

GGUM2004 - Generalized Graded Unfolding Model

Axel Sonntag and Daniela Weber

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GGUM

generalized graded unfolding model

Coombs Skala: binäre oder abgestufte stimme zu - stimme nicht zu
Antworten zu Statements

Idee: Personen und Items liegen bei Übereinstimmung auf einem
latenten Continuum nahe beieinander.

Continuum erstreckt sich von negativ bis positiv

Definition der GGUM

$$P(Z_i = z|\theta_j) = \frac{\exp\{\alpha_i[z(\theta_j - \delta_i) - \sum_{k=0}^z \tau_{ik}]\} + \exp\{\alpha_i[(M-z)(\theta_j - \delta_i) - \sum_{k=0}^z \tau_{ik}]\}}{\sum_{w=0}^C \exp\{\alpha_i[w(\theta_j - \delta_i) - \sum_{k=0}^w \tau_{ik}]\} + \exp\{\alpha_i[(M-w)(\theta_j - \delta_i) - \sum_{k=0}^w \tau_{ik}]\}}$$

Y_i subjektive Antwort zum Einstellungsstatment i

Z_i beobachtbare Antwort auf Einstellungsstatment i

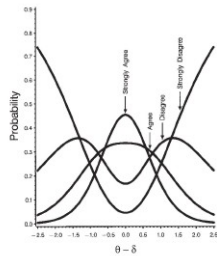
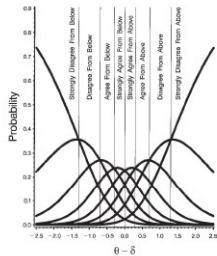
$z = 0 \dots C$ wobei 0 stärkster Level der Nichtzustimmung

C Anzahl der ORCs minus 1

α_i Unterscheidungsvermögen des Einstellungsstatments i

τ_{ik} Positionierung des k ten SCR Thresholds

SRC PF und ORC PF



Parameter Schätzung

Schätzung der Item Parameter mit marginal maximum likelihood (MML)

Schätzung der Personen Parameter mit expected a posteriori (EAP)

MML

Erste Partielle Ableitung der log likelihood um α_i , δ_i und τ_{ik} zu schätzen

EAP

θ Schätzer werden mittels EAP berechnet (conditional likelihood)

Einlesen der Daten

- *.dat - Dateien
- Fortran Format Spezifikation: z.B. (i4,1x,25i1)
→ Klammer nicht vergessen!
- Item-Definition (Anzahl, Ausprägungen)
- Festlegen von *Response Cutoffs*
- Ausschließen einzelner Items, Respondents

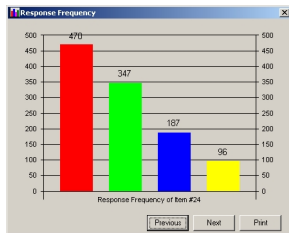
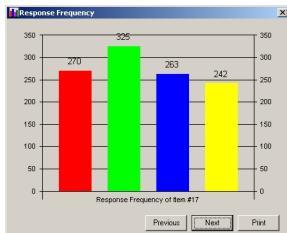
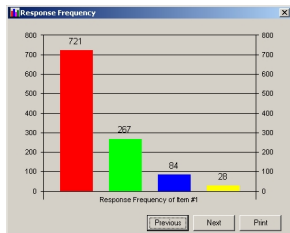
Schätzbare Modelle

- 1 **Constant Unit** version of the generalized graded unfolding model (GGUM)
- 2 **Multiple Unit** version of the GGUM
- 3 **Rating Scale** version of the GGUM
- 4 **Partial Credit** version of the GGUM
- 5 **Generalized Constant Unit** version of the GGUM
- 6 **Generalized Multiple Unit** version of the GGUM
- 7 **Generalized Rating Scale** version of the GGUM
- 8 **Generalized Graded Unfolding Model** (GGUM)

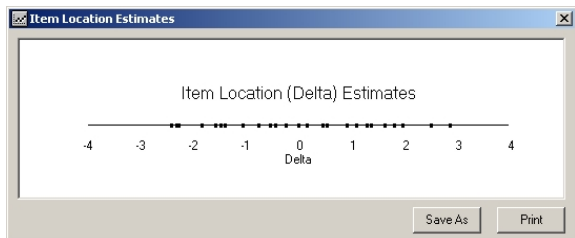
Konfiguration vor der Schätzung

```
0          ERROR: MODEL NUMBER SHOULD BE FROM 1 TO 8
N          CONSTRAINTS ARE NOT USED
N          DO NOT CHANGE THE SIGN OF INITIAL PARAMETER ESTIMATES
30         NUMBER OF QUADRATURE POINTS
C:\Programme\Ggum\examples\INDATA.DAT
(i4,1x,25i1)
25         NUMBER OF ITEMS
Y          IS NUMBER OF CATEGORIES CONSTANT?
4          NUMBER OF RESPONSE CATEGORIES
Y          DO YOU WANT TO RECODE THE DATA?
Y          IS RESPONSE CUTOFF CONSTANT?
0          RESPONSE CUTOFF
N          DISCARD ANY ITEMS
N          DISCARD ANY PEOPLE
N          SIGNS OF INITIAL LOCATION ESTIMATES NOT MANUALLY ASSIGNED
100        NUMBER OF OUTER CYCLES
10         NUMBER OF INNER CYCLES
30         NUMBER OF FISHER SCORING ITERATIONS FOR THRESHOLDS
30         NUMBER OF FISHER SCORING ITERATIONS FOR DELTAS & ALPHAS
0,001      CRITERION
Y          WANT TO PLOT
20         NUMBER OF PLOT GROUPS
2000       NUMBER OF THETA-DELTA PAIR GROUPS
Y          WANT FIT STATISTICS
20         NUMBER OF FIT GROUPS
N          PRINT FIT FOR EVERY PERSON
2.576     ITEM T-VALUE CUTOFF
0.01      ITEM CHI-SQUARE PROBABILITY CUTOFF
3.291     PERSON T-VALUE CUTOFF
0.001     PERSON CHI-SQUARE PROBABILITY CUTOFF
2.576     PERSON LOCALIZED T-VALUE CUTOFF
```

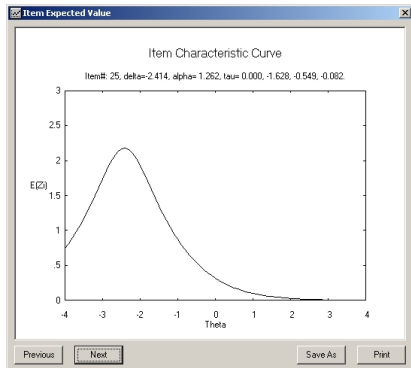
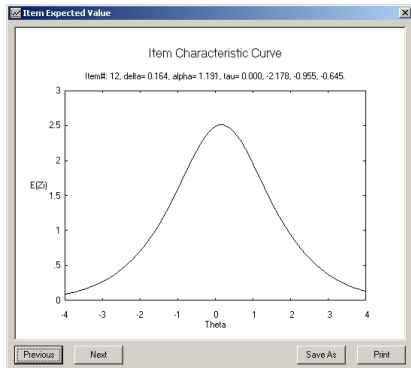
Response Frequency — Item 1, 17, 24



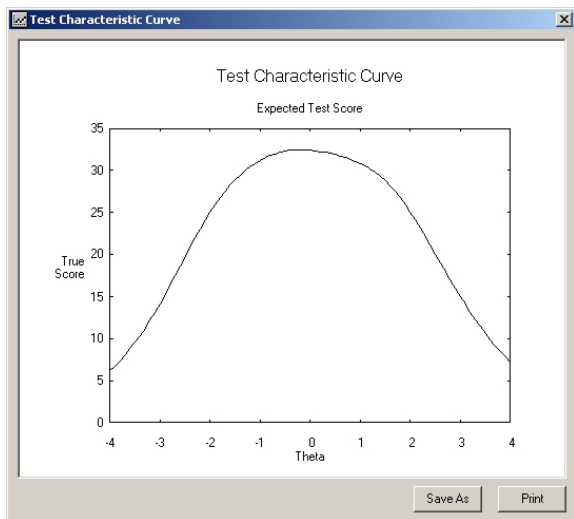
Item Location Estimates



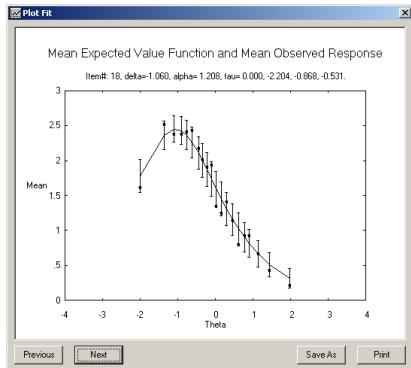
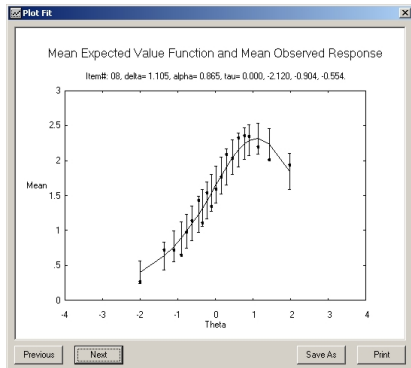
Item Characteristic Curve — Item 12, 25



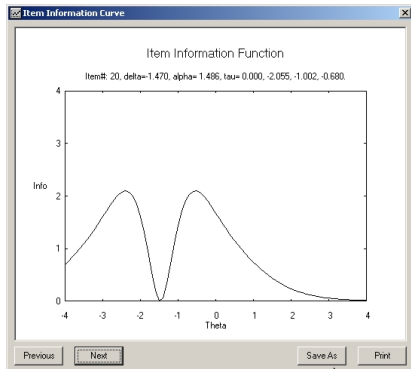
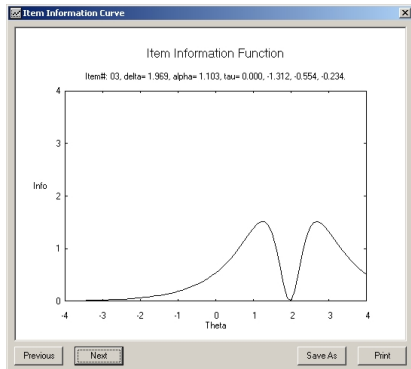
Test Characteristic Curve



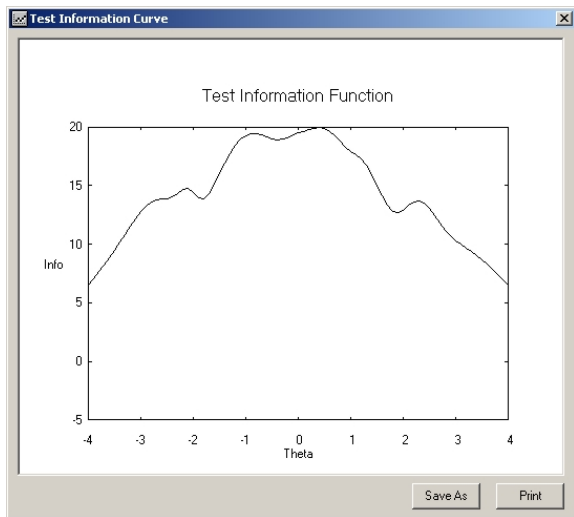
Fit Plot — Item 8, 18



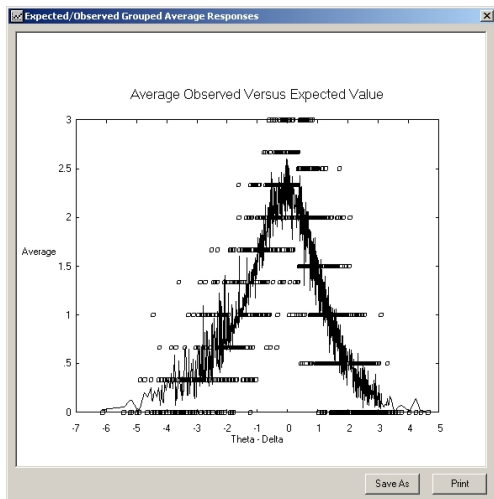
Item Information Function Item 3, 20



Test Information Function



Average Observed Versus Expected Value



Textoutput

- Execution Information
- Item Parameters
- Person Parameters
- Fit Statistics

Andere Softwareprodukte

Kommerzielle Software

- MUDFOLD: Multiple Unidimensional Unfolding
- RUMMFOLDss: unfolding single stimulus responses
- RUMMFOLDpp: unfolding pairwise preference responses

Freie Software

- GGUM2004
- CATJUG: SAS macro