

Identifying Symptoms Clusters among Pediatric Chronic Kidney Disease Patients Using PROMIS® Computer Adaptive Tests

Devin Peipert, PhD

HealthMeasures User Conference

Chicago, IL

6/6/2019

Co-authors

Robert Chapman

Michelle Langer

David Cella

Jin-Shei Lai

DEPARTMENT OF
MEDICAL SOCIAL SCIENCES

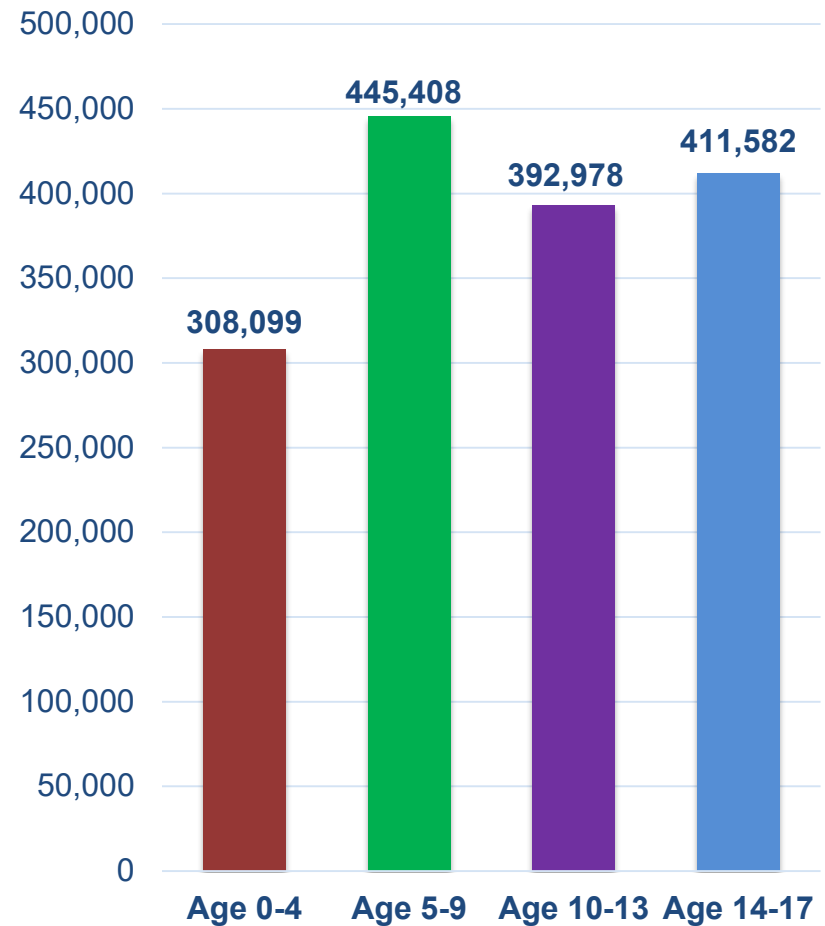
SYMPTOM CLUSTERS

- A **symptom cluster** is two or more co-occurring, inter-related symptoms
- Symptoms may have additive or interactive effects that exacerbate impact on HRQOL
- **Cluster-based management:** May intervene on multiple symptoms that share a biological mechanism

Kestler (2012) *Cancer Nurs*; Honea (2007) *Semin Oncol Nurs*; Miaskowski (2007) *Semin Oncol Nurs*

CHRONIC KIDNEY DISEASE

- Progressive, chronic illness leading to kidney failure
- Associated with multiple physical and mental symptoms



PEDIATRIC PROMIS - CKD

- Large study to develop and validate multi-dimensional set of item banks for children and parent proxies
- Data collected from **384** pediatric CKD patients, aged 8-17 in the Midwest Pediatric Nephrology Consortium
 - Mean Age= 13 (range: 8-17)
 - 42% female
- Item banks developed using rigorous PROMIS multi-stage approach
- Scored on T-score metric (mean = 50, SD = 10), and higher scores indicate more of the measured construct
 - Referenced to the general US population
- Administered as computer adaptive tests



STUDY OBJECTIVES

- Use multiple statistical approaches to identify symptom clusters in pediatric CKD patients using PROMIS CAT scores

PROMIS PEDIATRIC DOMAINS

Mobility

Upper
Extremity
Function

Fatigue

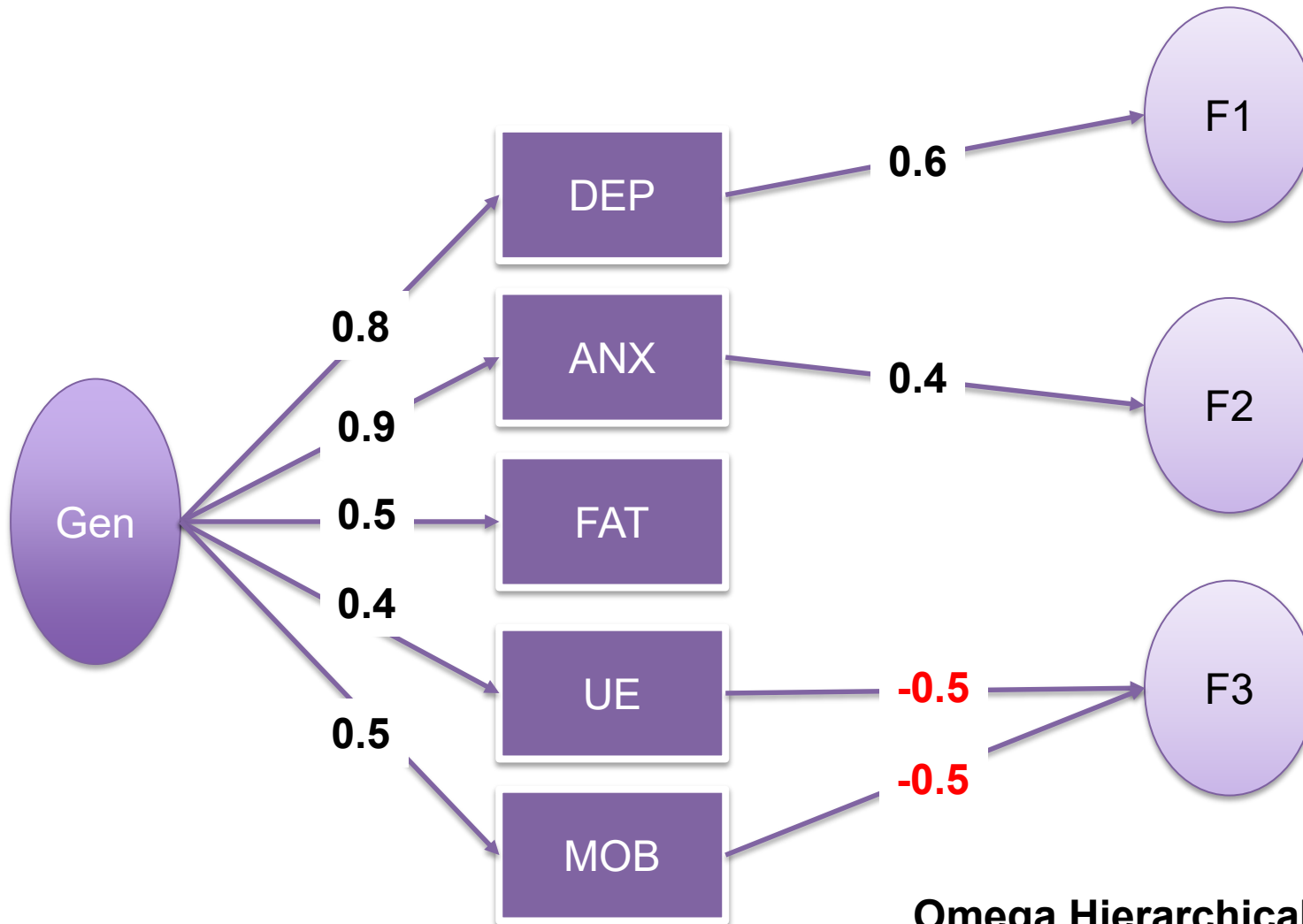
Depression

Anxiety

IDENTIFYING SYMPTOM CLUSTERS

- Modeled SCs at the domain level using two statistical approaches:
 - Bifactor exploratory analysis (oriented toward correlations among symptoms)
 - Latent profile analysis (oriented towards identifying profiles of patients in which symptoms co-occur)
- Each PROMIS domain T-score was entered into each model.

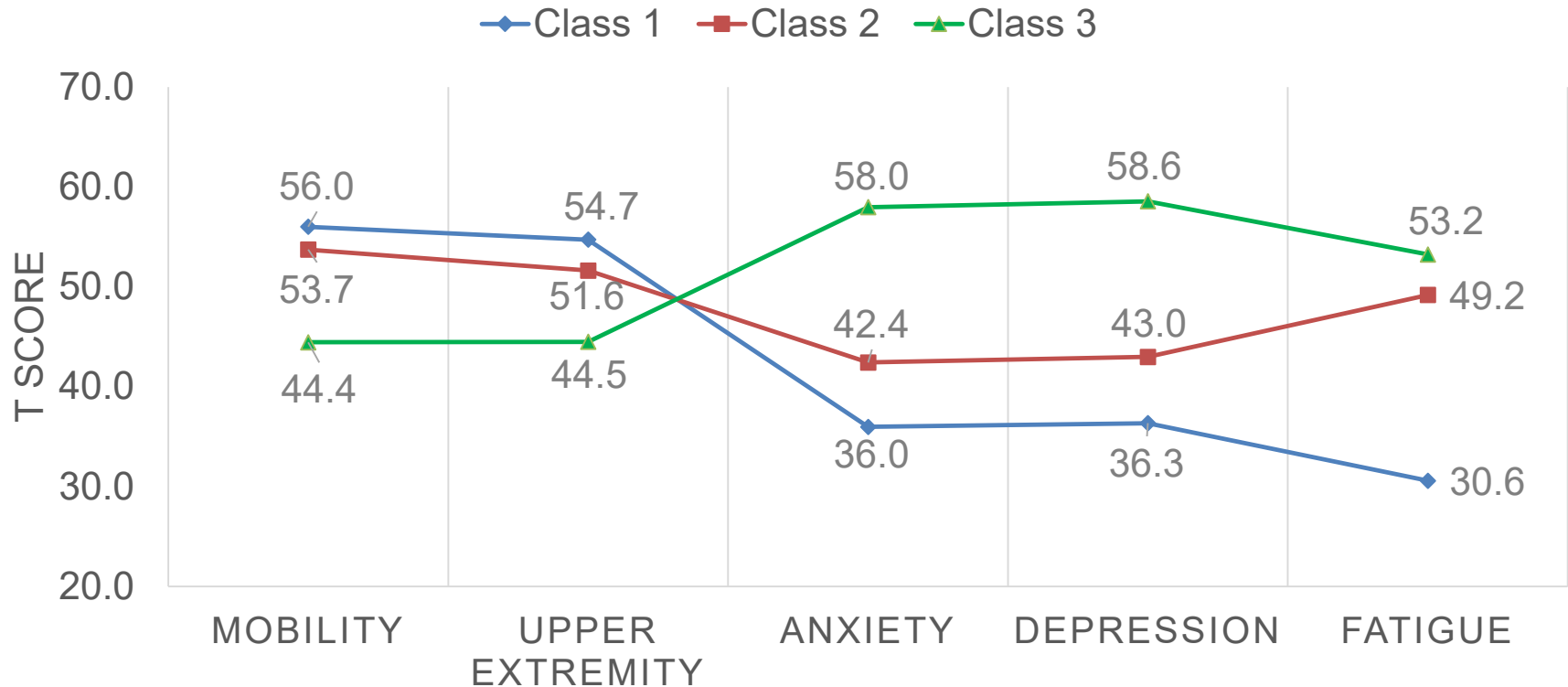
BIFACTOR EFA



Omega Hierarchical: 0.72

Explained Common Variance: 0.67

LATENT CLASS ANALYSIS



Vuong-Lo-Mendell-Rubin Likelihood Ratio Test for 2 vs. 3 classes, $p < 0.002$

CONCLUSIONS & NEXT STEPS

- PROMIS CATs are a clinically-feasible method for determining whether pediatric CKD patients experience high vs. low symptom burden.
- Symptom Clusters were identified with PROMIS CAT scores by characterizing patients with severity-based profiles.
- Additional research will model symptoms longitudinally and causally to determine symptom relationships.

Thank you!

Questions?

PROMIS DOMAIN T SCORES

	Mobility	Upper Extremity	Fatigue	Anxiety	Depression
Mean	51.5	50.1	47.3	45.8	46.3
Standard Deviation	8.3	8.3	9.1	10.8	10.9
Minimum	15.1	25.8	24.0	31.6	31.7
25 th percentile	46.1	43.9	45.9	35.9	35.5
Median	52.3	52.4	50.0	44.6	45.1
75 th percentile	58.5	57.5	50.0	52.5	54.3
Maximum	61.5	61.9	75.9	84.8	81.6

DOMAIN CORRELATIONS

	Mobility	Upper Extremity	Fatigue	Anxiety	Depression
Mobility	1.0	-	-	-	-
Upper Extremity	0.44	1.0	-	-	-
Fatigue	-0.36	-0.30	1.0	-	-
Anxiety	-0.48	-0.37	0.48	1.0	-
Depression	-0.43	-0.32	0.50	0.72	1.0

SYMPTOM CLUSTERS

Class	Content
Class 1	High physical function, low emotional distress, low fatigue
Class 2	Average physical function, low emotional distress, average fatigue
Class 3	Poor phys function, high emotional distress, average fatigue