

Psychometric properties of Dutch-Flemish PROMIS measures in pediatric oncology (8-17 years)

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Background

- Pediatric cancer affects physical, mental, and social health → PROMs are essential^{1,2}
- **PedsQL**: most widely used PROM in pediatric oncology³
- **PROMIS**[®]: becoming recognized as new international standard^{4,5}
- Psychometric evaluation in pediatric oncology is needed before PROMIS can replace PedsQL

Aim

Evaluation of psychometric properties of PROMIS measures in pediatric cancer patients (8-17 years)

- Part of larger study across all ages
- Preliminary results (data collection ongoing since March 2024)
- Part of larger project aiming to facilitate PROMIS in pediatric oncology

Methods

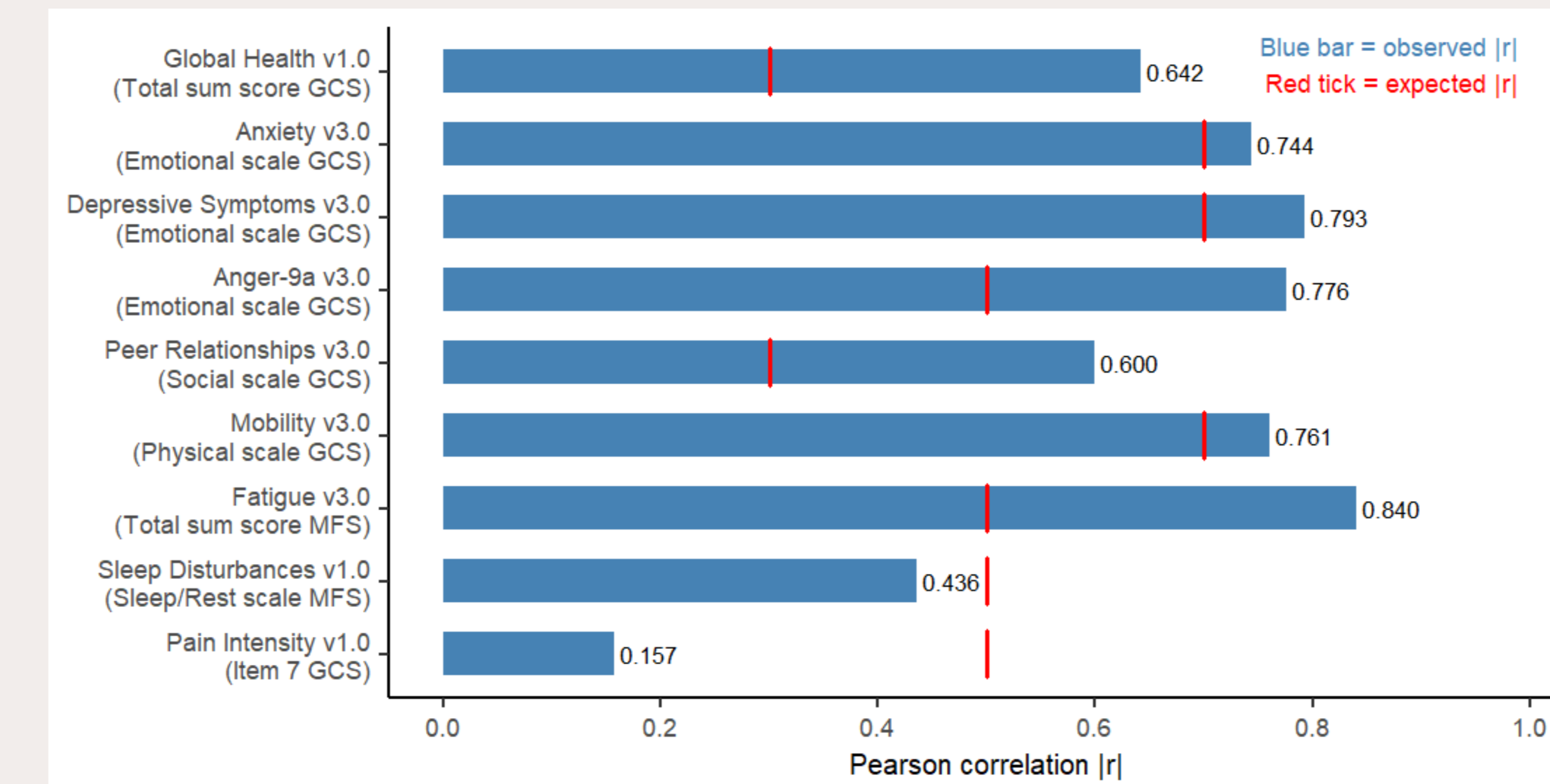
- **Participants**: Pediatric oncology patients (T1: $n=98$; T2: $n=68$):
 - Age: 11.5 ± 2.5 years; Sex: 45% female
 - Time since diagnose: 4.2 ± 2.7 years; Status: 20% in treatment
- **Design**: 2 measurement moments, 2-week interval
- **PROMIS measures**: Global Health v1.0, Anxiety v3.0, Depressive Symptoms v3.0, Anger-9a v3.0, Peer Relationships v3.0, Mobility v3.0, Fatigue v3.0, Sleep Disturbances v1.0, Pain Intensity v1.0
- **Legacy measures**: PedsQL GCS v4.0, PedsQL MFS v3.0

Outcome	Parameters	Analysis
Construct validity	U.S.	PROMIS T-scores vs. PedsQL scores: <ul style="list-style-type: none"> • Pearson Correlation
Reliability	Dutch	<ul style="list-style-type: none"> • Precision ($SE \leq 0.32$ (≥ 0.90)) • Test Information Functions • Marginal reliability
Relative efficiency	Dutch	Item bank, short form, CAT, PedsQL: <ul style="list-style-type: none"> • Efficiency ratios (bootstrap 95% CI)
Test-retest	U.S.	PROMIS item bank, PedsQL: <ul style="list-style-type: none"> • T1-T2 (out of treatment, $n=52$) • Interclass Correlation Coefficient

Results (1)

Construct validity:

- Moderate–strong ($r=0.60-0.84$); lower for Sleep Disturbance ($r=0.44$) and Pain Intensity ($r=0.16$)

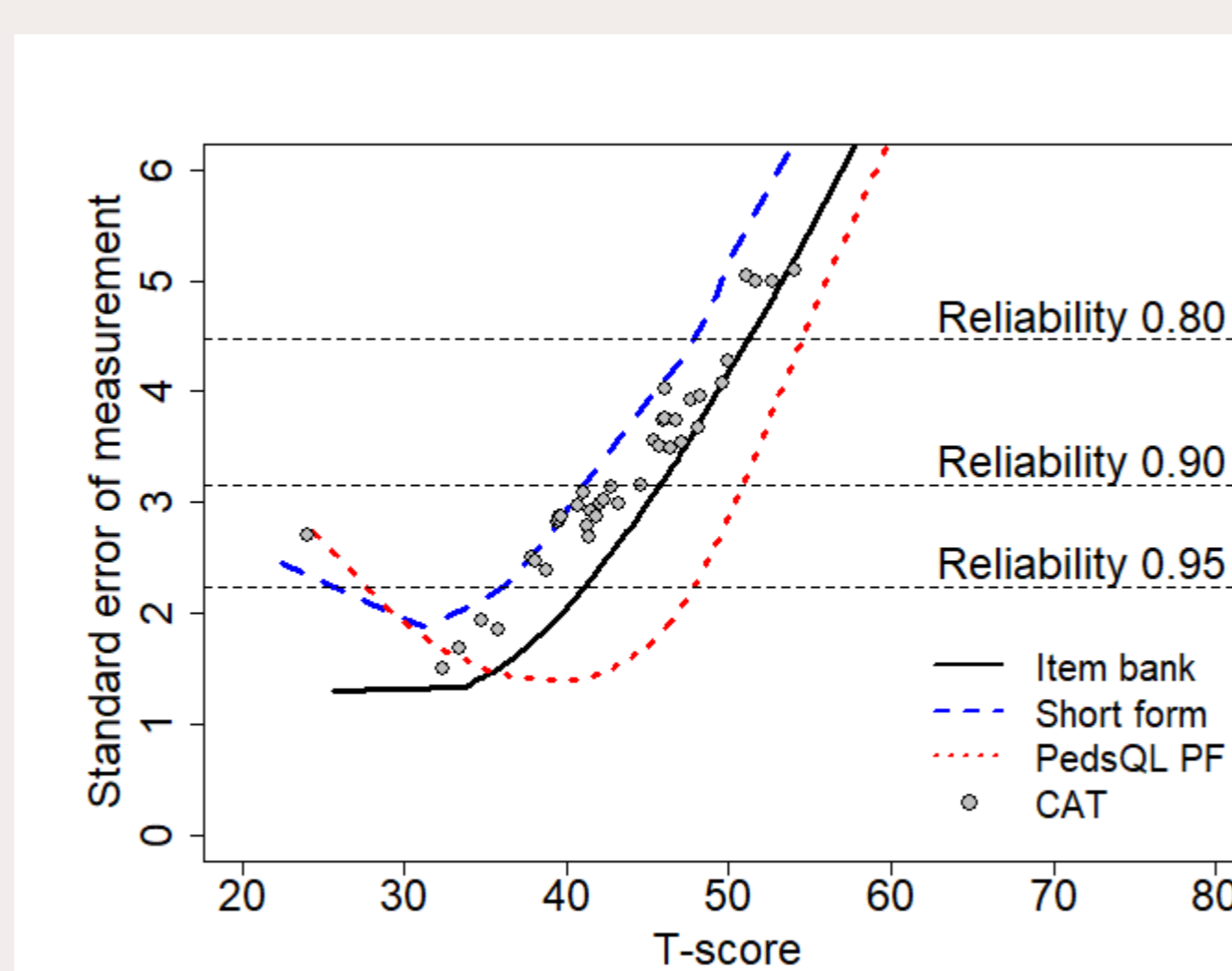


Reliability:

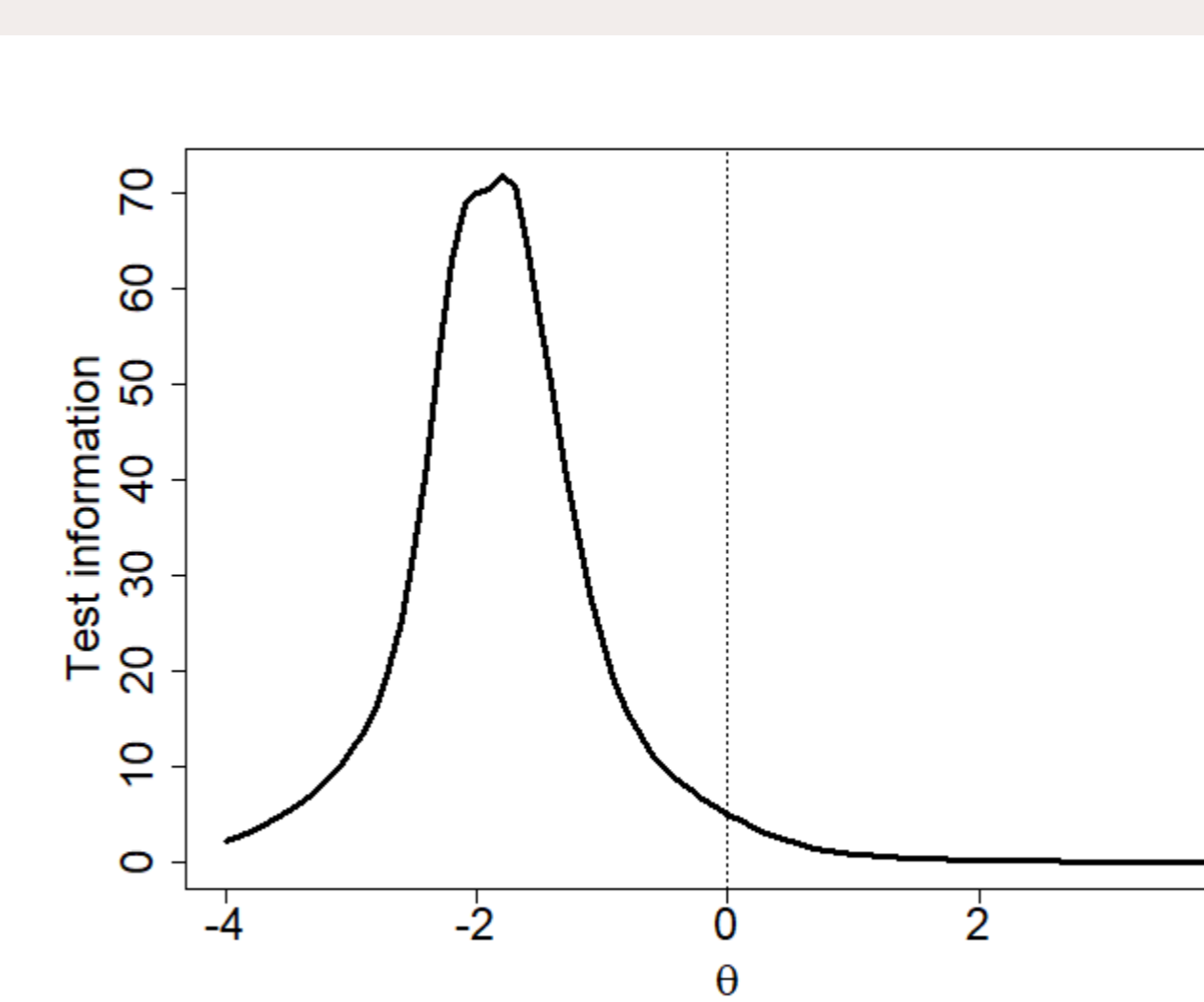
- Precision ($SE \leq 0.32$) high ($\theta=0 \pm 2SD$); except for Mobility
- Marginal reliability good (0.83–0.91); lower for Mobility (0.74)

PROMIS Mobility:

SE across T-scores



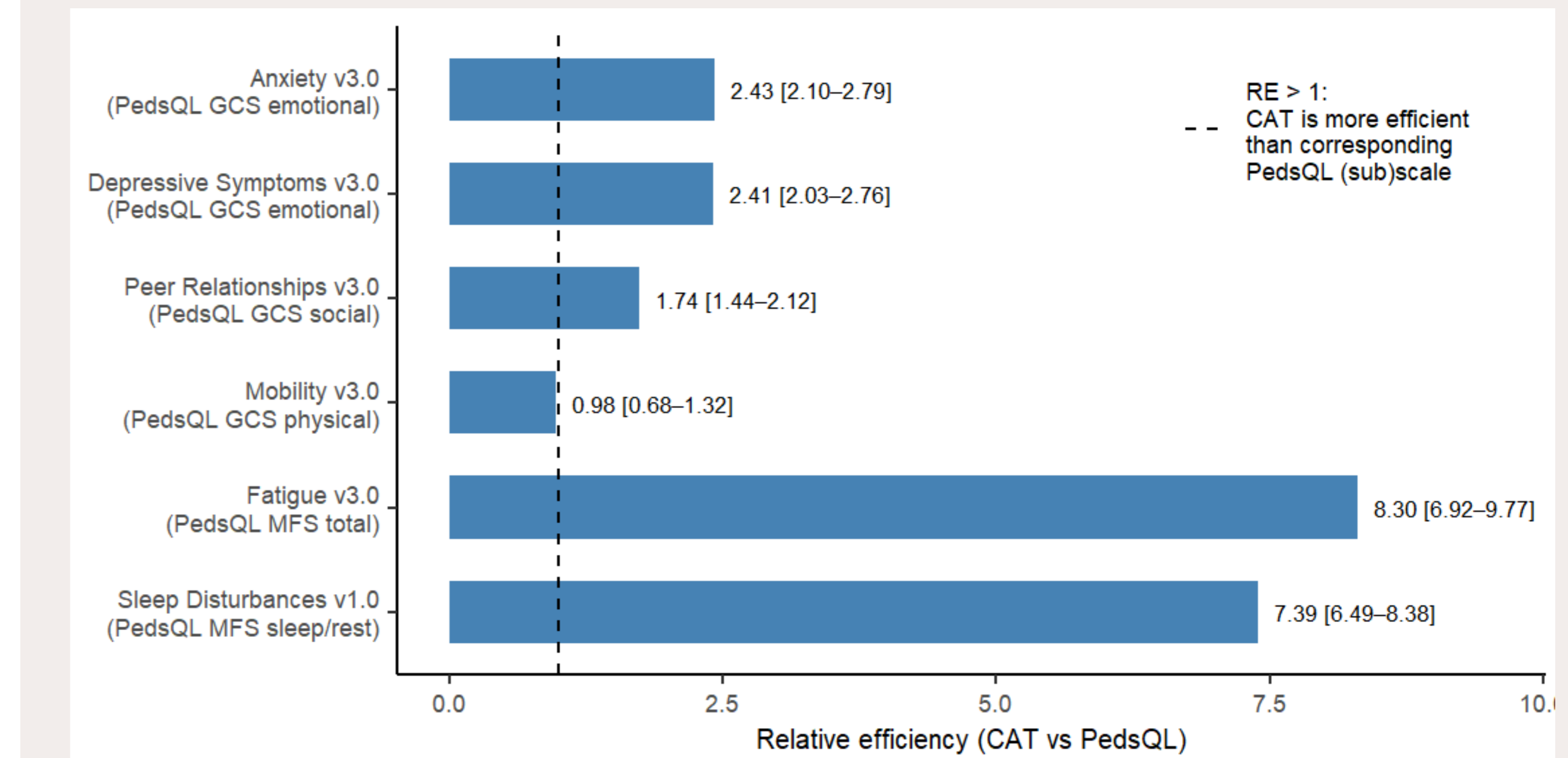
Test information across θ



Results (2)

Relative efficiency:

- CAT most efficient > full form, short form, PedsQL



Test-retest:

- PROMIS: acceptable–excellent ($ICC=0.69-0.84$); lower for Pain Intensity ($ICC=0.13$)
- PedsQL: acceptable–excellent ($ICC=0.74-0.91$)

Conclusions

- **Good construct validity**; lower for Sleep Disturbance (insomnia vs. sleep quantity) and Pain Intensity (severity vs. frequency)
- **High reliability**; lower for Mobility (less precise at high function)
- **CAT most efficient**, providing more information per item than the item bank, short form, PedsQL
- **Acceptable test–retest reliability**; lower for Pain Intensity (single-item, sensitive to weekly fluctuations)
- **Overall**: PROMIS valid, reliable, efficient alternative to PedsQL; recommended for pediatric oncology research & clinical practice (NL)

References: 1. Kearney, J.A., C.G. Salley, and A.C. Muriel, Standards of Psychosocial Care for Parents of Children with Cancer. *Pediatr Blood Cancer*, 2015. 62(Suppl 5): p. S632-83. 2. Kazak, A.E., et al., Psychosocial Assessment as a Standard of Care in Pediatric Cancer. *Pediatr Blood Cancer*, 2015. 62 Suppl 5: p. S426-59. 3. Lavalley, D. C., Chenok, K. E., Love, R. M., Petersen, C., Holve, E., Segal, C. D., & Franklin, P. D. (2016). Incorporating patient-reported outcomes into health care to engage patients and enhance care. *Health Affairs*, 35(4), 575-582. <https://doi.org/10.1377/hlthaff.2015.1362>. 4. Greenhalgh, J. (2009). The applications of PROs in clinical practice: what are they, do they work, and why? *Quality of Life Research*, 18, 115-123. <https://doi.org/10.1007/s11136-008-9430-6>. 5. Haverman, L., Luijten, M. A., Blackford, A. L., Absolom, K., Basch, E. M., van Rossum, M. A., Engelen, V., Grootenhuys, M. A., Velikova, G., & Snyder, C. (2024). Truth and dare: patients dare to tell the truth when using PROMs in clinical practice. *Quality of Life Research*, 1-9. <https://doi.org/10.1007/s11136-024-03772-3>.