Psychometric Validation of the PROMIS Fatigue-Short Form 7a in Adults with Newly Diagnosed or Recurrent *Mycobacterium avium* Complex (MAC) Lung Disease: The ARISE and ENCORE Studies

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Supplemental Material

METHODS

- Model fit was evaluated using the C2-based RMSEA and corresponding 90% CI.
- Item and score properties evaluated included local dependence (Chen & Thissen's G^2) and DIF (Wald-2 DIF Sweep procedure).
- The scoring algorithm was empirically supported by McDonald's omega.

RESULTS

- The lower limit of the RMSEA CI was < 0.05, satisfying the test of close fit; the TLI and CFI both approached their maximum values, indicating a very strong fit; and the omega statistic demonstrated that 92% of the score variance was explained by this model (**Table 1**). Thus, the unidimensional structure was supported for PROMIS-F SF-7a.
- After adjusting for multiple comparisons using an FDR adjustment, there was no observable local dependence among items.
- Item parameters were converted to IRFs to allow for easy visual interpretation of item behavior (**Supplemental Figure**).
- No DIF was present; therefore, there was no evidence of systematic bias between groups in the PROMIS-F SF-7a items.
- Because the unidimensional model fit the data very closely, and the omega statistic exceeded the threshold of 0.80 for supporting a unit-weighted sum score, a unidimensional unit-weighted score appears empirically justified for the PROMIS-F SF-7a within this context of use.

ABBREVIATIONS:

BMI, body mass index; CI, confidence interval; CFI, comparative fit index; DIF, differential item functioning; FDR, false discovery rate; FEV1, forced expiratory volume in 1 second; IRF, item response function; PROMIS-F SF-7a, Patient-Reported Outcomes Measurement Information System Fatigue Short Form 7a; RMSEA, root mean squared error of approximation; TLI, Tucker-Lewis index.

Supplemental Table. Sample Characteristics

	Validation Analysis Sample (N=231)[a]
Age group, n (%)	
< 65 years	75 (32.61)
≥ 65 years	156 (67.83)
Sex, n (%)	
Female	186 (80.87)
Male	45 (19.57)
Race, n (%)	
American Indian or Alaska Native	0 (0.00)
Asian	55 (23.91)
Black or African American	1 (0.43)
Native Hawaiian or Other Pacific Islander	0 (0.00)
White	168 (73.04)
Other	0 (0.00)
Multiple	0 (0.00)
Not reported	6 (2.61)
Unknown	1 (0.43)
Ethnicity, n (%)	
Hispanic or Latino	11 (4.78)
Not Hispanic or Latino	214 (93.04)
Not reported	6 (2.61)
Weight at baseline, mean (min-max), kg	60.16 (36.0-139.0)
Height at baseline, mean (min-max), cm	164.79 (132.1-195.6)
BMI at baseline, mean (min-max), kg/m²	22.02 (13.6-42.0)
FEV1, mean (min-max), L	1.97 (0.55-4.22)

[a] This table presents the demographic characteristics for the validation analysis sample at baseline. While the baseline sample description is based on 231 patients, the cross-sectional validation analysis sample at baseline comprised 230 patients due to 1 patient not providing any item-level PROMIS-F SF-7a data.

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Supplemental Figure. Modern Psychometric Methods: IRFs for PROMIS-F SF-7a