Using a logarithmic transformation in regression

Supplementary lecture

In the lab session in Week 9 we transformed mother's current height using the natural logarithm, ln().

Here we use this in a regression.

Regression mother's weight, log transformed, on number of units of alcohol per week.

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Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.160	.010		400.497	.000	4.140	4.180
	Units of alcohol in average week	.003	.001	.076	1.979	.048	.000	.005

Dependent Variable: lnwtnwkg1

	Unstandardized Coefficients		Sig.	95.0% Confidence Interval for B	
	B	Std. Error		Lower Bound	Upper Bound
(Constant)	4.160	.010	.000	4.140	4.180
Units of alcohol in average week	.003	.001	.048	.000	.005

Regression mother's weight, log transformed, on number of units of alcohol per week.

	Unstandardized Coefficients		Sig.	95.0% Confidence Interval for B	
	B	Std. Error		Lower Bound	Upper Bound
(Constant)	4.160	.010	.000	4.140	4.180
Units of alcohol in average week	.00270	.00137	.048	.000021	.00539

$\text{Log}_e(\text{weight}) = 4.160 + 0.00270 \times \text{units of alcohol}$

95% CI: 0.000021 to 0.00539

What does this tell us about weight?

Regression mother's weight, log transformed, on number of units of alcohol per week.

$\text{Log}_e(\text{weight}) = 4.160 + 0.00270 \times \text{units of alcohol}$

95% CI: 0.000021 to 0.00539

What does this tell us about weight?

Antilog:

$\text{weight} = 64.071523 \times 1.00270^{\text{units of alcohol}}$

95% CI: 1.00002 to 1.00540

Weight is multiplied by 1.00270 for every unit of alcohol consumed per week.

E.g. 5 units alcohol per week multiplies weight by $1.00270^5 = 1.01357$.

20 units alcohol multiplies weight by $1.00270^{20} = 1.0554$.

Regression mother's weight, log transformed, on number of units of alcohol per week.

20 units alcohol multiplies weight by $1.00270^{20} = 1.0554$.