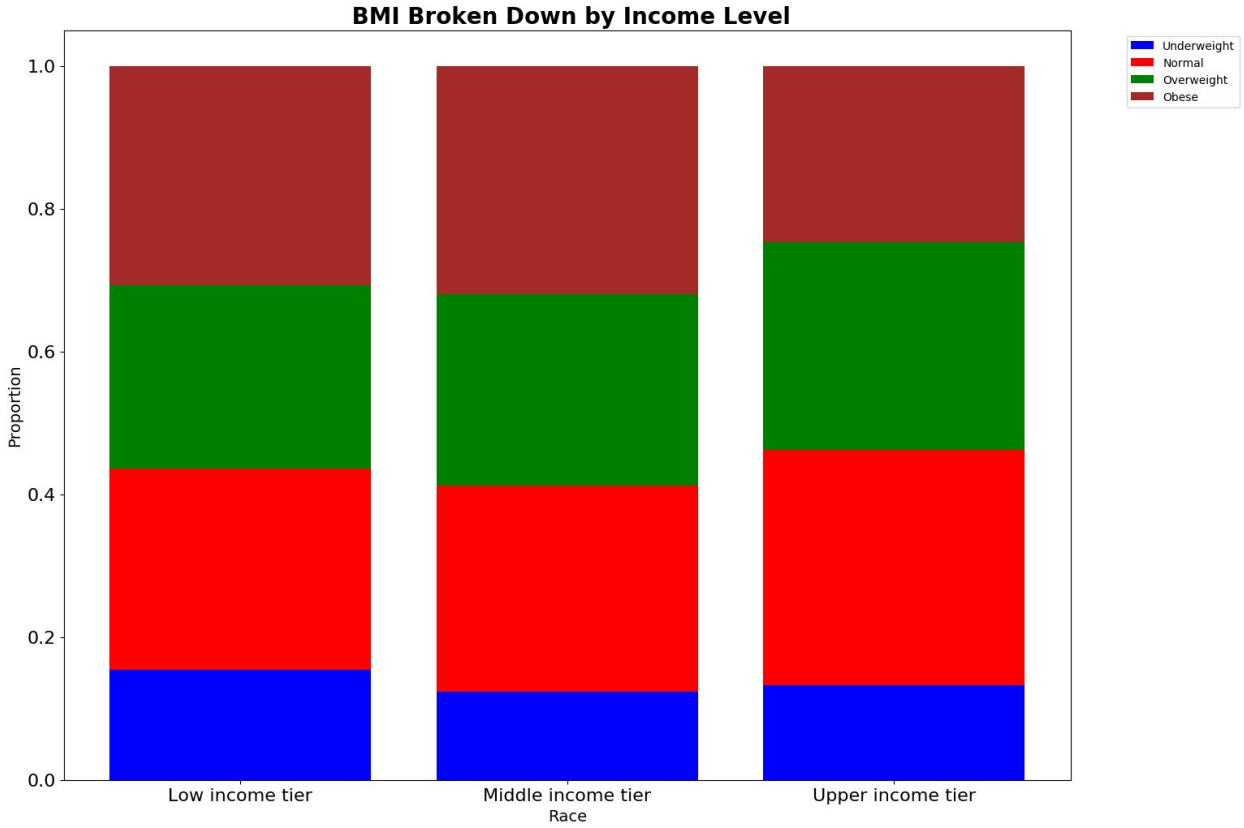
Omnibus:	59984.257	**Durbin-Watson:**	1.335
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	794.376
Skew:	0.019	**Prob(JB):**	3.19e-173
Kurtosis:	1.533	**Cond. No.**	104.



A simple linear regression was calculated to predict income based on BMI. A significant regression was found (f(1,8850)= 35.89, p <.0001), with R^2 of 0.004. Subjects' predicted income is equal to 69470 - 282.56 [BMI] dollars when BMI is measured in kg/m^2. Income is decreased by -282.56 (95% CI = -375.026, -190.102]) dollars for each kg/m^2 of BMI. The model is significant but cannot account for much of the variability as the p-value is lower than 0.05 but R-squared is lower than 50%.

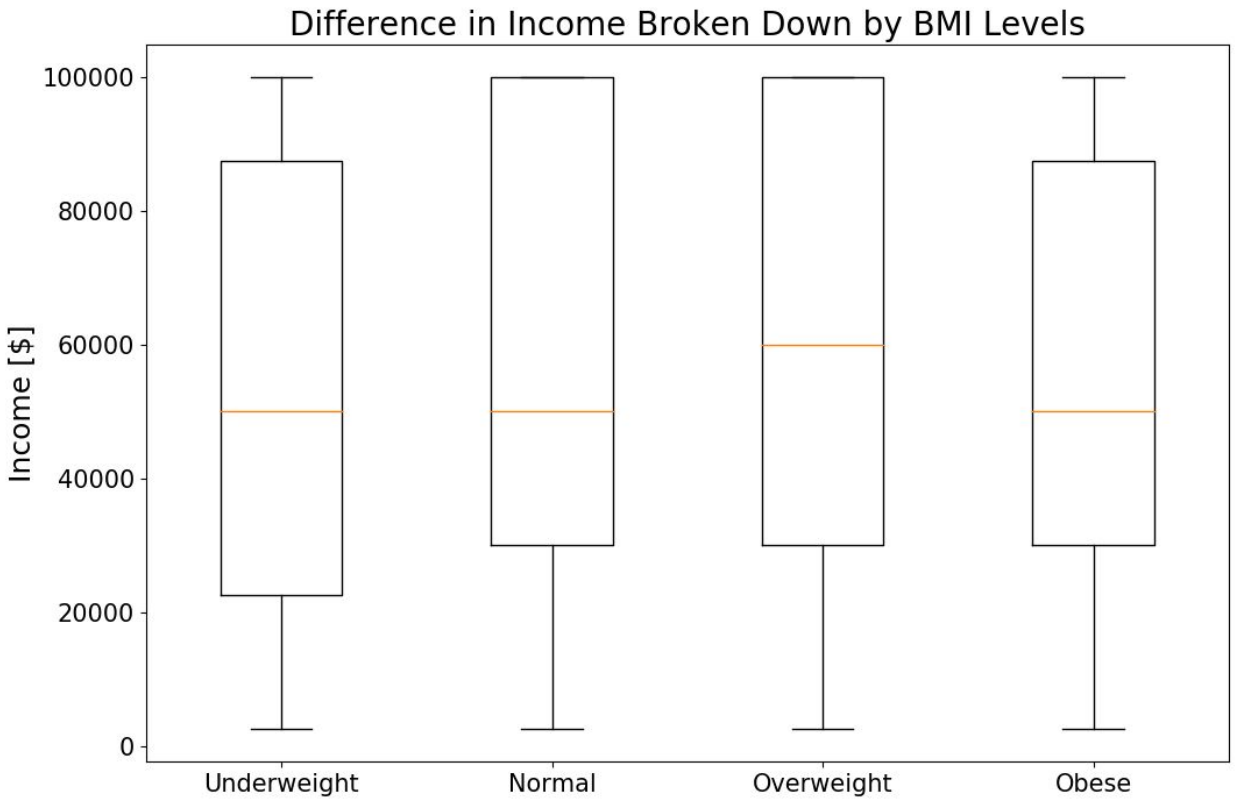
Test 4 (Grade)

H_O: BMI is not associated with income
H_A: BMI is associated with income.



A chi-square test of independence was performed to examine the relation between BMI and income. The relation between these variables was significant, X^2 (6, N = 8852) = 62.81, p = 1.2E-11. Of all income tiers, middle income had the highest proportion of obese individuals. The largest diffrence in the proportion of obese individuals was between the middle income tier and the high income tier with a value of 0.109 (95% CI = [0.087, 0.131]). By contrast, the smallest difference in the proportion of obese individuals was between the low income tier and the middle income tier with a value of 0.049 (95% CI = [0.023, 0.075]).

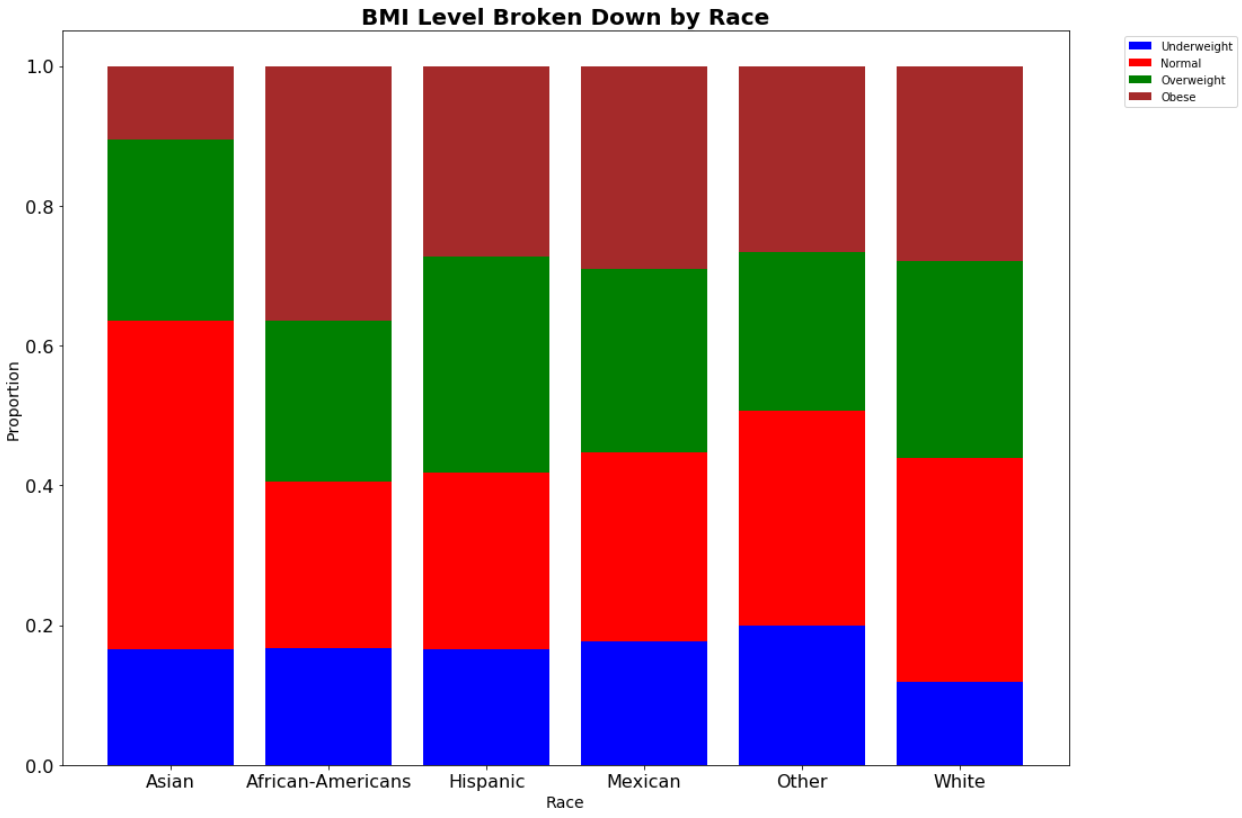
Test 5 (Grade)



The income of the obese tier, overweight tier, normal tier, and underweight tier were compared. When the income of the underweight tier (M = 55468.35, SD = 33849.2) was compared with the obese tier (M = 53761.24, SD = 31982.27), there was a statistically insignificant difference of $1707.11 (95% CI = [-583.61, 3997.84]; t(3740) = 1,46, p = 0.14. By contrast, when the average income of the normal tier (M = 58394.25 , SD = 33472.65) was compared with the medical charges of the obese tier (M = 53761.24, SD = 31982.27), there was a significant difference of $4633 (95% CI = [3004.66, 6261.35]; t(6413) = 5.58, p = 2.6E-8. Likewise, when the average income of the overweight tier (M =58903.26, SD = 33472.64) was compared with medical charges of the obese tier (M = 53761.24, SD = 31982.27), there was a significant difference of $5142.02 (95% CI = [3654.17, 6629.87]); t(8835) = 6.77, p =1.4E-11. This evidence implies that there is no decrease in salary due to an increase BMI, as the difference in salary between the overweight and obese toers was large and the oerweight tier had the largest median salary.

Test 6 (Grade)

H_O: Obesity is not Associated with race
H_A: Obesity is associated with race



A chi-square test of independence was performed to examine the relation between race and obesity. The relation between these variables was significant, X^2 (15, N = 9634) = 115.6, p = 1.4E-17. Of all races, African-Americans were more likely to be obese, The biggest difference in porpotion of obese individuals was between African Americans and Asians with a value of 0.26 (95% CI = [0.21, 0.31]). Contrastingly, the smallest diffrence in the proportion of obese

individuals was between African-Americans and Mexicans since the difference in proportion was 0.07 (95% CI = [0.02, 0.13]).