Psychometric Evaluation of the Indonesian version of Connor-Davidson Resilience Scale in Adolescent Survivors of Disaster

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PURPOSE

Assessing adolescent survivors' resilience in the long-term period after disaster needs an appropriate measurement. The Indonesian version of 25-item Connor-Davidson Resilience Scale (CD-RISC) is provided; however, no published study clearly explains its factorial structure, construct validity, and reliability. Moreover, a psychometric testing of the scale has never been reported among adolescent survivors of disaster. It is very important to examine whether the scale has adequate internal consistency and construct validity for its use in different background, population, and culture.

METHODS

STUDY DESIGN
Cross-sectional

SETTING AND PARTICIPANT
- 7 schools (4-junior and 3-senior high schools) in Cangkringan District, the most severely damaged district in Sleman Regency, Yogyakarta Province, Indonesia
- August-September 2017
- 599 students aged 12-18 years old, randomly divided into 2 groups: Group 1 (n= 300) and Group 2 (n= 299)
- Experienced the 2010 Mount Merapi volcano eruption
- Completed parent's consent and student's assent form
- Voluntarily agree to participate

FACTORIAL STRUCTURE
- IBM SPSS version 21.0
- Group 1 (n= 300), an exploratory factor analysis (EFA) with a correlation matrix using KMO (Kaiser-Meier-Olkin) and Barlett's test of sphericity, a principal component analysis which based on eigenvalues > 1, and oblique rotation.

CONSTRUCT VALIDITY
- IBM SPSS for AMOS version 21.0
- Group 2 (n= 299), a first order confirmatory factor analysis (CFA)
- A four-factor structure of present study and the original five-factor structure of CD-RISC
- Goodness-of-fit indices:
  - Ratio of the chi-square to the degree of freedom (x^2/df) < 5
  - Root-mean-square error approximation (RMSEA) < 0.08
  - Goodness of fit index (GFI) > 0.90
  - Comparative fit index (CFI) >0.90
  - Tuker-Lewis index (TLI) > 0.90
  - Standardized root mean square residual (SRMR) <0.08

INTERNAL CONSISTENCY RELIABILITY
- Cronbach's α of every factors and overall factors

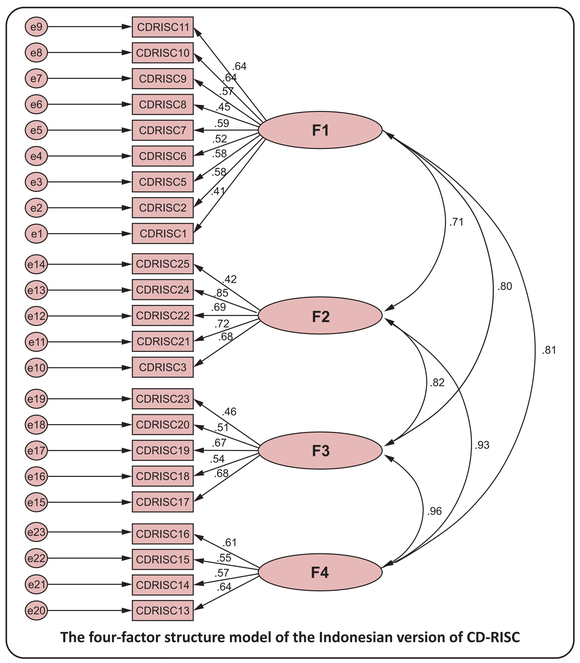
RESULTS

Table 1. Score of each item, item-total correlation, and oblique rotated factor pattern of the CD-RISC (n= 300)

Item	Score (mean±SD)	Item-total correlation	Factor loadings			
			1	2	3	4
9	2.70±0.831	0.528	0.674			
8	2.54±1.095	0.530	0.663			
7	2.27±1.034	0.577	0.625			
6	2.42±0.923	0.518	0.601			
10	2.94±0.826	0.606	0.594			
1	2.56±0.8843	0.520	0.580			
5	2.69±0.929	0.666	0.572			
2	2.55±0.943	0.544	0.504			
11	3.16±0.764	0.620	0.498			
25	3.18±0.871	0.472		0.718		
21	2.95±0.860	0.656		0.675		
22	2.50±0.941	0.635		0.587		
24	2.73±0.944	0.631		0.513		
3	3.31±0.842	0.469		0.492		
4	2.24±0.931	0.566				
18	1.87±1.031	0.529			0.749	
20	2.14±0.980	0.519			0.643	
19	2.32±0.990	0.640			0.608	
23	2.35±0.972	0.504			0.503	
17	2.32±1.030	0.657			0.485	
14	2.15±1.023	0.540				0.746
15	2.31±0.971	0.550				0.668
16	2.75±0.859	0.620				0.557
13	2.35±0.985	0.569				0.549
12	2.70±0.921	0.631				0.532
Eigenvalue			8.771	1.574	1.498	1.199
Variance explained (%)			35.083	6.297	5.990	4.796

CD-RISC, Connor-Davidson Resilience Scale; SD, Standard Deviation

RESULTS



The four-factor structure model of the Indonesian version of CD-RISC

Table 2. Goodness-of-fit for the CD-RISC models

	x^2/df	RMSEA	GFI	CFI	TLI	SRMR
Original 5-Factor	2.635	0.074	0.831	0.816	0.791	0.068
Original 4-Factor	2.428	0.069	0.854	0.851	0.831	0.067

x^2/df, ratio of the chi-square to the degree of freedom; RMSEA, root-mean-square error approximation; CFI, comparative fit index; TLI, Tuker-Lewis index; SRMR, standardized root-mean-square residual;

CD-RISC's reliability performances

Cronbach's α of the 4-factor structure demonstrated that every factor were reliable and internally consistent. Cronbach's α of factor 1= 0.804, factor 2= 0.712, factor 3= 0.713, factor 4= 0.655, and overall factor= 0.903.

The EFA yielded a new 4-factor structure with 24 items (Group 1, *n*= 300) that explained 52.17% variances. The KMO test's coefficient was 0.922, indicating that the sample size was perfectly fine, and the Bartlett's test of sphericity was statistically significant (p<0.001). We then confirmed the new model through CFA and compared to the original 5-factor structure using data from Group 2 (*n*=299). The present 4-factor structure confirmed a better fit than the original 5-structure (x^2/df= 2.428, RMSEA= 0.069, GFI= 0.854, CFI= 0.851, TLI= 0.831, and SRMR= 0.06) and demonstrated good internal consistency (Chronbach α overall scale=0.903, factor 1= 0.804, factor 2= 0.712, factor 3= 0.713, and factor 4= 0.655).

CONCLUSION

The findings support validation data for the Indonesian version of 25-item CD-RISC which was approved with 24 items in 4 factors, as well as evidence on the resilience construct for the use of the scale among adolescent survivors of disaster in Indonesia.

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