Longitudinal Measurement Invariance of the Physical Activity and Social Support Scale

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Introduction

- Five forms of functional social support (i.e., companionship, emotional, instrumental, informational, and validation) have been associated with higher physical activity levels in cross-sectional studies[1,2].
- The Physical Activity and Social Support Scale (PASSS) is designed to measure these five forms of functional social support for physical activity[2].
- The PASSS was initially developed among a healthy, active adult population and showed good psychometric properties through exploratory factor analysis, confirmatory factor analysis, and test re-test reliability[2].
- However, the PASSS has not been psychometrically assessed over multiple time points or across different groups.
- To address these limitations, measurement invariance techniques can be used to demonstrate the stability and consistently of the same factorial structure overtime and/or across groups.

Purpose

- The objective of the proposed study was to psychometrically assess the stability and consistency of forms of social support measured by the PASSS over time with longitudinal invariance testing.

Methods

- Sample size for the current analysis (n=611)
- PASSS responses at baseline, 6-months, and 24-months
- Multigroup confirmatory factor analyses were conducted using maximum likelihood estimation
- Used a fixed factor approach (all loadings freely estimated, each latent factor variance fixed to 1 with mean of 0).
  - Model 1:Configural - all item loadings and intercepts freely estimated
  - Model 2: Metric - loadings constrained across time
  - Model 3: Scalar - loadings and intercepts constrained across time
- Changes in chi-square and comparative fit index (CFI) were examined across models
- A lack of significant decrement in fit (i.e., similar fit) would indicate metric invariance (meaning factor loadings are equivalent across time) and scalar invariance (meaning that the factor loadings and intercepts are equivalent across time).

Results

- The chi-square difference test was significant for the change from model 1 to model 2 ($\Delta\chi^2 = 48.4$; $p < .001$).
  - The change in CFI ($\Delta CFI = .002$) was negligible, suggesting metric invariance held.
- The chi- square difference test was significant for the change from model 2 to model 3 ($\Delta\chi^2 = 93.8$; $p = .02$).
  - The change in CFI ($\Delta CFI = .003$) was again negligible, suggesting scalar invariance held.

Main finding

Functional forms of social support measured by the PASSS were stable and consistent over time, which demonstrates its strength in measuring social support for physical activity.

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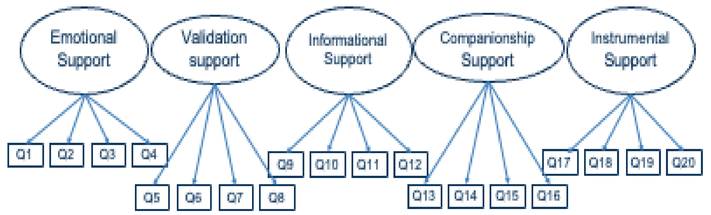
Tables & Figures

Table 1. *Longitudinal measurement invariance of the PASSS across baseline, 6-months, and 24-months (n=611)*

Invariance Model Type	χ^2	*df*	CFI	comparison	$\Delta\chi^2$	Δdf	*p*	ΔCFI
M1: Configural	4047.93	1605	0.846					
M2: Metric	4108.15	1645	0.844	M1 vs M2	60.21	40	.021	0.002
M3: Scalar	4201.98	1685	0.841	M2 vs M3	93.83	40	<.001	0.003

Note. All models are 5-factor confirmatory factor analysis models. PASSS = Physical Activity and Social Support Scale, *df* = degrees of freedom, CFI = comparative fit index, Δ = change in.



Discussion

- Findings show that both metric and scalar invariance held because the change in the CFI was less than .01.
- Although chi-square differences are reported, these are not relied on to determine invariance because of their sensitivity to sample size which has been supported by current research.
- Therefore, we can conclude that the forms of social support measured by the PASSS were stable and consistent over time.
- Provides evidence that any observed changes over time reflect actual changes in physical activity and social support, not artifacts of how the scale operates over time.
- Allows researchers to explain predictors of change in PASSS and physical activity levels.
- Furthermore, it demonstrates the PASSS's strength in measuring social support for physical activity.

References

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2. Golaszewski NM, Bartholomew JB. The Development of the Physical Activity and Social Support Scale. *J Sport Exercise Psychol*. 2019;41(4):215-229. doi:10.1123/jsep.2018-0234