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Analysis of Maternal Smoking

The question the following data attempts to answer whether or not maternal smoking is associated with infant birth weight. We let the alternative hypothesis mean that maternal smoking is associated with birth weight (true difference in means is not equal to 0) and the null hypothesis mean that maternal smoking is not associated with birth weight (the mean is equal to 0) . After running a t-test on the 99%, 95%, and 90% levels it yielded the results below. We also calculated the means, standard errors, and 95% confidence level along with the differences below as well.

P_Value	estimate	estimate1	estimate2	statistic	p.value	parameter	conf.low	conf.high	method	alternative
***p>.01	9.599201	123.2848	113.6856	8.258703	6.109022e-16	796.4435	9.584629	9.613774	Welch Two Sample t-test	two.sided
**p>.05	9.599201	123.2848	113.6856	8.258703	6.109022e-16	796.4435	7.317642	11.880761	Welch Two Sample t-test	two.sided
*p>.1	9.599201	123.2848	113.6856	8.258703	6.109022e-16	796.4435	9.453097	9.745306	Welch Two Sample t-test	two.sided

	Mean	Standard Error	Confidence Interval (95%)
Non Smoker	123.284768211921	0.705612249686545	[121.901768202535,124.667768221306]
Smoker	113.685567010309	0.923625314056223	[111.875261394759,115.495872625859]
Difference	9.59920120161125	1.16231336896431	[7.32106699844121,11.8773354047813]

With a p-value of 6.109022e-16, we can reject the null hypothesis on all three levels since the p-value is less than .1, .05, and .01. Therefore, the data is significant enough where we can say that non smoking mothers' and smoking mothers' children's birth weights are different.

In order to determine if the effect is causal, we have to consider the omitted variable bias. If we had omitted variables, we could better prove or disprove the prior conclusion further. The mother's health, eating, drinking, and working habits/routines could also influence the birth

weights of their children but were not considered in this analysis. Thus, we can say that there is some sort of correlation but we cannot say with certainty that there is a causal relationship.