Psychometric and cross-cultural validity of the Measure of Activity Performance of the Hand (MAP-Hand) across three European countries (Switzerland, Turkey and the UK)

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Background:

The **MAP-Hand** scale comprises 18 patient-generated items which assess hand activity among people with rheumatoid arthritis (RA). All items are scored on a 0–3 scale and are summed into a total score (0 to 54).

Objectives:

The **MAP-Hand** is fully validated within a UK population[1], and this study aims to assess the validity, stability and comparability across German-speaking (Swiss, Austrian and German) and Turkish populations with RA.

Methods:

- Rasch Analysis was used as analytic framework
- MAP-Hand was initially assessed at the individual-item level within each country
- The items were then organised into four domain-based testlets (super-items), as in the UK validation
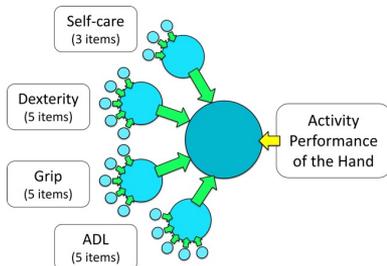

Results 1 – 18 individual items:

- Functional response structure
- Good targeting and reliability
- A lot of local dependency and **NOT unidimensional**
- Results consistent among the three countries

Results 2 – 4 Domain-based testlets:

- Testlet structure fits better and is **unidimensional**
- This approach accounts for the local dependency
- Results consistent among the three countries
- Some DIF apparent for the 'Self-Care' domain
- Impact of the DIF is minimal

Merged sample – 4 testlets

Targeting

DIF on Self-Care domain

UK   Turkish   German-speaking

Response structure

Targeting
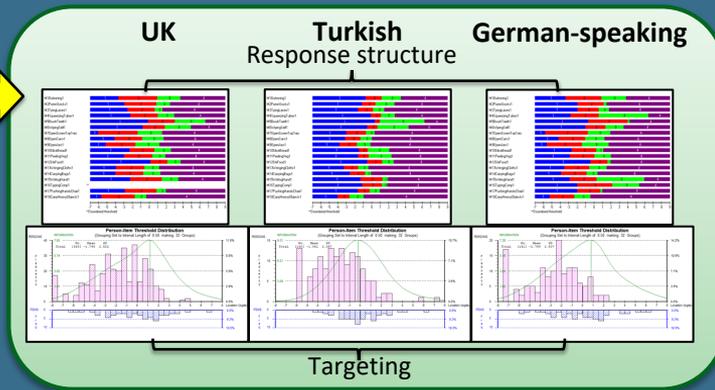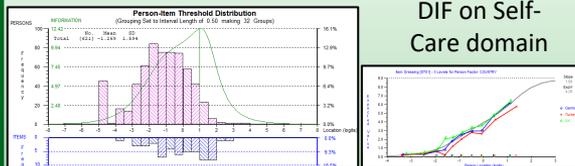
Fit Details

Analysis sample		n	Fit	Reliability		Domains		Unidimensionality	
			ChiSq p	PSI	Cronbach's Alpha	Latent Correlation (R)	Shared variance (A)	t-test	lower 95% CI
Initial (18 items)	UK	340	<0.001	0.95	0.96			12.42%	10.00%
	German	141	0.32	0.93	0.96			12.10%	8.30%
	Turkey	140	<0.001	0.93	0.97			15.08%	11.30%
	Merged	621	<0.001	0.94	0.96			9.62%	7.80%
Domains (4 super-items)	UK	340	0.569	0.91	0.93	0.87	0.96	5.05%	2.60%
	German	141	0.93	0.89	0.93	0.89	0.96	4.84%	1.00%
	Turkey	140	0.54	0.86	0.93	0.76	0.92	0.79%	-
	Merged	621	0.034	0.9	0.93	0.86	0.96	3.70%	1.90%
Target values			>0.01	>0.85				<5%	

Conclusion:

- The 4-testlet approach is consistent and invariant across the UK, German-speaking and Turkish RA samples
- The total scores taken from across all MAPHAND items can be directly compared
- The testlet scale range is narrower than the individual-item level range, reflecting the initial dependency

1. Prior et al. (2018). BMC Musculoskelet Disord 19; 275.