

Experimental Design and Data Analysis: Assignment 6

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Exercise 1

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Exercise 2

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The data contained in *psi.txt* was read in, the following figures were obtained.

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Fitting a logistic regression model with *psi* and *gpa* as explanatory variables for the outcome being that the student passed their assessment or not, we obtain the following table:

Coefficients:							
	Estimate	Std. Error	z	value	Pr(> z)		
(Intercept)	-11.602	4.213	-2.754	0.00589	**		
psi	2.338	1.041	2.246	0.02470	*		
gpa	3.063	1.223	2.505	0.01224	*		
<hr/>							
Signif. codes:							
0	***	0.001	**	0.01	*	0.05	. 0.1 1

Figure 1: Parameter estimation for logistic regression model

Thus we determine that our logistic regression model should be:

$$\frac{Pr(pass = 1)}{Pr(pass = 0)} = \exp(-11.602 + 2.338 * psi + 3.063 * gpa) \quad (1)$$

3

Based on the p-value obtained in Figure:1, we reject the null hypothesis that there is no effect of psi on the outcomes of the students final assessment. Further based on our parameters for the logistic regression model, we see that a positive value, ie. 1, for psi causes an increase in probability of passing, so we conclude that psi does in fact work.

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To estimate the probability that a student with a gpa equal to 3 who receives psi passes the assignment, we simply enter our values into equation 1, our logistic regression model.

$$\frac{Pr(pass = 1)}{Pr(pass = 0)} = \exp(-11.602 + 2.338 * (1) + 3.063 * (3)) = 0.9277$$

So there is a 92.77 % chance of a student with gpa of 3 who receives psi of passing the final assignment.

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Exercise 3

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1 R-Code

1.1 Exercise 1

1.2 Exercise 2

1.3 Exercise 3

1.4 Exercise 4