$$Y_{ij} = \begin{cases} 1 & \text{support legal abortion} \\ 0 & \text{else} \end{cases} \qquad i = 1, 2, \ldots, 1880$$

$\hookrightarrow$ individual i in situation j $\qquad j = 1, 2, 3$

<u>GLMM</u>: $\mu_{ij} = P(Y_{ij} = 1 \mid b_i)$ $\qquad b_i$ = random intercept

$$\log\left(\frac{\mu_{ij}}{1-\mu_{ij}}\right) = \beta_0 + b_i + \beta_1 G_i + \beta_2 S_{1ij} + \beta_3 S_{2ij}$$

$$G_i = \begin{cases} 1 & \text{indiv. } i \text{ is female} \\ 0 & \text{else} \end{cases}$$

$$S_{kij} = \begin{cases} 1 & \text{situation } k \\ 0 & \text{else} \end{cases} \qquad (k = 1, 2)$$

$$b_i \overset{iid}{\sim} N(0, \sigma_b^2)$$

Fitted model:

$$\exp\left[\log\left(\frac{\hat{\mu}_{ij}}{1-\hat{\mu}_{ij}}\right)\right] = \exp\left(-0.645 + 0.0136\, G_i + 0.8411\, S_{1ij} + 0.2949\, S_{2ij} + \hat{b}_i\right)$$

$\exp(0.0136) = 1.014 \rightarrow$ For each situation, the estimated odds of supporting legalized abortion for a female are about 1.4% higher than a male with the <u>same random effect value</u>

$\exp(0.2949) = 1.343 \longrightarrow$ For a given subject of either gender, the estimated odds of supporting abortion in Sit 2 are 34% higher than in Sit. 3.

Marginal Model : Let $\mu_{ij} = P(Y_{ij} = 1)$

Fitted model:

$$\text{logit}(\hat{\mu}_{ij}) = -0.1253 + 0.00344\, G_i + 0.1493\, S_{1ij} + 0.0520\, S_{2ij}$$

$$\hat{\text{Corr}}(Y_{ij}, Y_{ik}) = 0.817$$
$j \neq k$

$\exp(0.0520) = 1.053$ → The estimated odds of supporting legalized abortion in Situation 2 are 5.3% higher than Situation 3, holding gender fixed.

→ Population-averaged effects are much smaller than the subject-specific effects due to

① Large heterogeneity across individuals
$\hat{\sigma}_b = 9.338$

② Strong positive correlation between the 3 responses within an individual. (0.817)