Confirmatory Factor and Invariance Analysis of the Difficulties in Emotion Regulation Scale-Parent Report

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Emotion Dysregulation

- Emotion dysregulation is commonly defined as one's general ability (or inability) to regulate their emotions[1]
- Transdiagnostic factor for internalizing and externalizing behavior[2]
- There four widely used components:
    1. Emotional awareness and understanding
    2. Emotional acceptance
    3. Ability to exercise impulse control while experiencing negative emotions
    4. Ability to utilize any emotion regulation strategy appropriate for specific situations and modulate emotional responses to achieve individual goals[3]

1 Compas et al., 2017

2 Aldao et al., 2016; Amstadter, 2008; Cludius et al., 2020; Sloan et al., 2017; Weissman et al., 2019

3 Bunford et al., 2020; Gratz & Roemer, 2004

Difficulty in Emotion Regulation Scale-Parent Report (DERS-P)

- The DERS-P was developed to provide a parent report measure for their adolescent's emotion regulation ability[1]

DERS Self Report	DERS Parent Report
36 Items	29 Items
6 Factors 1. Lack of emotional response awareness 2. Lack of clarity in emotional responses 3. Nonacceptance of emotional responses 4. Strategies Use 5. Impulse Control 6. Goal Directed Behavior	4 Factors 1. Catastrophize 2. Negative Secondary 3. Attuned 4. Distracted

1 Bunford et al., 2020

2 Gratz & Roemer, 2004

Previous Validation

- To date, there has been one validation study conducted for the DERS-P[1]
- An online community sample was used to investigate the factor structure and internal consistency[1]
- A sample of youth who had been diagnosed with ADHD was used to determine convergent, concurrent, and incremental validity[1]
- Invariance testing of the DERS-P has not yet been conducted prior to this project

1 Bunford et al., 2020

Current Study Sample

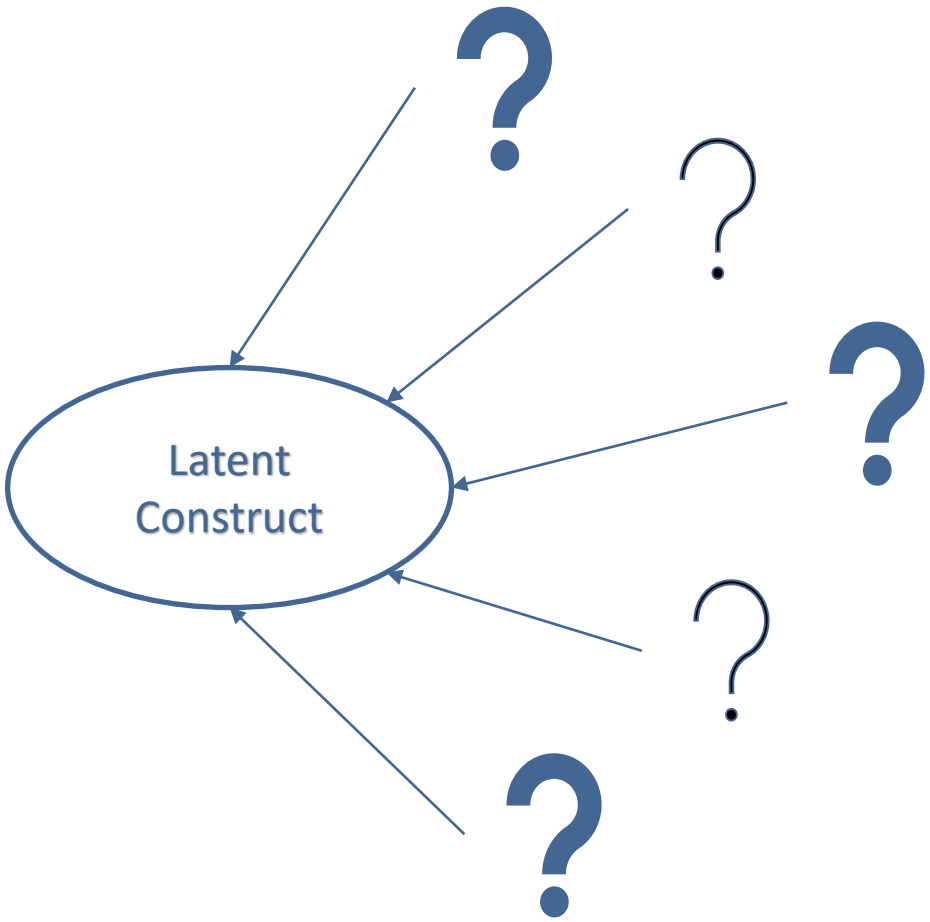
- This project used publicly available longitudinal data from the Adolescent Brain Cognitive Development (ABCD) Study[1]

	Wave 1	Wave 4	Missing Data Analysis
Sample	11,876	6,251	
Age in Years [SD]	9.92 [0.62]	12.90 [0.64]	
Sex			**Z-test**
% Female	47.8	47.3	0.44
Race/Ethnicity			
% White	52.1	58.1	-7.71***
% Black	18.1	12.9	9.01***
% Asian	5.3	5.4	0.28
% Hispanic	20.6	19.6	1.59
% All Other	3.9	3.9	0.00

1 Karcher & Barch, 2021

Confirmatory Factor Analysis

- CFAs are conducted to investigate the factor structure of a survey
- A way to verify that the observed variables map onto a latent structure
- Items with factor loadings above .40 are generally considered to load onto the same latent construct



Analysis

1

Initial test of the two factor structures:

- Four factor structure by Bunford et al., 2020 (parent report)
- Six factor structure by Gratz and Roemer, 2004 (self report)

2

Examined the Results:

- Both models had adequate fit statistics
- Two items had factor loadings under .40 and were removed
  - *"When my child is upset, he/she knows that he/she can find a way to eventually feel better."*
  - *"When my child is upset, he/she feels like he/she can remain in control of his/her behaviors."*
- Six factor model showed linear dependency between the Clarity and Awareness subscales (r = 1.02)

3

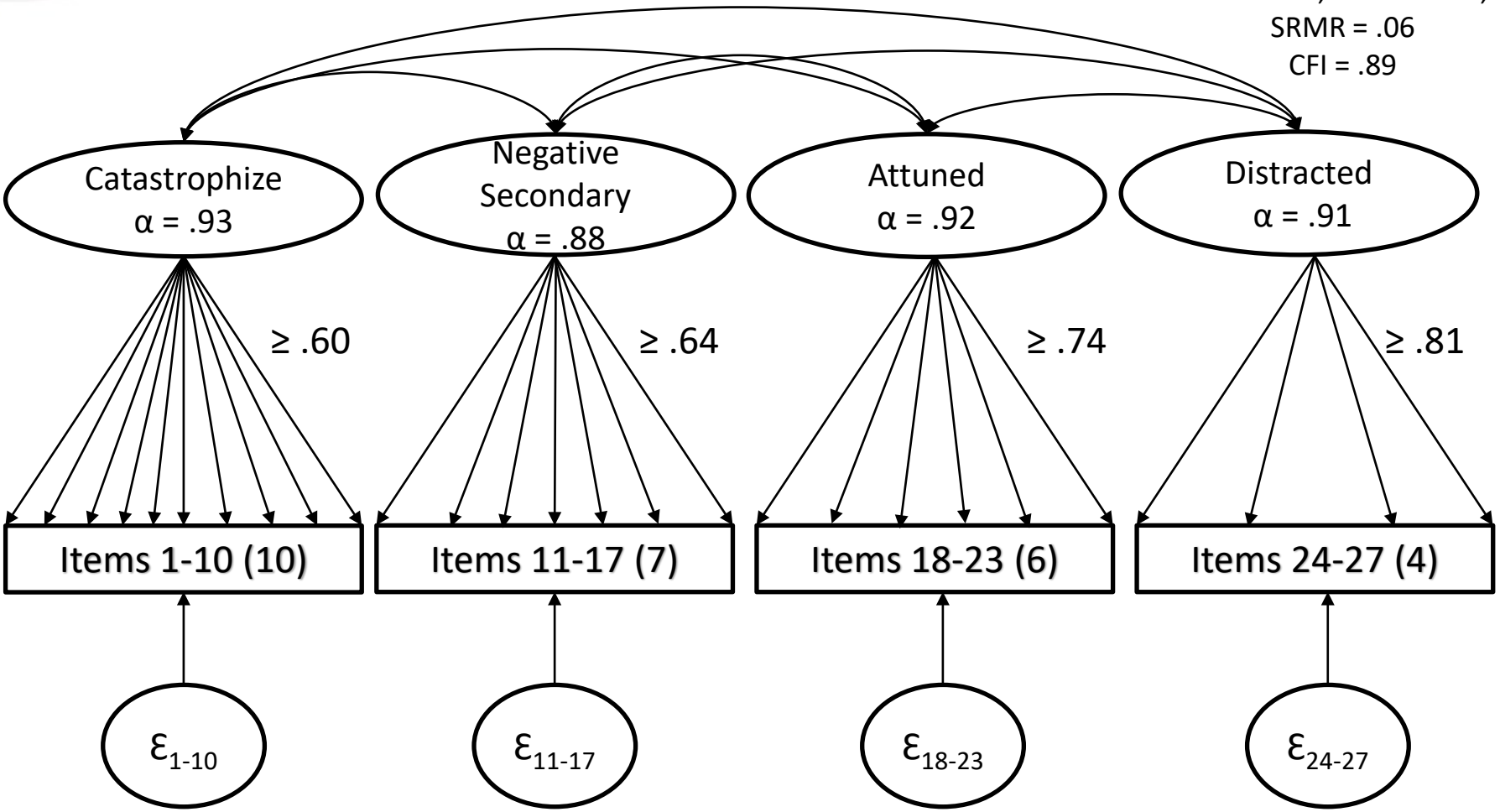
Removed 2 Items and Re-Ran Both Models:

- Both models retained adequate fit statistics
- Now all items loaded onto the intended factors, respectively
- Six factor model still showed linear dependency

Final Measurement Model:

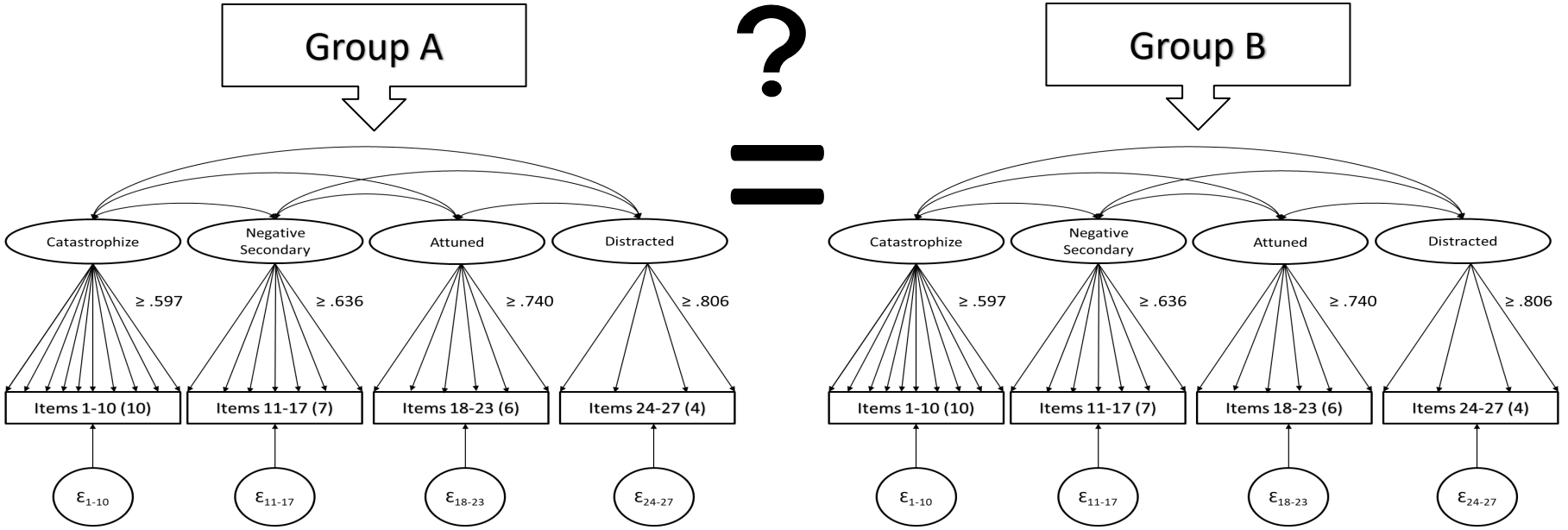
Four factor model by Bunford et al. (2020) with two items removed

Model Fit Indices:
χ^2 = 13793.37
df = 318, *p* < .001
RMSEA = .08, 90% CI: .08, .08
SRMR = .06
CFI = .89



Invariance Testing

- Investigates if the factor loadings, intercepts, and residual variances are equivalent across groups of people
- A way to verify that the latent construct has the same meaning across groups
- Generally, Chi-Square difference testing is used to determine invariance, however with large sample sizes, change in fit indices is considered a more accurate measures of invariance[1]



1 Kline, 2016; Putnick & Bornstein, 2016

Sex Invariance

- The model fit indices fell in acceptable ranges showing that factor loadings, intercepts, and residual variances were equivalent across both males (*n* = 3296) and females (*n* = 2955)

Table 1. Sex Invariance Testing

Model	$\chi 2$ (df)	CFI	RMSEA (90% CI)	SRMR	Comp. Model	$\Delta\chi 2$ (Δdf)	ΔCFI $\leq .010$	ΔRMSEA $\leq .015$	ΔSRMR $\leq .015$	Decision
M1: Configural Invariance	14169 (689)	0.887	0.079	0.053	--	--	--	--	--	--
M2: Metric Invariance	14327 (712)	0.886	0.078	0.055	M1	158 (23)	0.001	0.001	0.002	Accept
M3: Scalar Invariance	14723 (735)	0.883	0.078	0.055	M2	396 (23)	0.003	0.000	0.002	Accept
M4: Residual Invariance	14876 (708)	0.881	0.077	0.056	M3	153 (27)	0.002	0.001	0.001	Accept

df = Degrees of Freedom, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual, Comp. Model = Comparison Model

Race/Ethnicity Invariance

- The factor loadings, intercepts were equivalent across each group, but residual variances were not
- Consulted modification indices to free two pathways which led to partial residual invariance

Groupings	N
White	3,575
Black	794
Asian	334
Hispanic	1,208
All Other	243

Table 2. Race/Ethnicity Invariance

Model	$\chi 2$ (df)	CFI	RMSEA	SRMR	Comp. Model	$\Delta\chi 2$ (Δdf)	ΔCFI $\leq .010$	ΔRMSEA $\leq .015$	ΔSRMR $\leq .030$/ $\leq .015$	Decision
M1: Configural Invariance	15479 (1586)	0.884	0.085	0.058	--	--	--	--	--	--
M2: Metric Invariance	15818 (1678)	0.882	0.083	0.061	M1	339 (92)	0.002	0.002	0.003	Accept
M3: Scalar Invariance	16351 (1770)	0.878	0.083	0.061	M2	533 (92)	0.004	0.000	0.000	Accept
M4: Residual Invariance	18239 (1878)	0.863	0.085	0.068	M3	1888 (108)	0.015	0.002	0.007	Reject
M5: Partial Residual Invariance	17521 (1870)	0.869	0.083	0.064	M3	1170 (100)	0.006	0.002	0.003	Accept

df = Degrees of Freedom, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual, Comp. Model = Comparison Model

Race/Ethnicity Partial Invariance

- The two freed residual variances showed that the model was able to explain more variance in responses for participants who identified as White or any other category than those who identified as Black, Asian, or Hispanic

		Residual Variance	
Groupings	**N**	*"My child experiences his/her emotions as overwhelming and out of control"*	*"When my child is upset, he/she becomes angry with him/herself for feeling that way"*
White	3,575	0.54***	0.51***
Black	794	0.75***	0.67***
Asian	334	0.67***	0.59***
Hispanic	1,208	0.69***	0.66***
All Other	243	0.51***	0.49***

Conclusions

- The four-factor structure originally identified by Bunford et al. (2020) was supported with 27 items instead of 29
- Sex invariance was supported for factor loadings, intercepts, and residual variances
- Race/ethnicity invariance was supported for factor loadings and intercepts, however only partial invariance was supported for residual variances after freeing two items

Implications

- The Difficulty in Emotion Regulation-Parent Report has demonstrated a mainly consistent factor structure and strong internal consistency
- Invariance testing primarily showed equivalence across sex and racial/ethnic groups
- The results indicate that the Difficulty in Emotion Regulation-Parent Report is a good measure of emotional dysregulation