

Stat637 Homework 3 ¹

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30 January 2015

1 Q1

1.1 Estimates of p and 95% Confidence Intervals for Group 1

	Estimate	SD	95%.CI.Lower	95%.CI.Upper
p=.5	0.500000	0.158114	0.190102	0.809898
p.hat	0.500000	0.158114	0.190102	0.809898
p.til	0.500000	0.133631	0.238089	0.761911
eta	0.000000		0.224507	0.747600

1.2 Estimates of p and 95% Confidence Intervals for Group 2

	Estimate	SD	95%.CI.Lower	95%.CI.Upper
p=.5	0.500000	0.158114	0.190102	0.809898
p.hat	0.900000	0.094868	0.714061	1.085939
p.til	0.785714	0.109664	0.570776	1.000652
eta	2.197225		0.532763	0.982137

The confidence intervals obtained using $p = .5$ and \hat{p} are wider (more conservative). The confidence intervals obtained using $p = .5, \hat{p}$, and \tilde{p} also sometimes extend beyond the interval $(0, 1)$. The confidence intervals for group 1 are all similar as $\hat{p} = .5$. But the confidence intervals for group 2 vary widely because the most conservative estimate of p , which is $.5$, is much less than \hat{p} , which is $.9$. I prefer the confidence interval obtained using η because it does not exceed unity.

It appears that drugs in Group 2 significantly increase sleeping at the 95% confidence level because the 95% confidence intervals (excluding the one for $p = .5$) are all above $.5$.

2 Q3

a) The model fit using the logit link has slightly higher residual deviance than that using the probit link. But logit is easier to interpret, so I choose to use the logit link for fitting this model.

b) The expected increase in log odds is $.14486$ for a one level increase in L1. The coefficient is significant for predicting probability of remission at the $.95\%$ confidence level ($p\text{-val} = .01464$).

c) 26.07

d) The 95% confidence interval for the chance of remission given an L1 of 8 is $(0.01121483, 0.31924807)$. So, we are 95% confident that the true chance of remission given an L1 of 8 is in between 0.01121483 and 0.31924807 .

¹<https://github.com/luiarthur/Fall2014/blob/master/Stat637/2/sleep.R>