University of Zurich[UZH]

Rasch Analysis : General Procedure & Outlook

Master Rasch Seminar 13 – 9.12.2020

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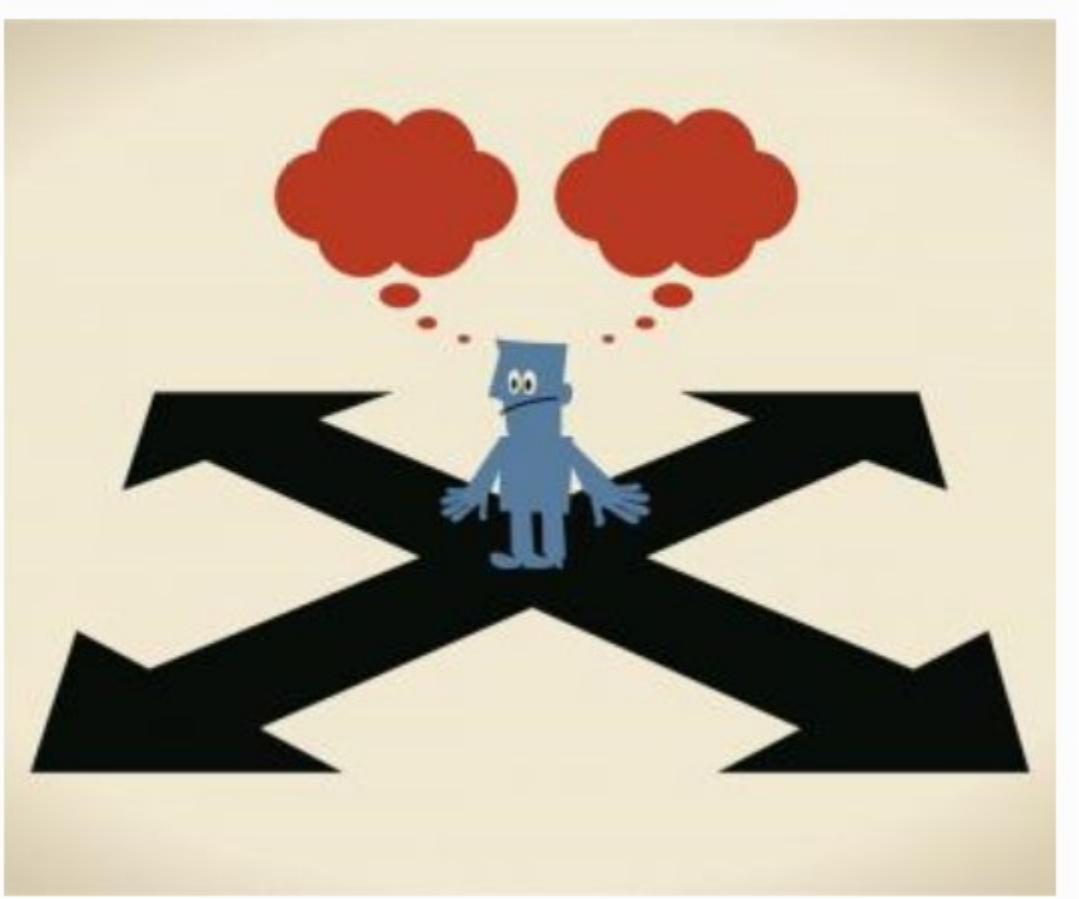
Rasch Analysis



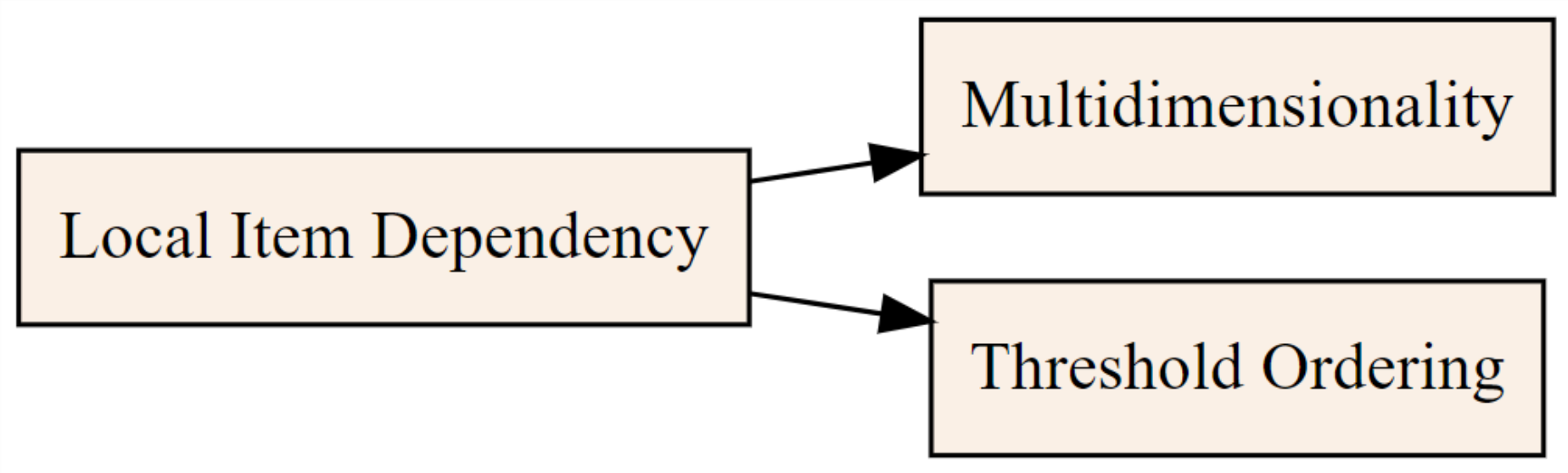
Studies using Rasch analysis usually reports:

A) Fit statistics at start

B) Fit statistics when all breaches to the assumptions are fixed

Often the strategy to go from A to B is not reported.

Rasch Analysis: Procedure



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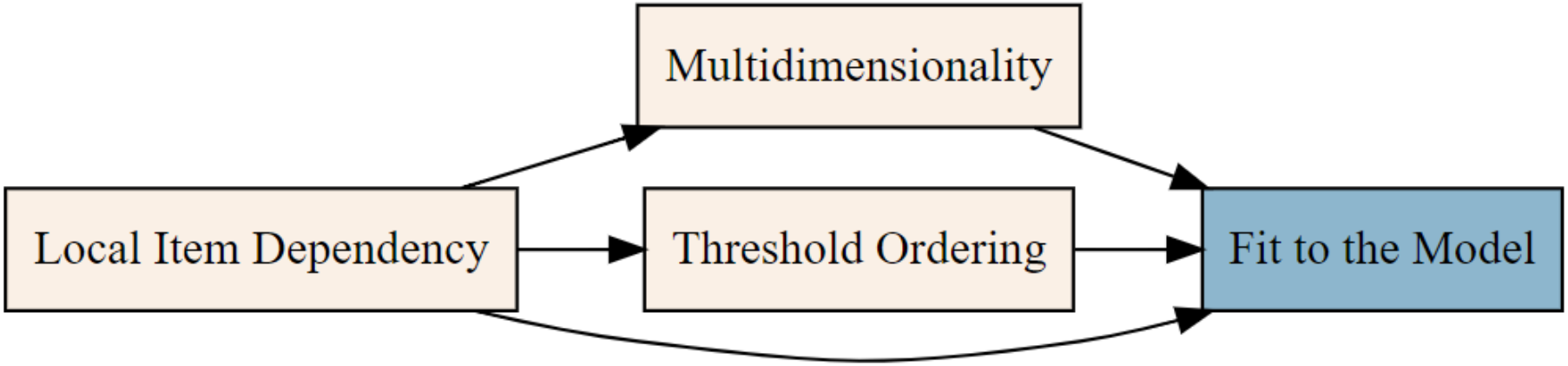

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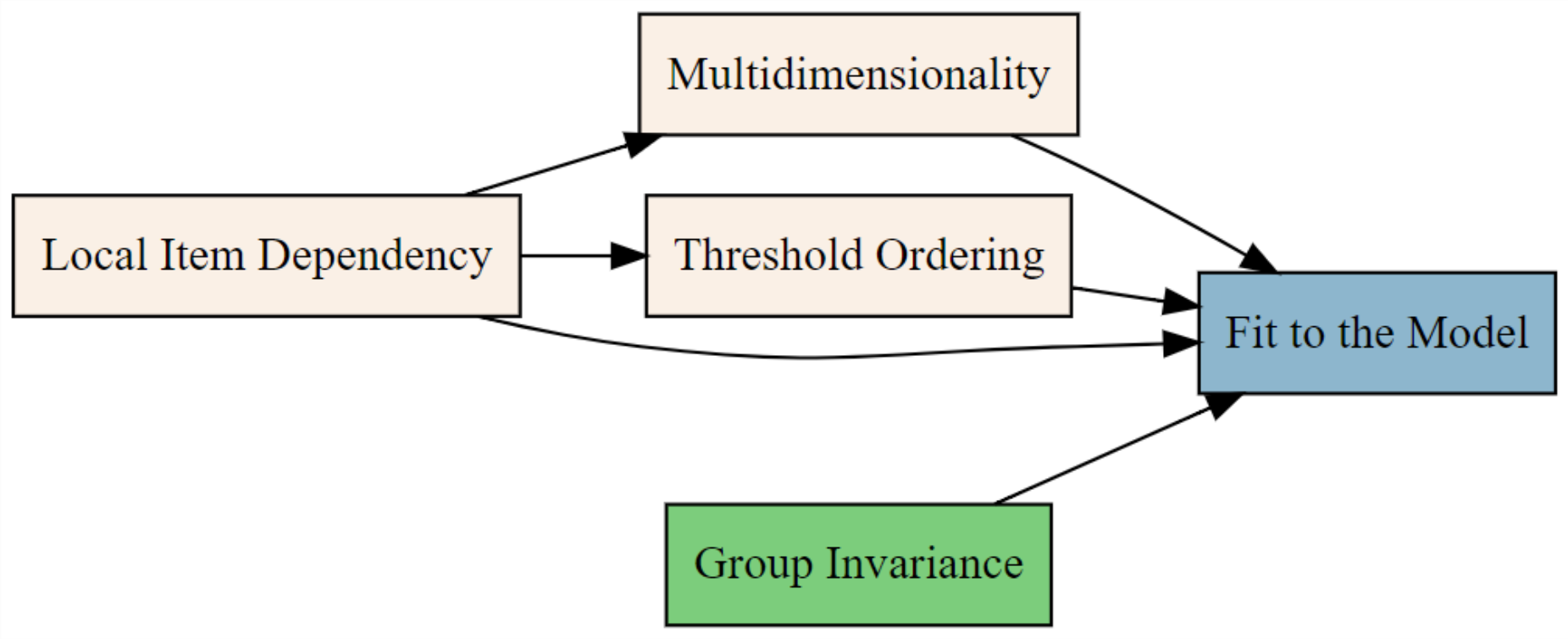
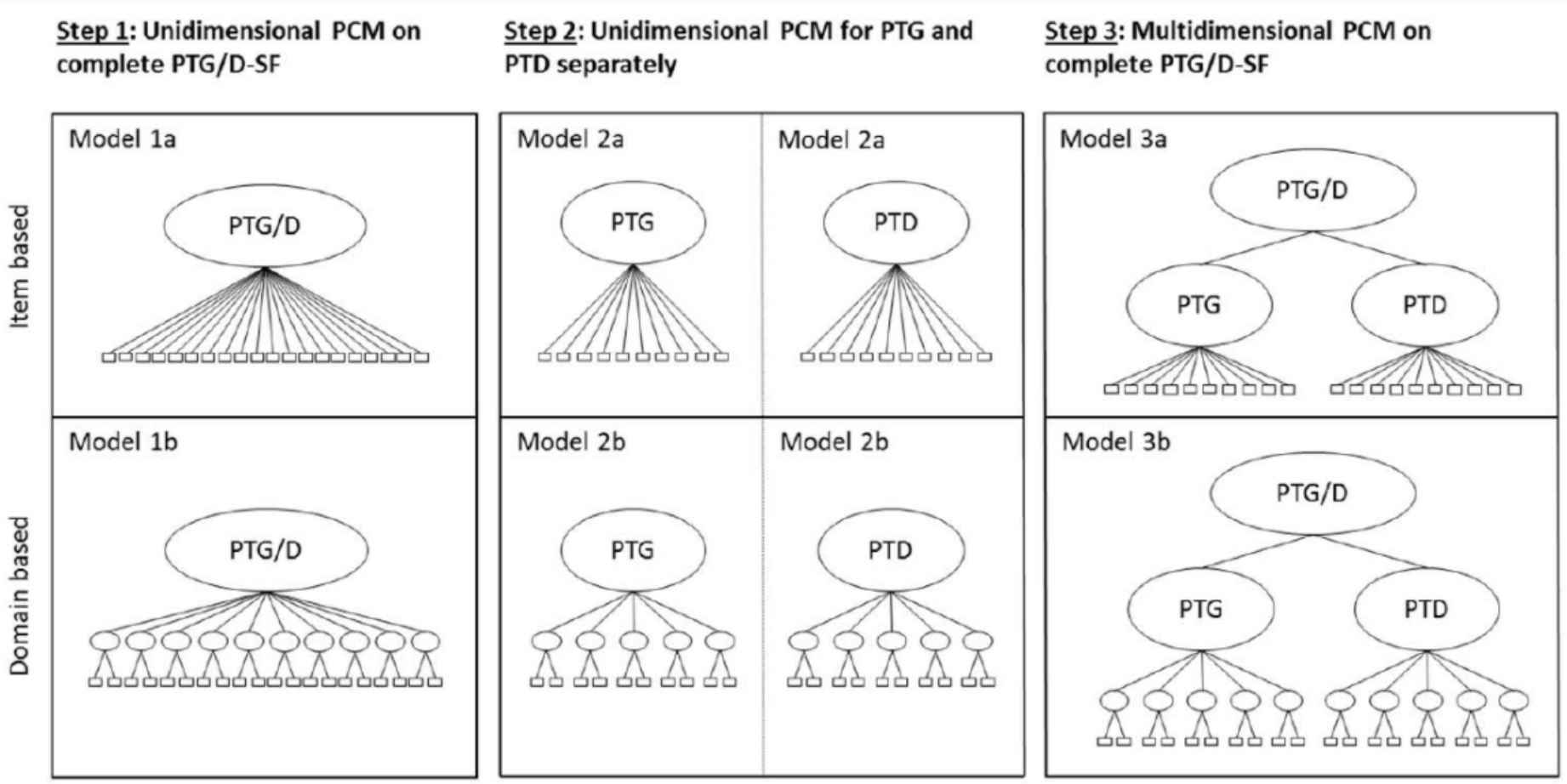


Rasch Analysis: Summarizing



Rasch Analysis: Summarizing

Table 4 Start and final model targeting fit of entire WHODAS 2.0, each subscale, and the calibration of domains as items

Dimension		Stage	Item difficulty		Person ability		Reliability		LID	Uniform DIF	Non-uniform DIF
			Mean	SD	Mean	SD	PSI	Cronbach alpha			
All	WHODAS 2.0	Start	0.05	0.71	−0.13	0.78	0.95	0.95	Yes	Yes	No
D1	Understanding and communicating	Start & Final	0.44	1.26	−0.58	1.34	0.91	0.91	No	No	No
D2	Getting around	Start	0.35	1.23	0.59	1.18	0.91	0.88	Yes	No	No
		Final	0.37	1.35	0.73	1.25	0.87	0.84	No	No	Yes
D3	Self-care	Start	0.54	1.90	−0.33	1.32	0.92	0.87	Yes	Yes	No
		Final	0.46	1.83	−0.36	1.11	0.89	0.67	No	Yes	No
D4	Getting along with people	Start	0.31	1.10	0.01	1.18	0.91	0.89	No	No	No
		Final	0.41	1.62	0.05	1.47	0.90	0.87	No	No	No
D5(1)	Household activities	Start & Final	2.15	5.00	2.39	4.04	0.98	0.99	No	No	No
D6	Participation in society	Start	0.25	0.73	0.26	1.01	0.90	0.88	Yes	Yes	No
		Final	0.26	0.93	0.27	1.05	0.89	0.83	No	Yes	No
Testlet		Start	0.02	0.96	−0.03	0.27	0.85	0.83	Yes	Yes	No
		Final	0.01	0.93	−0.02	0.22	0.79	0.75	No	Yes	No

PSI Person separation index, *LID* Local item dependency, *DIF* Differential item functioning

Rasch Analysis: Finalizing the SRG

During the course following issues where found for the SRG-scale.

1. **Item Fit:** Misfit in item *SRG15 I learned that there are more people who care about me than I thought* (Outfit = 1.646; Infit = 1.437)
2. **Targetting and Reliability**: OK
3. **Threshold Ordering**: OK
4. **Local Item Dependencies** : *SRG15* & *SRG13* (r = 0.2458), *SRG5* & *SRG8* (r = 0.1561)
5. **Multidimensionality:** OK
6. **Differential Item Functioning:** *SRG10 I learned to be open to new information and ideas* for lesion level (paraplegia versus tetraplegia).

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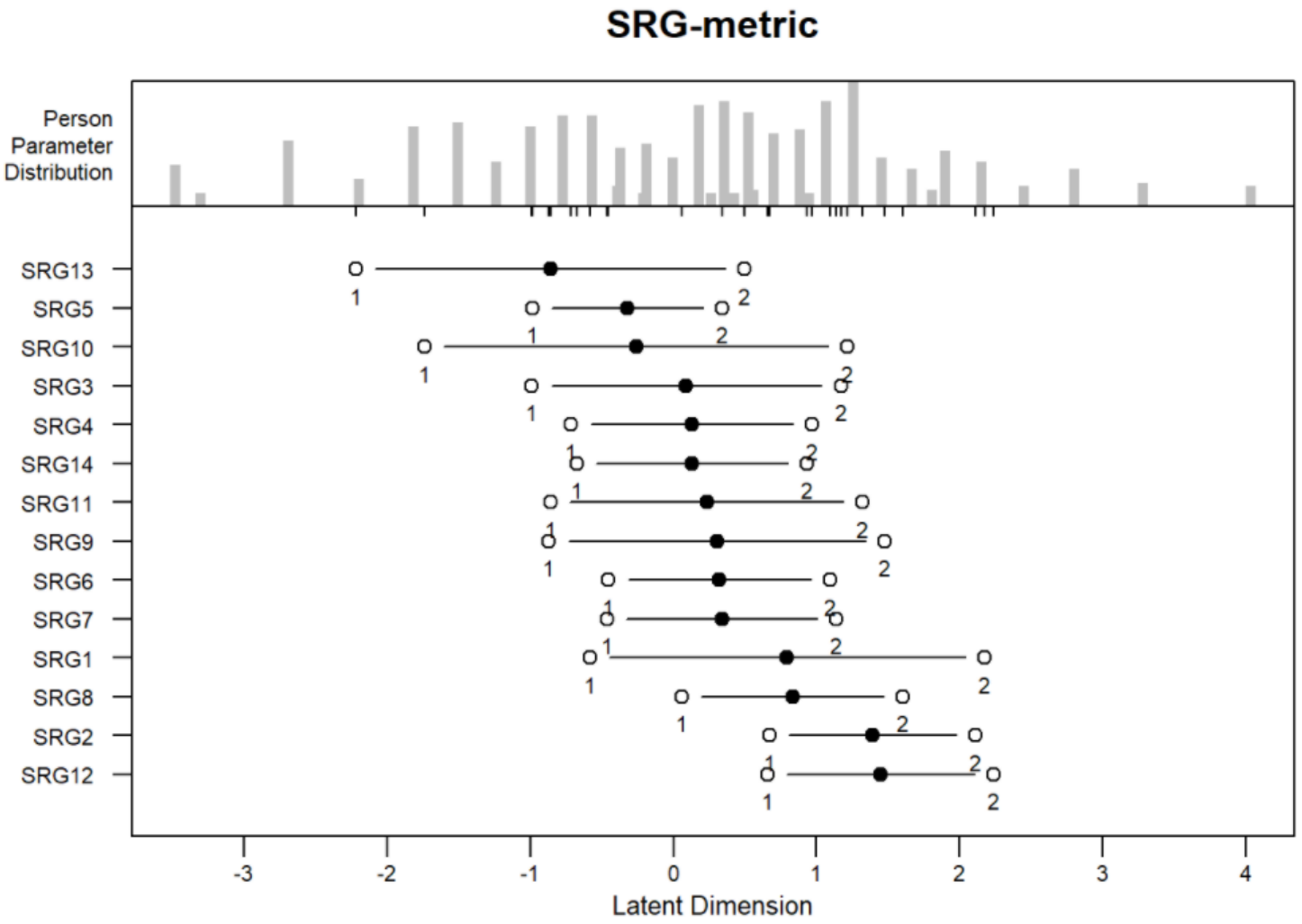
Rasch Analysis: Finalizing the SRG

Making a testlet with SRG15 and SRG13 resulted in very bad fit.

Item fit and LID: Suggestion deleting SRG15.

DIF: (Assuming) goal is one metric for the entire SCI sample, and that the systematic differences between injury level subgroups in item SRG10 is not understood as a “favoritism” for one of the subgroup. Let’s not split the item and keep just one difficulty estimate for SRG10.

Rasch Analysis: Finalizing the SRG



Rasch Analysis: Finalizing the SRG

Itemfit Statistics:

	Chisq	df	p-value	Outfit MSQ	Infit MSQ	Outfit t	Infit t	Discrim
SRG1	449.132	428	0.232	1.047	1.006	0.668	0.113	0.544
SRG2	439.557	428	0.339	1.025	1.028	0.252	0.432	0.542
SRG3	479.012	431	0.055	1.109	1.055	1.549	0.904	0.557
SRG4	469.749	430	0.090	1.090	1.131	1.190	2.079	0.521
SRG5	413.503	432	0.731	0.955	0.977	-0.527	-0.340	0.615
SRG6	317.565	430	1.000	0.737	0.769	-3.676	-4.115	0.721
SRG7	328.104	432	1.000	0.758	0.767	-3.389	-4.165	0.716
SRG8	378.689	432	0.969	0.875	0.936	-1.449	-1.025	0.605
SRG9	368.535	432	0.988	0.851	0.876	-2.272	-2.091	0.641
SRG10	383.925	431	0.950	0.889	0.900	-1.784	-1.670	0.603
SRG11	474.988	432	0.075	1.097	1.061	1.379	1.000	0.546
SRG12	389.044	431	0.927	0.901	0.937	-0.880	-0.933	0.584
SRG13	495.101	432	0.019	1.143	1.114	1.984	1.808	0.454
SRG14	363.940	431	0.992	0.842	0.861	-2.170	-2.373	0.675

Rasch Analysis: Finalizing the SRG

During the course following issues where found for the SRG-scale.

1. **Item Fit:** no outfit or infit > 1.2
2. **Targetting and Reliability**: OK (PSI = 0.91)
3. **Threshold Ordering**: OK
4. **Local Item Dependencies** : no dependencies > 0.2
5. **Multidimensionality:** OK
6. **Differential Item Functioning:** *n.a.*

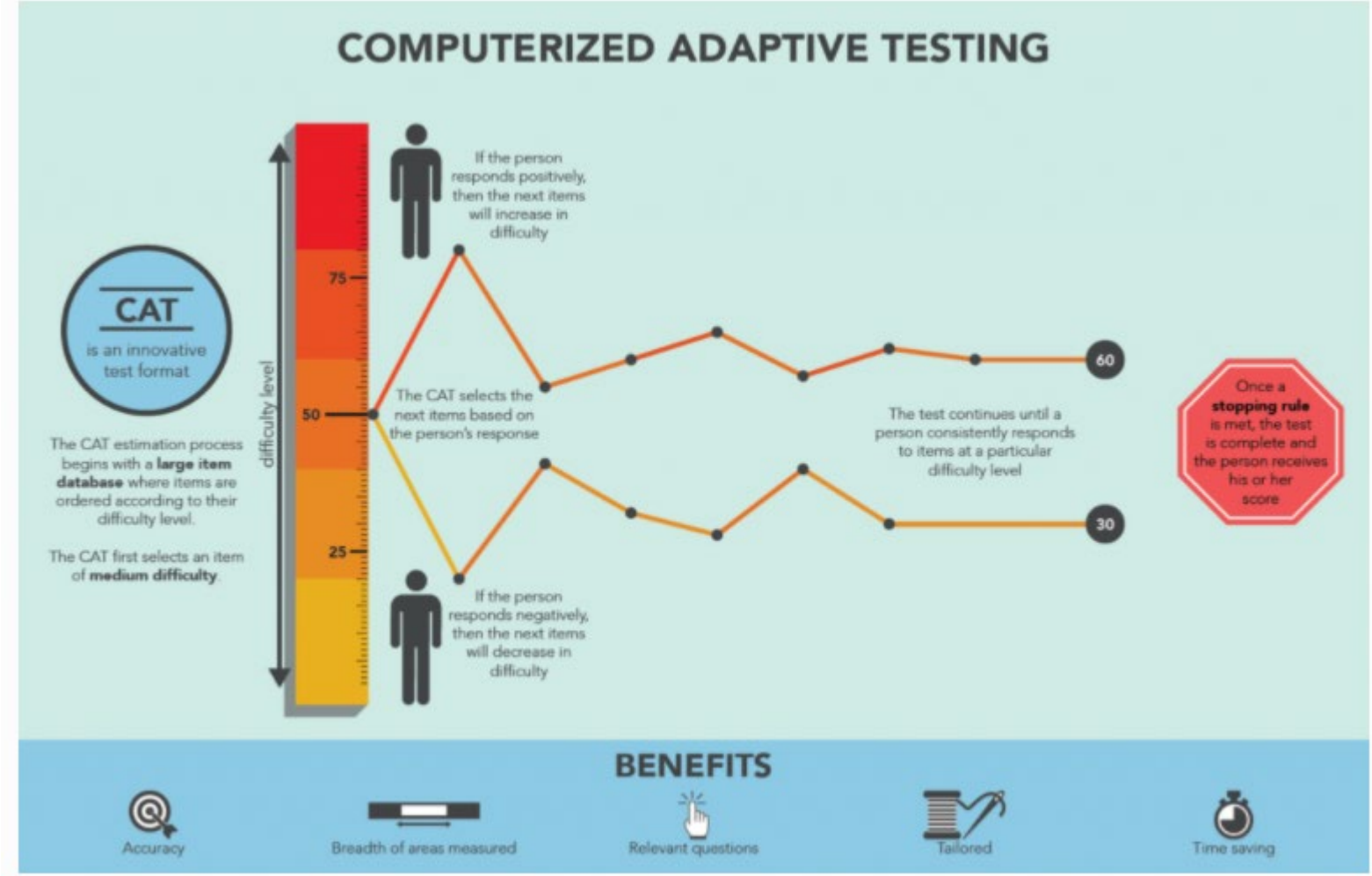
Rasch Analysis: Transformation Table

- When the Rasch model fits, a transformation table is created.
- The transformation table links

  rows scores -> ability estimates -> 0-100 scale

- The range of the user-friendly score is typically from 0 to 100.

Rasch Analysis: Computer Adaptive Testing



Boston University: School of Public Health