Define statistics:
Global statistics: $\mathbf{\Gamma} = \{\boldsymbol{M}, \mathbf{\Sigma}\}$, grand correlation $\mathbf{R}^*$, sample size N
Phone statistics: $\mathbf{\Lambda}^\phi = \{\boldsymbol{\mu}^\phi, \mathbf{\Sigma}^\phi\}$, phone correlation $\boldsymbol{R}^\phi$, sample size N^ϕ
Model statistics $\mathbf{\Delta}_k^\phi = \{\boldsymbol{m}_k^\phi, \boldsymbol{S}_k^\phi\}$, sample size N_k^ϕ
Threshold $\Theta = \{\theta_\mathrm{C}, \theta_\mathrm{D}\}$
Model initialisation:
level $k = 0$
$\boldsymbol{m}_{k,i}^\phi = \boldsymbol{M}_i$, $\boldsymbol{S}_{k,i}^\phi = \mathbf{\Sigma}_i$, $N_{k,i}^\phi = N$, for all articulators $i \in \{1..n\}$
Critical articulator list $\boldsymbol{C}_k^\phi = \{\}$
$isConverge = 0$
while($k \leq n$ and $isConverge = 0$)
    Identification divergence:
    $J_{k,i}^\phi = \text{computeIdiv}(\mathbf{\Delta}_{k,i}^\phi, \mathbf{\Lambda}_i^\phi, N_{k,i}^\phi, N^\phi)$, for all articulators $i \in \{1..n\}$
    Articulator with maximum divergence $j = \text{argmax}\{J_{k,1}^\phi .., J_{k,n}^\phi\}$
    C-step:
    if($J_{k,j}^\phi > \theta_\mathrm{C}$)
        Go to the next level $k = k + 1$
        $\mathbf{\Delta}_k^\phi = \mathbf{\Delta}_{k-1}^\phi$
        $N_k^\phi = N_{k-1}^\phi$
        Add critical articulator: $\boldsymbol{C}_k^\phi \leftarrow \{\boldsymbol{C}_{k-1}^\phi\} \cup \{j\}$
        Set distribution: $\boldsymbol{m}_{k,j}^\phi \leftarrow \boldsymbol{\mu}_j^\phi$, $\boldsymbol{S}_{k,j}^\phi \leftarrow \mathbf{\Sigma}_j^\phi$
        $N_{k,j}^\phi \leftarrow N^\phi$
        D-step:
        $[N_k^\phi, \mathbf{\Delta}_k^\phi] = \text{updateDep}(\mathbf{\Delta}_k^\phi, N_k^\phi, \mathbf{\Gamma}, \mathbf{\Lambda}^\phi, \Theta, \boldsymbol{C}_k^\phi, \boldsymbol{R}^*, \boldsymbol{R}^\phi)$
    else
        Critical articulator list $\hat{\boldsymbol{C}}^\phi = \boldsymbol{C}_k^\phi$
        Model distribution $\hat{\boldsymbol{m}}^\phi = \boldsymbol{m}_k^\phi$, $\hat{\boldsymbol{S}}^\phi = \boldsymbol{S}_k^\phi$
        No: of critical articulators $K^\phi = k$.
        $isConverge = 1$
    end if
end while

function computeIdiv($\mathbf{\Delta}_{k,i}^\phi, \mathbf{\Lambda}_i^\phi, N_{k,i}^\phi, N^\phi$)
Incorporating standard error:
$\boldsymbol{S}_1 = \boldsymbol{S}_{k,i}^\phi + (\boldsymbol{S}_{k,i}^\phi / N_{k,i}^\phi)$, $\boldsymbol{S}_2 = \mathbf{\Sigma}_i^\phi + (\mathbf{\Sigma}_i^\phi / N^\phi)$
$J = \frac{1}{2}\left(tr(\boldsymbol{S}_1 - \boldsymbol{S}_2)(\boldsymbol{S}_2^{-1} - \boldsymbol{S}_1^{-1}) + tr(\boldsymbol{S}_1^{-1} + \boldsymbol{S}_2^{-1})(\boldsymbol{m}_{k,i}^\phi - \boldsymbol{\mu}_i^\phi)(\boldsymbol{m}_{k,i}^\phi - \boldsymbol{\mu}_i^\phi)'\right)$
return J

function updateDep($\mathbf{\Delta}_k^\phi, N_k^\phi, \mathbf{\Gamma}, \mathbf{\Lambda}^\phi, \Theta, \boldsymbol{C}, \boldsymbol{R}^*, \boldsymbol{R}^\phi$)
Collate critical grand statistics: $\boldsymbol{M}_{\{\boldsymbol{C}\}}$, $\mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}}$ (from $\mathbf{\Sigma}$ and $\boldsymbol{R}^*$)
Collate critical phone statistics: $\boldsymbol{\mu}_{\{\boldsymbol{C}\}}^\phi$ and covariance matrix $\mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}}^\phi$ (from $\mathbf{\Sigma}^\phi$ and $\boldsymbol{R}^\phi$)
for $i \in \{1..n\} - \{\boldsymbol{C}\}$
    $J_{k,i}^\phi = \text{computeIdiv}(\mathbf{\Delta}_{k,i}^\phi, \mathbf{\Lambda}_i^\phi, N_{k,i}^\phi, N^\phi)$
    if($J_{k,i}^\phi > \theta_D$)
        Dependent covariance : $\mathbf{\Sigma}_{i\{\boldsymbol{C}\}}$
        update mean: $\boldsymbol{m}_{k,i}^\phi \leftarrow \boldsymbol{M}_i + \mathbf{\Sigma}_{i\{\boldsymbol{C}\}}\mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}}^{-1}(\boldsymbol{\mu}_{\{\boldsymbol{C}\}}^\phi - \boldsymbol{M}_{\{\boldsymbol{C}\}})$
        update variance: $\boldsymbol{S}_{k,i}^\phi \leftarrow \mathbf{\Sigma}_i + \mathbf{\Sigma}_{i\{\boldsymbol{C}\}}\mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}}^{-1}(\mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}}^\phi - \mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}})\mathbf{\Sigma}_{\{\boldsymbol{C}\}\{\boldsymbol{C}\}}^{-1}\mathbf{\Sigma}'_{i\{\boldsymbol{C}\}}$
        $N_{k,i}^\phi \leftarrow N^\phi$
    end if
end for
return $\mathbf{\Delta}_k^\phi, N_k^\phi$