Figure 1. Procedure to obtain estimates of latent trait scores for ordinal data when data is missing from the dataset

Matrix with individuals' responses to likert-type items
X
(Some individuals' responses to some items are missing)

Step 1
Multiple imputation
(No missing responses)

$\mathbf{X}_1$ $\mathbf{X}_2$ $\mathbf{X}_3$ $\mathbf{X}_4$ $\mathbf{X}_5$

Step 2
Independent factor analysis

$[\mathbf{R}_1,\mathbf{T}_1]= \text{polychoric}(\mathbf{X}_1)$
$\mathbf{A}_1=\text{ULS}(\mathbf{R}_1)$

$[\mathbf{R}_2,\mathbf{T}_1]= \text{polychoric}(\mathbf{X}_2)$
$\mathbf{A}_2=\text{ULS}(\mathbf{R}_2)$

$[\mathbf{R}_3,\mathbf{T}_3]= \text{polychoric}(\mathbf{X}_3)$
$\mathbf{A}_3=\text{ULS}(\mathbf{R}_3)$

$[\mathbf{R}_4,\mathbf{T}_4]= \text{polychoric}(\mathbf{X}_4)$
$\mathbf{A}_4=\text{ULS}(\mathbf{R}_4)$

$[\mathbf{R}_5,\mathbf{T}_5]= \text{polychoric}(\mathbf{X}_5)$
$\mathbf{A}_5=\text{ULS}(\mathbf{R}_5)$

Step 3
Consensus Promin Rotation

$[\mathbf{P}_1,\mathbf{P}_2,\mathbf{P}_3,\mathbf{P}_4,\mathbf{P}_5,\mathbf{\Phi}]= \text{ConsensusProminRotation}(\mathbf{A}_1,\mathbf{A}_2,\mathbf{A}_3,\mathbf{A}_4,\mathbf{A}_5)$

where $\mathbf{\Phi}$ is the consensus inter-factor correlation matrix

Step 4
EAP factor scores

$\mathbf{F}_1=\text{EapScores}(\mathbf{X}_1,\mathbf{P}_1,\mathbf{T}_1)$

$\mathbf{F}_2=\text{EapScores}(\mathbf{X}_2,\mathbf{P}_2,\mathbf{T}_2)$

$\mathbf{F}_3=\text{EapScores}(\mathbf{X}_3,\mathbf{P}_3,\mathbf{T}_3)$

$\mathbf{F}_4=\text{EapScores}(\mathbf{X}_4,\mathbf{P}_4,\mathbf{T}_4)$

$\mathbf{F}_5=\text{EapScores}(\mathbf{X}_5,\mathbf{P}_5,\mathbf{T}_5)$

Step 5
Final latent trait scores

$\mathbf{F}= \text{average}(\mathbf{F}_1,\mathbf{F}_2,\mathbf{F}_3,\mathbf{F}_4,\mathbf{F}_5)$

Matrix with individuals' latent trait scores
F
(Even individuals that produced some non-responses to some items have a factor score estimate)