


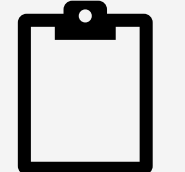
Use of Item Response Theory to Create Multi-dimensional Measures of Financial Toxicity in Cancer

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Background

 Financial toxicity is common after cancer diagnosis and is associated with worse quality of life and earlier mortality

 Current measures of financial toxicity do not assess all dimensions of this hardship and could miss patients that are struggling. Current measures are also unlikely to capture patients before they experience severe financial hardship making prevention more difficult.

 This study created multidimensional measures of financial toxicity in people recently diagnosed with breast cancer.

Methods

- **Population:** Adults (age 18+) diagnosed with breast cancer (all stages, all types including recurrence and second primary) in the past two years
- **Recruitment source:** Surveillance, Epidemiology and End Results (SEER) Cancer Registry in Washington State, USA
- **Procedures:** Potential participants received letters, texts, phone calls and paper surveys inviting them to participate in the study
- **Measures:** Using prior qualitative research and literature, measures for four dimensions of financial toxicity were used.
 - **Financial Anxiety**- about affording healthcare and working
 - **Financial Depression**- specifically about finances
 - **Financial Coping**- behaviors to prevent or manage financial hardship
 - **Financial Consequences**- economic shocks or impacts when coping is overwhelmed
- **Analysis:** Item response theory (IRT) was used to evaluate the reliability and validity of the four measures. Correlations with other measures of cancer-specific and general financial hardship evaluated construct validity

Findings

Chart 1: Standard Error for Four Financial Hardship Measures

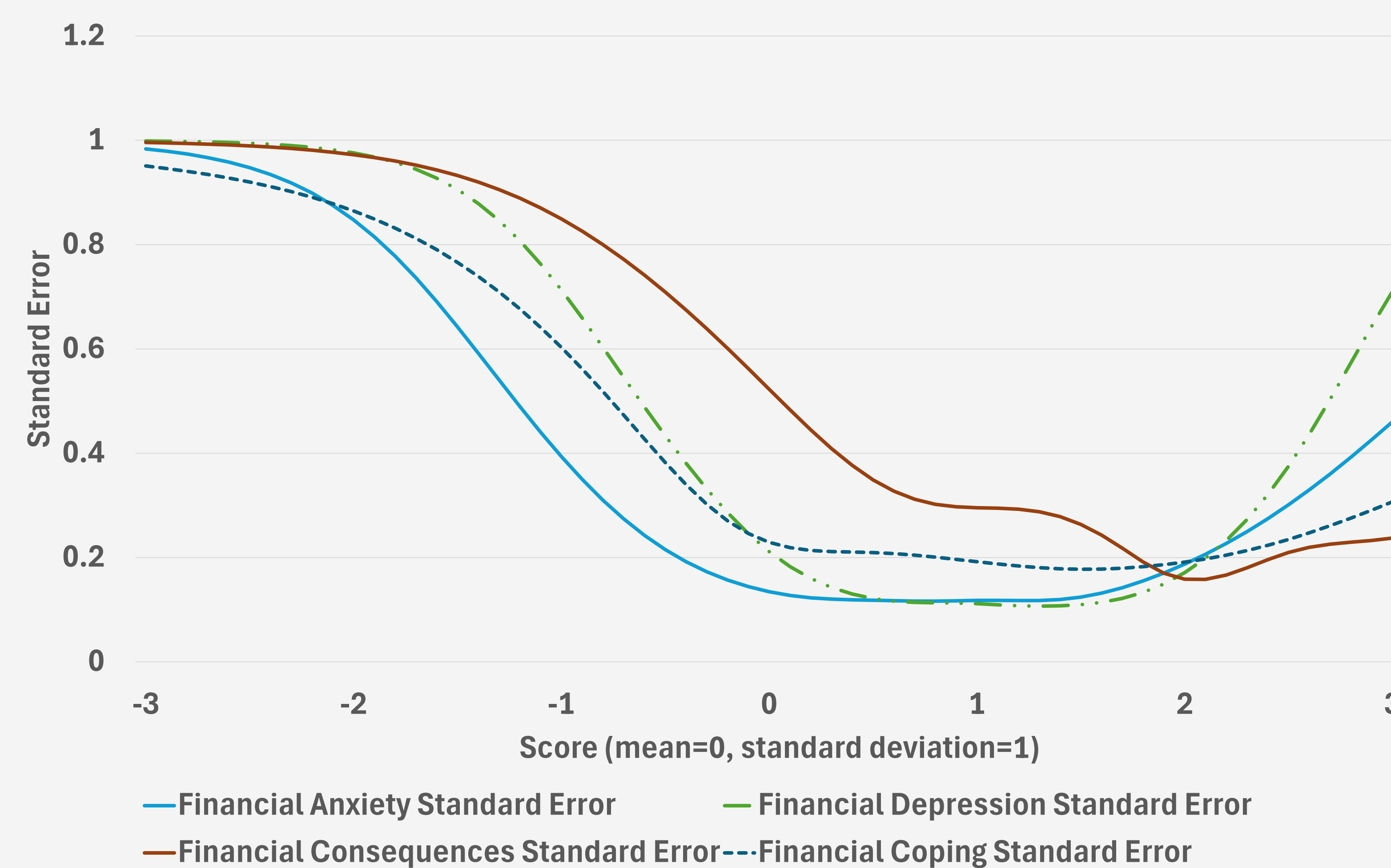


Table 1: Pearson Correlations Between Financial Hardship Measures and Construct Validity Measures. All correlations significant at $p < 0.0001$. Spearman correlations showed similar results

Comparison Measure	Financial Hardship Measures			
	Financial Anxiety	Financial Depression	Financial Consequences	Financial Coping
Consumer Financial Protection Bureau Financial Well-Being Scale score	-0.70	-0.75	-0.70	-0.76
Comprehensive Score for Financial Toxicity-Financial Toxicity Score (COST)	-0.74	-0.76	-0.76	-0.76
Treatment nonadherence NHIS medication cost-related nonadherence questions	0.23	0.20	0.19	0.24
NHIS financial hardship questions	0.27	0.30	0.40	0.35
NHIS financial hardship questions Cancer Treatment and Distress Scale finances subscale	0.76	0.74	0.71	0.76
Cancer Treatment and Distress Scale finances subscale	0.73	0.70	0.68	0.71

Findings

- IRT analyses showed all items for three financial hardship measures were valid and reliable (slopes > 1.0)
 - 15 Financial Depression items
 - 24 Financial Anxiety items
 - 22 Financial Consequences items
- One financial coping item (tax deductions due to medical expenses) was not reliable (slope < 0.50) and was removed.
- Three financial coping items had slopes between 0.75 and 0.99 but were retained due to the importance of assessing use of health insurance as a coping strategy
 - Items: change insurance, appealed denial, tracked insurance claims
- Financial Anxiety captured a wider range of financial hardship than the other measures as shown by the standard error curves (**Chart 1**). Financial Consequences tended to measure only severe levels of financial hardship.
- Correlations with cancer-specific and general financial hardship measures were significant and in the expected direction (**Table 1**).

Conclusion

- The four financial hardship measures:
 - Were valid and reliable
 - Assess multiple dimensions of cancer-specific financial hardship
 - Can be used with computerized adaptive testing, using all items or as short forms
- Financial anxiety may be a useful precursor of more severe financial hardship such as financial consequences
- When assessing financial hardship in clinical trials, investigators should consider multiple dimensions of financial hardship

Acknowledgements:

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References:

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2. Jones, S. M., Yi, J., Henrikson, N. B., Panattoni, L., & Shankaran, V. (2024). Financial hardship after cancer: revision of a conceptual model and development of patient-reported outcome measures. *Future Sci OA*, 10(1), FSO983. <https://doi.org/10.2144/fsoa-2023-0229>