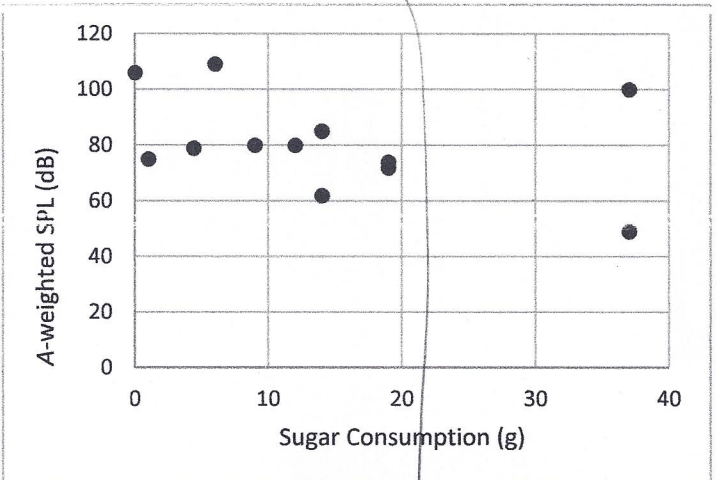*Concerned scientists* have long speculated that there is a *correlation* between the A-weighted sound pressure level in decibels emitted by my maniacal children (y) and the number of grams of sugar they have ingested at snack time (x). Data was collected over the course of twelve randomized snack times and is presented below. Test the following hypotheses on the correlation coefficient between sound pressure level and sugar consumption using the fixed significance level approach at $\alpha = 0.05$.

$H_0: \rho = 0$
$H_1: \rho \neq 0$

What does your conclusion suggest in terms of the original problem?

Sugar Consumption (g) [x]	SPL (dB) [y]
14	85
37	49
0	106
4.4	79
19	72
14	62
9	80
1	75
12	80
19	74
6	109
37	100

(+1) $\begin{cases} \sum y_i = 971 \\ \sum x_i = 172.4 \end{cases}$ $\begin{cases} \bar{y} = 80.92 \\ \bar{x} = 14.37 \end{cases}$ (+1)

Insufficient evidence to suggest there is a correlation! (+1)

(+1) $\begin{cases} \sum y_i^2 = 81913 \\ \sum x_i^2 = 4133 \end{cases}$

$S_{xy} = 13101.6 - \dfrac{971 \cdot 172.4}{12} = -848.4$ (+1)

$S_{xx} = 4133 - \dfrac{172.4^2}{12} = 1656$ (+1)

(+1) $\sum x_i y_i = 13101.6$

$\hat{\beta}_1 = \dfrac{-848.4}{1656} = -0.5123$ (+1)

$SS_T = 81913 - 12 \cdot 80.92^2 = 3336$ (+1)

$SS_E = 3336 - (-0.5123) \cdot 848.4 = 2902$ (+1)

$R^2 = 1 - \dfrac{2902}{3336} = 0.1301$ (+1)

$t_{\alpha/2, n-2} = t_{.025, 10}$
$= 2.228$ (+1)

$\therefore t_0 = \dfrac{\sqrt{.1301}\sqrt{10}}{\sqrt{1 - .1301}} = 1.223$ (+1)

$t_0 \not> t_{.025, 10}$

$\therefore$ fail to reject H_0 (+1)

Why is this a *correlation* problem and not *regression*? How would you conduct this experiment as a regression analysis?

both x and y are random variables (+1)

Would need to dose kids with pre-determined amount of sugar (control/x variable) and measure SPL (response/y-variable)

(+2)