i for each task (dynamic, static, shuffle), j for each participant.

$$
\begin{aligned}
&\text{Hyperpriors of the slope} \\
\mu_\beta &\sim \text{StudentT}(3, 0, 10) \\
\sigma_\beta &\sim \text{HalfNormal}(10) \\
&\text{Hyper-prior of the breakpoint} \\
\tau &\sim \text{Uniform}(0, 100) \\
&\text{Hyperprior of the recognition ability at } \tau \\
\theta &\sim \text{Uniform}(0, 1) \\
\kappa &\sim \text{Uniform}(0, Nt) \\
&\text{(reparameterized as the mode of Beta Distribution)} \\
a &= \theta * (\kappa - 2) + 1 \\
b &= (1 - \theta) * (\kappa - 2) + 1
\end{aligned}
$$

$$
\begin{aligned}
&\text{For each stimuli type } i \in \text{static, dynamic, shuffled:} \\
&\text{Prior of the recognition ability at } \tau \\
\theta_i &\sim \text{Beta}(a, b) \\
&\text{Priors of the breakpoint} \\
\tau_i &\sim \text{Normal}(\tau, 10) \\
&\text{Priors of the slopes } (a \text{ indicates before age } \tau) \\
\beta_i^{a,b} &\sim \text{Normal}(\mu_\beta, \sigma_\beta) \\
&\text{The intercepts before and after age } \tau \\
b_i^{a,b} &= logit(\theta_i) - \tau_i * \beta_i^{a,b} \\
&\text{Linear function and invlogit transform} \\
\beta_i, Intercept_i &= \begin{cases} \beta_i^a, b_i^a & \text{if } age < \tau_i \\ \beta_i^b, b_i^b & \text{if } age \geq \tau_i \end{cases} \\
\theta_{i,j} &= \beta_i \otimes age_j + Intercept_i \\
\hat{y}_{i,j} &= \text{invlogit}(\theta_{i,j}) \\
&\text{Observed accurate categorizations} \\
\text{k}_{i,j} &\sim \text{Binomial}(\hat{y}_{i,j}, \text{n}_{i,j})
\end{aligned}
$$