```
\tau_{gp} \sim \text{invGamma}(5,5)
                                                                                                                                                                                                                                                                                                                                         = \tau_{gp} \cdot \left(1 + \frac{\sqrt{3}\|x - x'\|}{\ell}\right) \exp\left(-\frac{\sqrt{3}\|x - x'\|}{\ell}\right)
                                                                                                                                                                                                                                                                                        k(x|\tau_{gp},\ell)
                                                                                                                                                                                                                                                                                                               f_j(x) \sim \text{MvNormal}(\mathbf{0}, k(x|\tau_{gp}, \ell)), j \in \{1:6\}
                                                                                                                                                                                                                                                                                                                \begin{array}{lll} \sigma_{gp} & \sim & \text{Gamma}(5, 10) \\ \mu_{1}^{(\alpha)} & \sim & \text{Normal}(-0.8, 1.5) \\ \mu_{2}^{(\alpha)} & \sim & \text{Normal}(0, 1) \\ \tau_{j}^{(\beta)} & \sim & \text{Gamma}(5, 10), \ j \in \{1:6\} \\ \tau_{k}^{(\alpha)} & \sim & \text{Gamma}(5, 10), \ k \in \{1, 2\} \\ \boldsymbol{R}^{(\alpha)} & \sim & \text{LKJcorr}(2), \ \boldsymbol{R}^{(\alpha)} \in \mathbb{R}^{2 \times 2} \end{array}
                                                                                                                              \mu^{(lpha)}
                                                                                                                                                                                                                          	au^{(lpha)}
                                                                                                                                                                              \Sigma^{(\alpha)}
                                                                                                                                                                                                                            R^{(\alpha)}
                                                                       \beta_i
                                                                                                                                                        oldsymbol{lpha}_i
oldsymbol{u}^{(eta)}
                                                                                                                                                                                                                  oldsymbol{u}^{(lpha)}
                                                                                                                                                                                                                                                                                                                 \mathbf{\Sigma}^{(\alpha)} = \operatorname{diag}(\boldsymbol{\tau}^{(\alpha)}) \cdot \boldsymbol{R}^{(\alpha)} \cdot \operatorname{diag}(\boldsymbol{\tau}^{(\alpha)})
                                                                                                                                                                                                                                                                                                                         eta_i \sim \operatorname{MvNormal}(\boldsymbol{f}(x_i), \operatorname{diag}(\sigma_{gp})^2), \ eta_i \in \mathbb{R}^{6 \times 1}
oldsymbol{lpha}_i \sim \operatorname{MvNormal}(oldsymbol{\mu}^{(lpha)}, \ oldsymbol{\Sigma}^{(lpha)}), \ oldsymbol{lpha}_i \in \mathbb{R}^{2 \times 1}
X^{(eta)}
                                                                                                                                                                                                                oldsymbol{X}^{(lpha)}
                                                                      \rho_{ic}
                                                                                                                                                       \gamma_{id}
                                                                                                                                                                                                                                                           \begin{array}{cccc} \boldsymbol{\omega}_{j}^{(\beta)}, \, \boldsymbol{\omega}_{k}^{(\alpha)} & \sim & \mathrm{Uniform}(0.01, 0.4), \ j \in \{1:6\}, \ k \in \{1,2\} \\ \boldsymbol{u}_{j[study]}^{(\beta)} & \sim & \mathrm{Normal}(0, \boldsymbol{\omega}_{j}^{(\beta)}), \ study \in \{1:4\} \\ \boldsymbol{u}_{k[study]}^{(\alpha)} & \sim & \mathrm{Normal}(0, \boldsymbol{\omega}_{k}^{(\alpha)}), \ study \in \{1:4\} \\ \boldsymbol{u}_{[study]}^{(\beta)}, \ \boldsymbol{u}_{[study]}^{(\alpha)} & = & [\boldsymbol{u}_{1[study]}^{(\beta)}, \dots, \boldsymbol{u}_{6[study]}^{(\beta)}]^{\top}, \ [\boldsymbol{u}_{1[study]}^{(\alpha)}, \boldsymbol{u}_{2[study]}^{(\alpha)}]^{\top} \end{array}
                                                                                                                                                                                                                \eta^{(\gamma)}
\eta^{(
ho)}
                                                                 \theta^{(\mathrm{old})}
                                                                                                                                                   \theta_{id}^{(\text{new})}
                                                                                                                                                                                                                                                                                                                              c = \begin{cases} 1, 2, 3 & \text{for phases } 1-3^{(CS-)} \\ 4, 5, 6 & \text{for phases } 1-3^{(CS+)} \end{cases}
                                                                                                                                                                                                                                                                                                                               d = 1 for CS-, 2 for CS+
                                                                                                                                                                                                                                                                                                  w_c, w_d = \begin{cases} -1/2 & \text{if } c, d \in \{\text{animals}\} \\ 1/2 & \text{if } c, d \in \{\text{tools}\} \end{cases}
                                                                   y_{ic}^{(\mathrm{old})}
                                                                                                                                                  y_{id}^{(\text{new})}
                                                                                                                                                                                                                                                                                           \eta^{(\rho)}, \ \eta^{(\gamma)} \sim \text{Normal}(0, 1)
                                                                                                                                                                                                                                                                                             \operatorname{logit}(\rho_{ic}) = \boldsymbol{X}_{c}^{(\beta)} \cdot (\boldsymbol{\beta}_{i} + \boldsymbol{u}_{[study]}^{(\beta)}) + w_{c} \, \eta^{(\rho)}, \, \boldsymbol{X}_{c}^{(\beta)} \in \mathbb{R}^{1 \times 6}
                                                                   n_{ic}^{(\text{old})}
                                                                                                                                                  n_{id}^{(\text{new})}
                                                                                                                                                                                                                                                                                            \operatorname{logit}(\gamma_{id}) = \boldsymbol{X}_{d}^{(\alpha)} \cdot (\boldsymbol{\alpha}_{i} + \boldsymbol{u}_{[study]}^{(\alpha)}) + w_{d} \ \boldsymbol{\eta}^{(\gamma)}, \ \boldsymbol{X}_{d}^{(\alpha)} \in \mathbb{R}^{1 \times 2}
                                                                                                                                                                                                                                                                                                      \theta_{ic}^{\text{(old)}} = \begin{cases} \rho_{ic} + (1 - \rho_{ic}) \ \gamma_{i1}, & c \in \{1, 2, 3\} \\ \rho_{ic} + (1 - \rho_{ic}) \ \gamma_{i2}, & c \in \{4, 5, 6\} \end{cases}
\theta_{id}^{\text{(new)}} = \begin{cases} (1 - \rho_{i1} \ \rho_{i2} \ \rho_{i3}) \ \gamma_{i1} & \text{if } d = 1 \\ (1 - \rho_{i4} \ \rho_{i5} \ \rho_{i6}) \ \gamma_{i2} & \text{if } d = 2 \end{cases}
                                                 i individuals
                                                                                                                                                                                                                                                                                                           \begin{array}{lcl} y_{ic}^{(\text{old})} & \sim & \text{Binomial}(\theta_{ic}^{(\text{old})}, n_{ic}^{(\text{old})}), \ c \in \{1\text{:}6\} \\ y_{id}^{(\text{new})} & \sim & \text{Binomial}(\theta_{id}^{(\text{new})}, n_{id}^{(\text{new})}), \ d \in \{1,2\} \end{array}
```

 $\sim \text{invGamma}(5,5)$