2020

Life Satisfaction: Measurement Invariance and Correlations with Adolescent Adjustment

Sarah K. Pittman
Virginia Commonwealth University

Robert F. Valois

Albert D. Farrell

Life Satisfaction: Measurement Invariance and Correlations with Adolescent Adjustment

Sarah K. Pittman[1], Robert F. Valois[2], Albert D. Farrell[1]
[1]Clark-Hill Institute for Positive Youth Development, Department of Psychology, VCU
[2]Arnold School of Public Health, University of South Carolina

VCU
Clark-Hill Institute for Positive Youth Development

VCU
Clark-Hill Institute for Positive Youth Development

Introduction

- Low life satisfaction during adolescence has been associated with adjustment problems during adolescence and low levels of life satisfaction in adulthood. However, there are few well-validated measures available to assess adolescents' life-satisfaction. Few studies have evaluated their measurement invariance despite evidence that the properties of these measures may differ across racial and ethnic groups (Zeng et al., 2018).
- A review of adolescent life satisfaction measures found only one (Students' Life Satisfaction Scale) that demonstrated measurement invariance across gender and race (Gilman & Huebner, 2000).
- Other scales either did not have consistent factor structures, lacked evidence of measurement invariance, or have not evaluated these psychometric properties.
- The purpose of this study was to investigate the structure of the Life Satisfaction Scale (Valois et al., 2001), evaluate its measurement invariance across sex and race/ethnicity, and investigate its associations with stressors (i.e., witnessing violence, peer pressure) and adjustment (i.e., frequency of aggression). The focus was on a rural sample of adolescents – a population that has received little attention in the literature.

Methods

Participants
- 3,340 adolescents from nine rural middle schools in Florida participating in a study evaluating a violence prevention program
- 50% female, 51% White, 15% black, and 22% Latinx
- > 60% eligible for the federal free or reduced school lunch program
- 29% had parents who were migrant workers
- 32% English was not primary language at home

Measures
- The Life Satisfaction Scale has six items that represent the following domains: family life, friendships, school experience, myself, where I live (i.e., environment), and overall life. Participants rate level of satisfaction on a seven-point scale from 1= *Terrible* to 7= *Delighted*.
- Children's Report of Exposure to Violence assesses frequency of lifetime exposure to community violence from 1 = *Never* to 4 = *Many times*
- Non-violent problem behavior, physical violence, and peer pressure to use drugs subscales from the Problem Behavior Frequency Scales (PBFS), ask participants to rate frequency of problem behaviors within the past 30 days from 1 = *Never* to 6 = *20 or more times*

Analyses
- We conducted confirmatory factor analyses using Mplus version 8 (Muthén & Muthén, 2017). We treated item responses as ordered categorical.
- We conducted multiple group analyses to evaluate measurement invariance across sex and racial/ethnic identity based on the chi-square difference test and change in the comparative fit index (i.e., ΔCFI > .01).
- We compared correlations between life satisfaction and measures of adolescent experiences across sex and racial/ethnic identity

Results

Life Satisfaction Structure & Invariance testing
- A one-factor model of overall life satisfaction fit the data well (Model 1).

By Sex
- We found support for configural (Model 2) and metric invariance (Model 3). This indicated that a one-factor model was appropriate for boys and girls, and that factor loading did not differ across sex.
- There was not, however, support for scalar invariance, indicating differences in item thresholds across sex (see Model 4). This indicates that boys and girls differed in how they responded to the anchor points on the rating scale.
- We found support for partial scalar invariance in a model that allowed 20% of the thresholds (identified by modification indices) to vary by sex (see Model 6).
- The lack of support for scalar invariance (i.e., there were differences in 20% of the thresholds), indicates that means of life satisfaction for boys and girls cannot be compared (Dimitrov, 2010).

Table 1. Results of item response analyses/invariance testing

Model	χ^2	df	$\chi^2\Delta$	dfΔ	RMSEA	CFI	TLI
Full sample							
1. Overall model	14.994*	5			.024	.998	.996
Multiple group by sex							
2. Configural invariance	24.460*	10			.029	.997	.995
3. Metric invariance	24.400*	14	3.80[1]	4	.021	.998	.997
4. Scalar invariance	194.535*	38	182.57[2]	24	.050	.972	.985
5. Partial scalar, 3 thresholds free	118.040*	35	105.09[2]	21	.038	.985	.991
6. Partial scalar, 6 thresholds free	70.209*	32	51.59[2]	18	.027	.993	.996
Multiple group by race							
7. Configural invariance	17.828*	15			.014	.999	.999
8. Metric invariance	29.587*	23	11.31[1]	8	.017	.999	.998
9. Scalar invariance	163.703*	71	141.90[2]	48	.036	.982	.992
10. Partial scalar, 2 thresholds free	122.839*	69	98.37[2]	46	.028	.990	.995

Note. N = 3340. RMSEA = root mean square error of approximation. CFI = comparative fit index. TLI = Tucker- Lewis fit index. * = p < .05
1$\chi^2\Delta$ and dfΔ are based on the metric against configural model comparison
2$\chi^2\Delta$ and dfΔ are based on the scalar against metric model comparison.
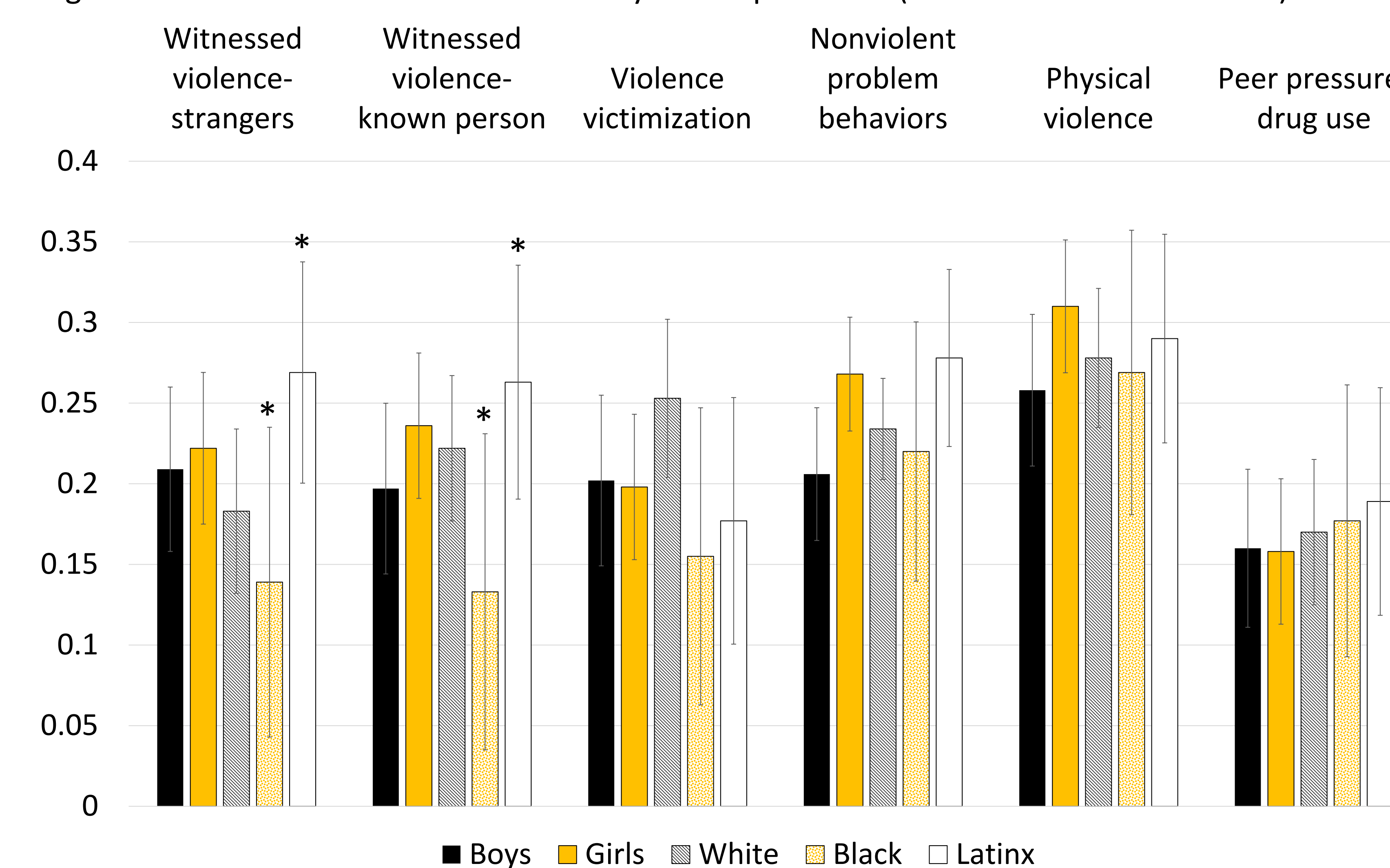
By Race/ethnicity
- We again found support for both configural (Model 7) and metric invariance (Model 8), but not for full scalar invariance (Model 9).
- We did, however, find support for partial scalar invariance in a model that allowed 2 of the thresholds to vary across groups (Model 10).
- Finding differences in less than 20% of the thresholds and overall model fit (Hu & Bentler, 1999) meet recommended guidelines for assuming scalar invariance (Dimitrov, 2010).

Relations with adjustment
- Life satisfaction was significantly negatively correlated with adolescent experiences for all participants. The correlations between life satisfaction and both witnessing violence against a stranger and someone known to the participant were significantly stronger for Latinx participants than for Black participants. No other correlations significantly differed between groups.

Figure 1. Life satisfaction correlation with youth experiences (based on models 6 and 10)

Note: All correlations between life satisfaction and outcome variables are negative. Signs of correlations were reversed for simplicity. * = groups significantly differed

Discussion & Future Directions

- Although tests of measurement invariance revealed consistency in factor loadings across sex, there were significant differences in item thresholds such that girls at the same level of life satisfaction as boys, were more likely to endorse higher responses ("pleased" and "delighted") to items assessing satisfaction with school, with themselves, and with their friendships
- This has important implications for measurement, in particular it raises issues when comparing mean differences across groups
- Overall, our findings suggest that the Life Satisfaction Scale may be suitable for assessing life satisfaction across groups of adolescents that differ in race or ethnicity. They also suggest that examining sex differences must be done cautiously as male and female adolescents may be responding differently to anchor points on the scale, which could suggest that life satisfaction has different meanings to boys and girls
- The negative correlations of life satisfaction with violence exposure and problem behavior across groups highlights the importance of developing sound measures to assess this important construct and determine how it relates to youth adjustment

References

Dimitrov, D. M. (2010). Testing for factorial invariance in the context of construct validation. Measurement and Evaluation in Counseling and Development, 43, 121–149. http://dx.doi.org/10.1177/0748175610373459

Gilman, R., & Huebner, E. S. (2000). Review of Life Satisfaction Measures for Adolescents. *Behaviour Change, 17*(3), 178–195. https://doi.org/10.1375/bech.17.3.178

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1-55. https://doi.org/10.1080/10705519909540118

Valois, R. F., Zullig, K. J., Huebner, E. S., & Drane, J. W. (2001, July). Relationship Between Life Satisfaction and Violent Behaviors among Adolescents [Text]. https://doi.org/info:doi/10.5993/AJHB.25.4.1

Zeng, Y., Ling, Y., Huebner, E. S., He, Y., & Fu, P. (2018). Assessing the measurement invariance of the Brief Multidimensional Students' Life Satisfaction Scale in Chinese and American adolescents. *Quality of Life Research, 27*(1), 259–266. https://doi.org/10.1007/s11136-017-1688-0