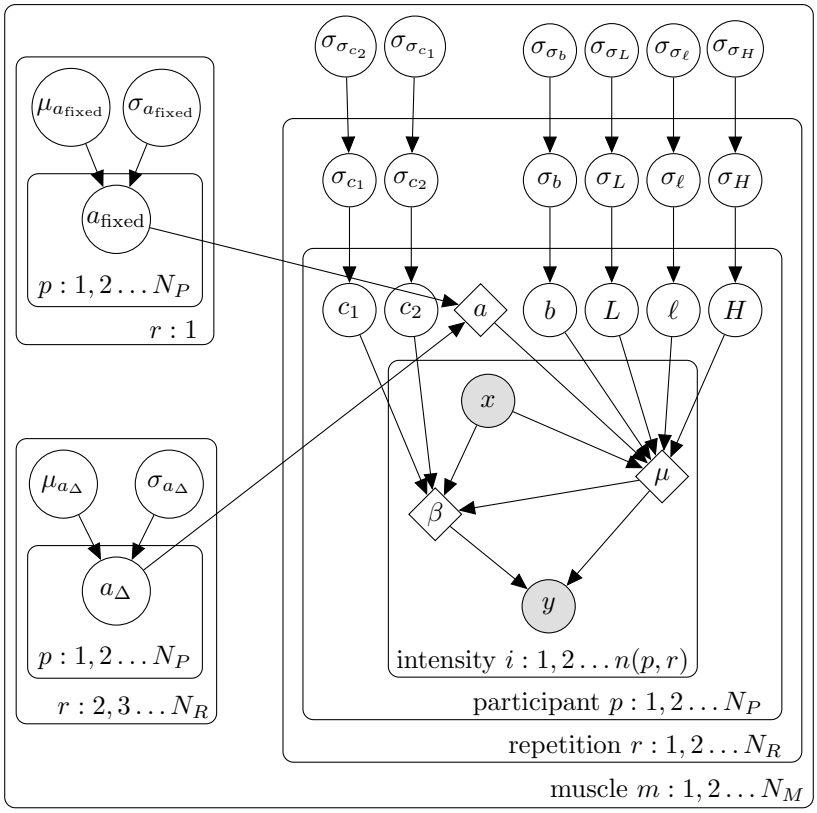
In this section, we describe a mixed-effects model consististing of both fixed and random components. This model is particularly useful in settings where the same participants undergo repeated experiments. For instance, one might be interested in assessing intervention benefits by looking at how the thresholds change from pre and post intervention. Fig. 4.3.3 gives the graphical representation of such a model implemented by hbmep. In section 5.3, we use this model (with $N_R = 2$) to compare midline and lateral stimulation thresholds.



where threshold $a^{m,p,r}$ of participant p in repetition r is given by,

$$a^{m,p,r} = \begin{cases} {a_{\text{fixed}}}^{m,p} & r = 1 \\ {a_{\text{fixed}}}^{m,p} + {a_\Delta}^{m,p,r} & r > 1 \end{cases} \tag{4.2.4}$$

A priori we assume no random effects, or lack thereof. This is reflected in the choice of a flat prior for $\mu_{a_{\text{random}}}$ that is symmetric about 0. Once the model is fit, we look at the shift in the posterior distribution of $\mu_{a_{\text{random}}}$ to assess the strength of the random component.