IS 606 Presentation

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OpenIntro Statistics

Problem 7.41

7.41   Murders and poverty, Part II. Exercise **??** presents regression output from
for predicting annual murders per million from percentage living in poverty based on a
sample of 20 metropolitan areas. The model output is also provided below.

	Estimate	Std. Error	t value	$\Pr(>|t|)$
(Intercept)	-29.901	7.789	-3.839	0.001
poverty%	2.559	0.390	6.562	0.000
$s = 5.512$	$R^2 = 70.52\%$		$R^2_{adj} = 68.89\%$	

(a) What are the hypotheses for evaluating whether poverty percentage is a significant
     of murder rate?
(b) State the conclusion of the hypothesis test from part (a) in context of the data.
(c) Calculate a 95% confidence interval for the slope of poverty percentage, and inter
     context of the data.
(d) Do your results from the hypothesis test and the confidence interval agree? Explain.
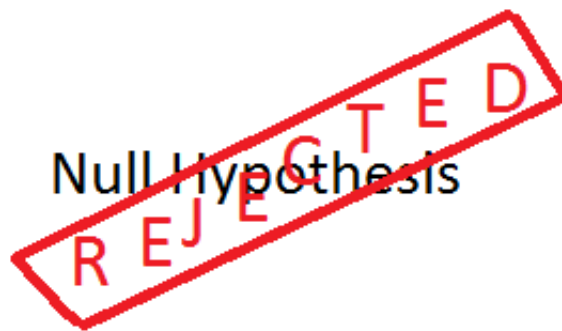
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The Hypotheses

$$H_0 \quad : \quad \beta_1 \quad = \quad 0$$

Poverty percentage is not a significant predictor of murder rate.

$$H_A \quad : \quad \beta_1 \quad > \quad 0$$

Poverty percentage is a significant predictor of murder rate.

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The Conclusion

From the data presented in the table we saw that the p value for the slope estimate was 0.000. This low value leads to…

This data provides convincing evidence that poverty percentage is a significant predictor of murder rate.

95% CI for slope of poverty percentage

Since the null hypothesis is rejected, we cannot use the t value from the computed statistics.

Sample Size n = 20

df = n - 2 = 18

For a one-tailed t-test with 95% confidence we use the one tail value of 1 - 0.05/2 = 0.975

Use the function qt to get the critical value under the t distribution

```
t <- qt(0.975, 18)
t
```

```
## [1] 2.100922
```

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Confidence Interval

ce interval calculation and the

ot contain 0!

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