$y$: label map           $x$: data (time series)

$y_t$: test subject label     $x_t$: test subject data

goal: given $\alpha$, compute

$p(x_t \mid x; \theta)$           $\theta = \{\alpha, \beta, \mu, \kappa\}$

$= \int p(x_t \mid y_t) \cdot p(y_t \mid x; \theta) \, dy_t$

$\approx \frac{1}{M} \sum p(x_t \mid y_t^s)$ ,   $y_t^s \sim p(y_t \mid x; \theta)$

To draw sample $y_t^s$ from $p(y_t \mid y; \theta)$, need

$p(y_t \mid x; \theta) = \int p(y_t \mid y) \cdot p(y \mid x) \, dy$

$\approx \frac{1}{M} \sum p(y_t \mid y^s)$ ,   $y^s \sim p(y \mid x)$

$y$ includes grp and subject

$y = (y_g, y_s)$ .

$$p(y_t | y^s) = p(y_t | y_g)$$