We assume that, for a given observation i, we have that:

For our priors, we assume that:

where is the truncated stick-breaking prior, given by:

#----------------------------------------

FCD

* For (for multinomial likelihood)

Where is the number of bins in

Where

* For (for Binomial likelihood)
* For

Where and

* For

Taking logs, this becomes:

For a group that does not exist yet, then we need to integrate out these parameters.

For the multinomial likelihood, notice that:

Where is the number of bins in .

For the Binomial likelihood, notice that:

Notice that in the expression for existing clusters, I ignore , and . Therefore, I will also ignore these here:

Taking logs, this becomes:

We can sample this from a categorical distribution