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Factor Structure of the Difficulties in Emotion Regulation Scale among Early Adolescents: Results from the Adolescent Brain Cognitive Development Study

Jacqueline E. Smith[1] · Hannah R. Brinkman[1] · Angelo M. DiBello[2] · Jessica L. Hamilton[1] · Teresa M. Leyro[1] · Brianna R. Altman[1] · Samantha G. Farris[1]

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Abstract

Introduction Emotion regulation (ER) deficits in early adolescence are associated with subsequent negative health consequences, including anxiety and depression. Yet, limited work has evaluated the factor structure of measures of ER deficits in early adolescents, leaving a methodological gap for at-risk youths.

Method This study examined the Difficulties in Emotion Regulation Scale (DERS) factor structure in early adolescents ($N = 2300$) recruited from the Adolescent Brain Cognitive Development Study. We randomly split the sample into two subsamples ($n = 1150$ each) and implemented an a-priori three-pronged approach: (1) A confirmatory factor analysis (CFA) assessed the fit of the six-factor DERS in Sample 1; (2) An exploratory factor analysis (EFA) identified an alternative factor structure in Sample 1; and (3) A second CFA assessed the new model in Sample 2. A bi-factor model was also used to assess the global structure of the DERS total and subscales.

Results The original six-factor model yielded poor-to-adequate fit. EFA results supported an alternative five-factor model with different item mappings and ten omitted items. CFA results supported the five-factor solution with good fit. The bi-factor model, estimating a general factor with the five subscales, also demonstrated good fit.

Discussion A five-factor structure of the DERS appears supported in a large community sample of early adolescents. Items from the former Awareness and Clarity subscales were combined into a single factor. Nearly all items from the former Strategies subscale were omitted, suggesting there may be developmental considerations rendering those items less relevant.

Keywords Difficulties in Emotion Regulation Scale · Emotion Regulation · Early Adolescence · Factor Analysis

Introduction

Early adolescence, typically defined as the developmental stage between 10 and 14 years of age (Robards & Bennett, 2013), is characterized by hormonal, neural, and other bodily changes that occur with the onset of puberty (Berenbaum et al., 2015; Blakemore, 2012). This period is also marked by significant psychosocial shifts including increased autonomy from caregivers (Branje et al., 2021) and the initial development of self-identity (Steensma et al., 2013). Notably, the interaction of these pubertal and psychosocial shifts can be further compounded by increases in emotional intensity and the emergence of adaptive and maladaptive coping strategies (Cracco et al., 2017; Silvers, 2022). For example, adolescents high in emotional reactivity to stressful events exhibit stronger relations between interpersonal stress and depression (Charbonneau et al., 2009), and the use of maladaptive strategies to cope with negative emotional experiences is linked to greater adolescent emotional and behavioral problems (Schäfer et al., 2017; Silk et al., 2003). The biopsychosocial changes that emerge during

Jacqueline E. Smith and Hannah R. Brinkman contributed equally to this work.

✉ Jacqueline E. Smith
jacqueline.e.smith@rutgers.edu

[1] Department of Psychology, The State University of New Jersey, Rutgers, New Brunswick, NJ, USA

[2] Center for Alcohol & Substance Use Studies and Graduate School of Applied and Professional Psychology, Rutgers University, New Brunswick, NJ, USA

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early adolescence underscore the importance of effective regulation to successfully navigate this transitional period (Cracco et al., 2017; Silvers, 2022).

Emotion regulation reflects conscious and unconscious strategies that an individual uses to modulate their emotional experience (Gross, 2002), whereby effective emotion regulation can facilitate adaptive responding to changing situational demands (Gratz & Roemer, 2004; Tamir, 2011). In contrast, deficits in emotion regulation have been linked to increased anxiety and depression among early adolescents (Gonçalves et al., 2019; Mathews et al., 2014; Schäfer et al., 2017), as well as greater emotional problems during subsequent developmental stages. For example, longitudinal work has shown that difficulties in emotion regulation among early adolescents predicted depressive symptoms both cross-sectionally and 2-years later (Gonçalves et al., 2019). Relatedly, emotion dysregulation, characterized by diminished emotional understanding, disproportionate expressions of sadness and anger, and ruminative responses to distress at baseline are prospectively associated with a range of psychopathology (e.g., increases in anxiety, aggression, and eating pathology) among adolescents 7-months later (McLaughlin et al., 2011). Ecological momentary assessment data has further found that youth exhibiting greater emotional intensity, lability, and difficulty regulating negative affect in response to real time events report greater depressive symptoms and behavioral problems (Boemo et al., 2022; Silk et al., 2003). Such findings highlight the proximal and distal effects of both global and individual facets of emotion regulation throughout this developmental period (Beauchaine, 2015; McLaughlin et al., 2011; Silk et al., 2003).

Given the implications of emotion regulation on adolescent health, assessments of emotion regulation deficits among early adolescents are warranted. The Difficulties in Emotion Regulation Scale (DERS) is a widely used, 36-item, self-report measure designed to assess multiple aspects of emotion regulation difficulties in adults (Gratz & Roemer, 2004). The original development and validity tests of the DERS identified that the items reflected six facets of emotion regulation: (1) Non-acceptance of emotional responses; (2) Difficulties engaging in goal directed behaviors when experiencing emotional distress; (3) Difficulties with impulse control; (4) Lack of emotional awareness; (5) Limited access to emotion regulation strategies; and (6) Lack of emotional clarity (Gratz & Roemer, 2004). Multiple investigations have supported the psychometric properties of the six-factor DERS across clinical and non-clinical adult samples (Burton et al., 2022; Hallion et al., 2018; Ritschel et al., 2015). While a global DERS factor was not tested during the development of the DERS measure, a single index (total score) of difficulties in emotion regulation remains of great clinical interest and is widely used in empirical research. Relatedly, there is evidence for a bifactor model in various clinical samples (Hallion et al., 2018), and among individuals from diverse racial and ethnic backgrounds (Mekawi et al., 2021; Xu et al., 2021), often yielding five subscales in addition to a global factor (Bardeen et al., 2012). Taken together, the heterogeneity of the factor structures across varying adult samples necessitates further examination among adolescents prior to widespread use.

Published work on the factor structure of the DERS in adolescent samples has yielded equivocal findings. This inconsistency may be due, in part, to differences across clinical samples and in the emotional development that occurs during early, mid, and late adolescent stages. For example, while some studies have retained all 36 items and the original six factors with adequate fit (Neumann et al., 2010; $N = 870$, Netherlands-based community sample, aged 11–17 years; Charak et al., 2019; $N = 636$, U.S. clinical sample, aged 12–17 years; Perez et al., 2012; $N = 218$, clinical sample, aged 12–17 years), other studies have made notable modifications. In some cases, several items have been removed (Gómez-Simón et al., 2014; $N = 642$, Spain-based community sample; aged 12–18 years) or been permitted to cross-load to support a six-factor solution (McVey et al., 2022; $N = 156$ autistic adolescents and adults, aged 12–32 years). In other cases, subscales have been completely removed resulting in a five-factor solution (Monell et al., 2022; $N = 581$, Sweden-based clinical sample, aged 13–17) and a four-factor solution (Marín Tejeda et al., 2012; $N = 455$, Mexico-based community sample, average age 13.1 years). To our knowledge, there is only one study that has examined the DERS factor structure among a community sample of older adolescents from a northeastern city in the United States (Weinberg & Klonsky, 2009; $N = 428$, aged 13–17 years). The authors opted to retain a six-factor solution with cross-loading items, but explicitly noted the structure may be different or suboptimal in younger adolescents (Weinberg & Klonsky, 2009). Yet, no studies have examined an early adolescent community sample. These discrepant findings illustrate the need to assess the factor structure in early adolescents, as differences in structure may reflect developmental considerations unique to this age group. Moreover, much of the extant work focuses on samples that are primarily comprised of White and/or non-Hispanic youths (Charak et al., 2019; McVey et al., 2022; Perez et al., 2012; Weinberg & Klonsky, 2009) and are predominantly female (Charak et al., 2019; Gómez-Simón et al., 2014; Perez et al., 2012; Weinberg & Klonsky, 2009), underscoring a need for investigations with more racially and ethnically diverse samples.

Thus, the current study was designed to address this gap in the literature by evaluating the factor structure of the DERS

items in a large, community cohort of early adolescents. The specific aims were to provide support for the DERS original six-factor structure, and pending model fit, explore alternative factor structures in early adolescents. The resulting outcomes of this work have implications for theoretical models of emotional development in early adolescents, and ultimately could inform early-stage interventions that buffer against later adolescent mental health consequences (Compas et al., 2014).

Method

Participants

The Adolescent Brain Cognitive Development (ABCD) study is the largest long-term investigation of biological, psychological, social, and behavioral development in the United States, spanning across 21 sites (Barch et al., 2021; Garavan et al., 2018). The Social Development substudy (ABCD-SD) was funded by the National Institute of Justice with support from the Centers for Disease Control and Prevention to add additional measures focused on facets of biopsychosocial development. Five of the total 21 parent ABCD study sites participated, including the University of Pittsburgh, University of Michigan, Yale University, University of Florida, and University of Maryland-Baltimore. Data for the present investigation were from year 3 of ABCD (timepoint one for ABCD-SD), which was the first time the DERS was administered in the substudy. Participants ($N = 2300$) were 11.66 (SD = 0.95) years old at their first ABCD-SD study visit. Participants were 52.2% male with 63.2% identifying as White, 31.9% identifying as Black, and 89.2% identifying as non-Hispanic. Household income was reported at less than $49,999 for 41.6% of participants.

Procedure

During the initial study visit for ABCD-SD, early adolescents and their identified caregiver/parent completed a battery of additional self-report measures specific to the social development interests of the study that were not administered as a part of the broader ABCD study. Informed consent from caregivers and informed assent from adolescents was provided at the site. Institutional Review Board (IRB) approval was granted for the ABCD study, and analysis of secondary, deidentified data did not require additional IRB review. The full description of the broader ABCD study and nationally representative sampling can be found elsewhere (Barch et al., 2021; Garavan et al., 2018).

Measures

Demographic characteristics were assessed from the perspective of the youth's caregiver. Using a self-report form, caregivers provided information about their respective youth's age and sex at the time of the baseline assessment, as well as their race, ethnicity, and household income (Barch et al., 2021).

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was completed by the early adolescent participants in the ABCD-SD study. The DERS is a 36-item self-report questionnaire designed to assess emotion regulation deficits globally and was originally found to reflect six facets: nonacceptance of emotional responses ("When I'm upset, I become angry with myself for feeling that way"), difficulty engaging in goal-directed behavior ("When I'm upset, I have difficulty getting work done"), impulse control difficulties ("I experience my emotions as overwhelming and out of control"), lack of emotional awareness (" I pay attention to how I feel"), lack of emotion regulation strategies ("When I'm upset, I believe that I will remain that way for a long time"), and lack of emotional clarity ("I have difficulty making sense out of my feelings"). Items on the DERS are rated on a five-point Likert-type scale (*1 = Almost never to 5 = Almost always*). Twelve of the DERS 36-items are reverse coded before sum scores are computed, including a total score (ranging from 36 to 180) and individual sum scores for each subscale. Higher scores indicate greater emotion regulation difficulties.

Data Analytic Plan

Prior to analysis, data were screened to ensure assumptions of parametric statistics were met. Absolute skew and kurtosis values for all variables showed no significant outliers and each variable's distribution was approximately normal (all absolute skew values < 2; all absolute kurtosis values < 7) (Kim, 2013). Independent t- and chi-square tests were then computed to evaluate significant differences between samples across demographic and DERS variables. A contingent, a priori three-pronged approach was specified to test the factor structure of the DERS. Prior to the first step, the full early adolescent cohort ($N = 2300$) was split into two smaller samples of equal size ($n = 1150$ each) using the random case select feature in SPSS V.28. Participants with incomplete DERS responses were excluded from data analysis; Sample 1 (final $n = 1134$) excluded $n = 16$ participants (Total incomplete responses = 121, ranging from 3 to 5 incomplete responses per DERS item), and Sample 2 (final $n = 1139$) excluded $n = 11$ participants (Total incomplete responses = 111, ranging from 4 to 5 incomplete responses per DERS item).

First, we conducted a confirmatory factor analysis (CFA) in Sample 1 to explore the fit of the previously identified six-factor DERS structure. Model fit was evaluated using the following comprehensive indices, as statistical significance can be confounded by the large sample size: Chi-square value/df ≤ 3 rule, RMSEA < 0.10, SRMR < 0.08, CFI > 0.90. Next, we conducted an exploratory factor analysis (EFA) in Sample 1 to identify an alternative factor structure that might yield a better model fit. Pre-identified metrics (e.g. Kaiser-Meyer-Oklin (KMO) measure of sampling adequacy, Bartlett's test of sphericity) were used to assess data factorability (Costello & Osborne, 2005; Osborne, 2014). Third, we evaluated a second CFA in Sample 2 using the alternative factor structure identified using the EFA in Sample 1. This secondary CFA allowed for the comparison of our alternative factor structure to the original DERS factor structure, a step not yet taken in an early adolescent sample. Finally, and consistent with previous investigations of the DERS factor structure among adults (Hallion et al., 2018; Osborne, 2014), we analyzed a bi-factor model. Bifactor models, like hierarchical models, are those that model a general factor that accounts for the covariation among each individual item, as well as uncorrelated grouping factors that account for additional covariation among the items that is not reflected in the general factor. All analyses were conducted using SAS version 9.4.

Table 1 Sample characteristics and group differences

	Sample 1 ($N = 1134$)	Sample 2 ($N = 1139$)	Tests of group differences
Age (M; SD)	11.67 (0.96)	11.65 (0.94)	$t(2271) = 0.25$, $p = 0.80$
Age (Range)	9.83–14.58	9.75–14.58	
Female (N; %)	547 (48.24%)	545 (47.85%)	$X(1) = 0.03$, $p = 0.85$
Hispanic [a] (N; %)	108 (9.64%)	130 (11.56%)	$X(1) = 2.17$, $p = 0.14$
Race [b] (N; %)			$X(6) = 2.99$, $p = 0.81$
White	717 (63.34%)	712 (62.73%)	
Black	358 (31.63%)	368 (32.42%)	
Native American or Alaskan Indian	4 (0.35%)	4 (0.35%)	
Pacific Islander	24 (2.12%)	15 (1.32%)	
Asian Indian or Asian	24 (2.12%)	30 (2.64%	
Other	5 (0.44%)	6 (0.53%)	
Income [c] (N;%)			$X(4) = 0.57$, $p = 0.97$
<= $49,999	475 (46.43%)	471 (46.27%)	
$50,000 – $74,999	132 (12.90%)	133 (13.06%)	
$75,000 – $99,999	124 (12.12%)	128 (12.57%)	
$100,000 – $199,999	292 (28.54%)	286 (28.09%)	
>= $200,000	--	--	

Note[a] Missing Ethnicity data for $n = 14$ in each Sample; [b] Missing Race data for $n = 2$ and $n = 4$ participants in Samples 1 and 2, respectively; [c] Missing Income data for $n = 111$ and $n = 121$ participants in Samples 1 and 2, respectively

Results

Participant Characteristics and Descriptive Statistics

Sample characteristics and DERS scores are presented in Table 1. Independent t- and chi-square tests showed non-significant differences between Samples 1 and 2 across all demographic variables and DERS scores (all $ps > 0.05$).

Initial CFA in Sample 1

The PROC CALIS command in SAS was used to run the initial CFA of the previously confirmed six-factor structure in Sample 1. A common and recommended approach suggests dividing the absolute chi-square value by its degrees of freedom (chi-square/df) to produce a value less than or equal to 3 (Kline, 2016). Our chi-square statistic indicated poor model fit for this sample, as the chi-square was approximately six times greater than the degrees of freedom ($\chi 2 = 4006.82$, df = 574, $p < 0.0001$) (Kline, 2005). Based on pre-identified fit indices (Kline, 2016; Tabachnick & Fidell, 2019; Tabachnick et al., 2007), results indicated a poor-to-adequate fit of this model to our data: RMSEA = 0.07, SRMR = 0.09, CFI = 0.81. All factor loadings were statistically significant, with *t*-values ranging from 9.44 to 75.20 (all *p*'s < 0.0001) and standardized coefficients greater than 0.29. Further, we examined the Wald and Larange Multiplier (LM) tests; while the Wald tests did not suggest removal of any paths would improve model fit, the results of the LM tests indicated the addition of several paths between latent and manifest variables would improve model fit. Inclusion of these paths was not pursued given the lack of a cohesive theoretical framework, as well as the overall poor-to-adequate model fit in our sample. We thus proceeded to conduct an EFA in Sample 1 to determine if an alternative factor structure might improve model fit.

EFA in Sample 1

Alternative factor structures were explored with exploratory factor analyses (EFA), using maximum likelihood, and a promax rotation. The initial Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = 0.895) and Bartlett's test of sphericity (Bartlett's $\chi^2 = 12155.959$, $df = 325$, $p < 0.001$)

supported the factorability of the data. An initial solution suggested a six-factor solution best fit the data. However, there were 7 items that did not load above the minimum standardized factor loading of 0.4 (Stevens, 2009) or exhibited complex loadings (e.g., those that loaded on more than one factor with loadings of 0.4 or higher). Upon removing these items, a second EFA was run on the remaining 29 items, which resulted in a 5-factor solution. However, three additional items evidenced complex loadings, which were subsequently eliminated. Next, a final EFA was conducted on the remaining 26 items, resulting in a stable, 5 factor solution, with standardized factor loadings ranging from 0.454 to 0.856 across their respective factors and eigenvalues of 12.44, 6.13, 3.08, 1.91, and 1.02 respectively. Results of the pattern matrix suggested nine items mapped onto Factor 1, six items for Factor 2, four items for Factor 3, four items for Factor 4, and three items for Factor 5. Standardized factor loadings can be found in Table 2.

Secondary CFA in Sample 2

The PROC CALIS command was used to conduct a CFA of the new five-factor structure in Sample 2. We applied the same Chi square value/df ≤ 3 rule and the previously listed indices: RMSEA < 0.10, SRMR < 0.08, CFI > 0.90 (Kline, 2016; Tabachnick & Fidell, 2019). For our new five-factor model, the chi-square statistic ($\chi 2 = 1399.508$, df $= 289$, $p < 0.0001$) was still significant, though this is consistent with large datasets. Other fit indices were RMSEA $= 0.058$ (90% confidence interval [CI: 0.055, 0.061]), SRMR $= 0.063$, CFI $= 0.906$. These indices suggest good fit to our data (see Fig. 1).

Bi-Factor Model in Sample 2

The PROC CALIS command was used to examine a bi-factor model based on the five-factor structure observed

Table 2 Factor analysis of the difficulties in emotion regulation scale in sample 1

	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1.	I am clear about my feelings (R)	0.628	--	--	--	--
2.	I pay attention to how I feel (R)	0.766	--	--	--	--
6.	I am attentive to my feelings (R)	0.643	--	--	--	--
7.	I know exactly how I am feeling (R)	0.563	--	--	--	--
8.	I care about what I am feeling (R)	0.753	--	--	--	--
10.	When I'm upset, I acknowledge my emotions (R)	0.608	--	--	--	--
17.	When I'm upset, I believe that my feelings are valid and important (R)	0.599	--	--	--	--
22.	When I'm upset, I know that I can find a way to eventually feel better (R)	0.464	--	--	--	--
34.	When I'm upset, I take time to figure out what I'm really feeling (R)	0.496	--	--	--	--
11.	When I'm upset, I become angry with myself for feeling that way	--	0.543	--	--	--
12.	When I'm upset, I become embarrassed for feeling that way	--	0.621	--	--	--
21.	When I'm upset, I feel ashamed with myself for feeling that way	--	0.841	--	--	--
23.	When I'm upset, I feel like I am weak	--	0.454	--	--	--
25.	When I'm upset, I feel guilty for feeling that way	--	0.768	--	--	--
29.	When I'm upset, I become irritated with myself for feeling that way	--	0.578	--	--	--
14.	When I'm upset, I become out of control	--	--	0.788	--	--
19.	When I'm upset, I feel out of control	--	--	0.802	--	--
27.	When I'm upset, I have difficulty controlling my behaviors	--	--	0.640	--	--
32.	When I'm upset, I lose control over my behaviors	--	--	0.856	--	--
13.	When I'm upset, I have difficulty getting work done	--	--	--	0.691	--
18.	When I'm upset, I have difficulty focusing on other things	--	--	--	0.712	--
20.	When I'm upset, I can still get things done (R)	--	--	--	0.546	--
26.	When I'm upset, I have difficulty concentrating	--	--	--	0.814	--
4.	I have no idea how I am feeling	--	--	--	--	0.672
5.	I have difficulty making sense out of my feelings	--	--	--	--	0.618
9.	I am confused about how I feel	--	--	--	--	0.597
Factor descriptive statistics (M;SD)						
	Sample 1	24.14	10.12	6.84	10.65	5.60
		(7.87)	(4.66)	(3.67)	(4.09)	(2.44)
	Sample 2	24.06	10.35	7.01	10.80	5.76
		(7.67)	(4.94)	(3.70)	(3.95)	(2.56)

Note Factor 1 (IDENTIFICATION): Difficulty Identifying Emotions; Factor 2 (NON-ACCEPTANCE): Non-acceptance of Emotional Responses; Factor 3 (IMPULSE): Impulse Control Difficulties; Factor 4 (GOALS): Difficulties Engaging in Goal Directed Behavior; Factor 5 (CLARITY): Lack of Emotional Clarity. (R) - reflects reverse coded items. All loadings are standardized factor loadings

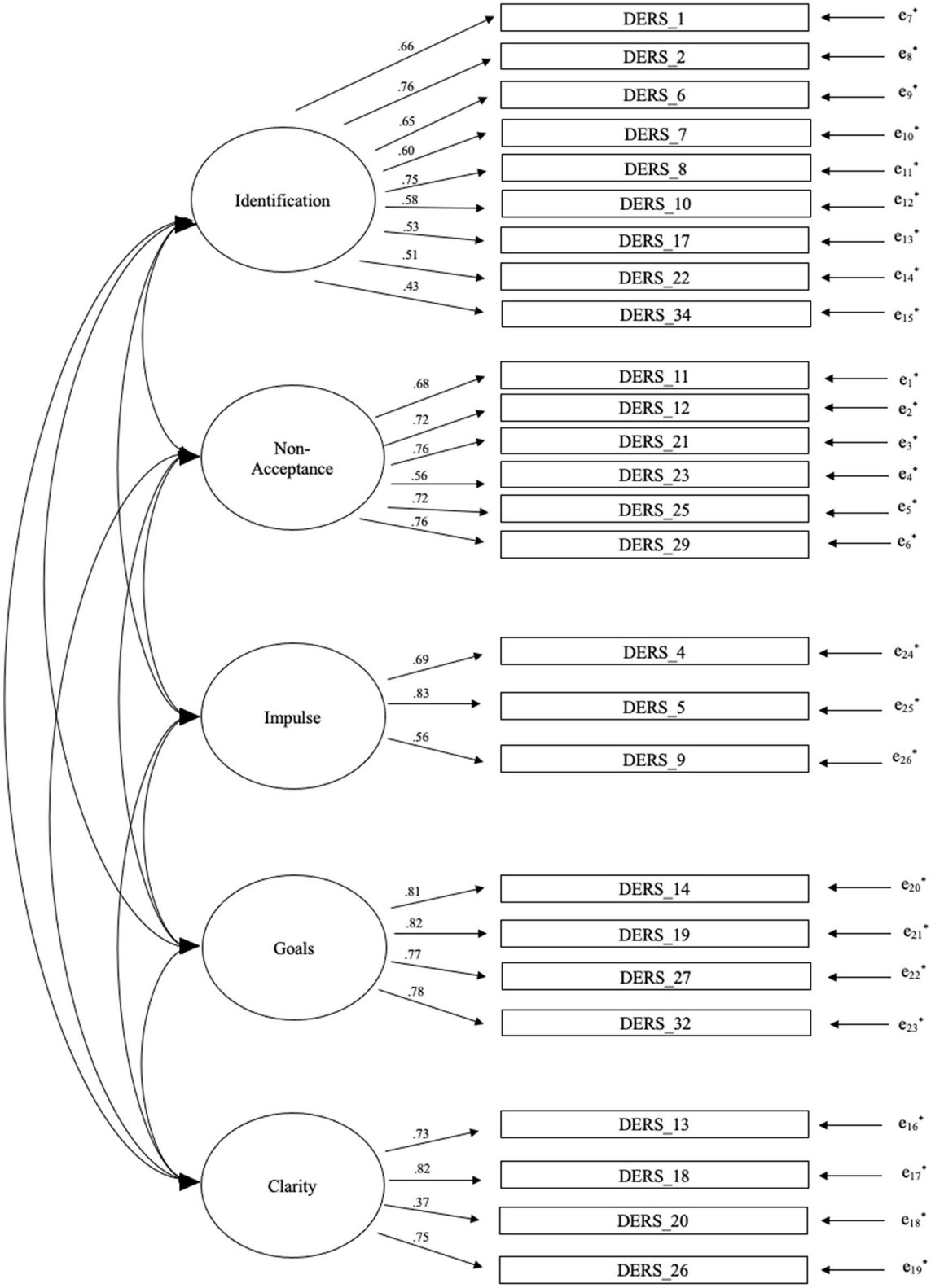

Fig. 1 Diagram of the confirmatory factor analysis of our modified five-factor model in Sample 2

in Samples 1 and 2. In this approach, the model simultaneously estimated a general factor score (overall DERS general factor) as well as the five subscales derived from our previous examination detailed above. We applied the same Chi square value/df ≤ 3 rule and the previously listed indices: RMSEA < 0.10, SRMR < 0.08, CFI > 0.90 (Kline, 2016; Tabachnick & Fidell, 2019). The fit indices suggest that the model demonstrated good fit to the data (RMSEA = 0.051 (90% confidence interval [CI: 0.047, 0.054]), SRMR = 0.037, CFI = 0.936). See Fig. 2 for the standardized loadings on the subscale and general factors.

Correlations between the new model subscales are presented in Table 3. All subscale correlations were significant (range: $r = 0.06$ to $r = 0.51$, $p < 0.05$).

Discussion

Development of adaptive emotion regulation strategies is critical for navigating the diverse array of biological and psychosocial changes that occur during early adolescence (Beauchaine, 2015; Cracco et al., 2017; Silvers, 2022). Appropriate assessment of emotion regulation abilities, or lack thereof, is therefore equally as critical for identifying at-risk youth and developing tailored interventions. Examination of the factor structure and subsequent psychometric properties of the Difficulties in Emotion Regulation Scale (DERS), a commonly used and well-studied measure among adults, has yielded inconsistent findings in adolescent samples. Further, a total factor reflecting global deficits in emotion regulation has not been supported among early adolescents in the U.S., despite its ubiquitous use. This study was the first to evaluate the factor structure of the DERS in a large cohort of early adolescents in the U.S. Findings revealed both a five-factor solution (with 26 items) and a bi-factor model to be better fits to the data than the original six-factor structure. Items from the original Awareness and Clarity subscales were combined. Omitted items were primarily from the original Strategies subscale. These findings support the use of a five-factor model to examine the granularity of emotion regulation deficits.

Several studies have yielded a five-factor model of the DERS in clinical and non-clinical samples among adults and late adolescents (Bardeen et al., 2012, 2016; Lee et al., 2016; Monell et al., 2022). Across investigations this change in factor structure often reflects the removal of the measure's original Awareness subscale due to its lower internal consistency, weaker intercorrelations, and composition of reverse coded items (Bardeen et al., 2012; Lee et al., 2016). However, in the current sample all items from the Awareness subscale were retained and combined with two items from the original Clarity subscale to form a factor referred to here, and previously, as Identification (Bardeen et al., 2016). The Identification factor here appears to tap into the ability, or lack thereof, to attend to emotional states (i.e., "I am attentive to my feelings"), including the ability to identify the content (i.e.,"I know exactly how I am feeling") and the utility of emotional recognition and understanding (i.e., "When I'm upset, I take time to figure out what I'm really feeling"). Notably, the authors of the original measure conceptualized four distinctive facets of emotion regulation including "Awareness and Understanding of Emotions" (Gratz & Roemer, 2004). When this facet produced items that loaded onto two separate factors (i.e. Awareness and Clarity), the orignal developers reasoned it was due to differences in being aware of emotional responses and having a clear understanding of them (Gratz & Roemer, 2004). Thus, it is plausible that the findings here illustrate that early adolescents have not yet developed the ability to distinguish between the two. Of note, all items belonging to the Identification subscale here are reverse coded. While some may argue that these items merely "hang" together due to their syntactical structure, this perspective has been challenged by prior work. Specifically, among a sample of adults, Bardeen et al. (2016) modified the reverse-coded items to read as straight forward and still achieved a five-factor solution with a similar Identification factor combining the Awareness and Clarity items (Bardeen et al., 2016). This finding suggests that the Identification subscale is not merely due to a method effect. Rather, Identification, as a broader factor of attending to and understanding emotions, is a more appropriate fit in this sample of early adolescents.

The former Strategies subscale was removed except for a single item ("When I'm upset, I know that I can find a way to eventually feel better") which became a part of the Identification subscale. Unlike the Awareness subscale, the structure and composition of the original Strategies factor has received less debate in the literature. To our knowledge, one investigation examining the factor structure of the DERS Spanish version among Mexican community-dwelling adolescents removed both the Strategies and Impulse subscales (Marín Tejeda et al., 2012). Similarly, only two reports in adult samples have discouraged its use due to redundancy with the measure's general factor (Benfer et al., 2019; Osborne et al., 2017). One explanation for the absence of the Strategies subscale in the current sample of early adolescents may be due to age-specific developmental differences in emotional awareness and regulation more broadly. Initial theories on the development of emotional awareness have posited that it emerges in infancy, and related work has more recently demonstrated that the recognition of discrete emotions in others develops incrementally, reaching adult levels by the age of 11 (Chronaki et al., 2015). It is plausible then that the awareness and identification of emotions

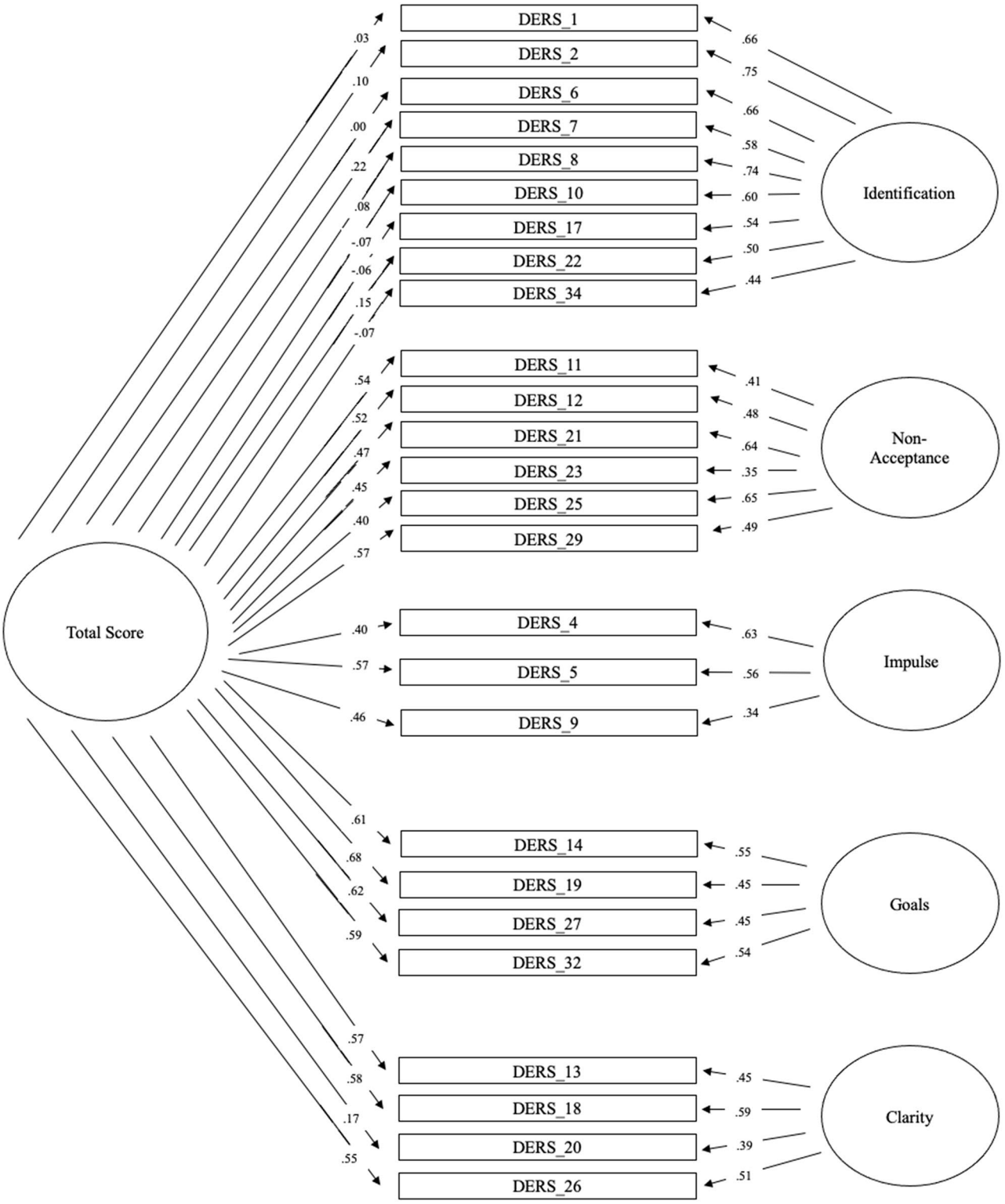

Fig. 2 Diagram of the confirmatory factor analysis of our bifactor model in sample 2

occurs *prior* to the development of the explicit strategies used to regulate emotional states.

We found evidence of both a five-factor (26-item) model and a bi-factor model. There are several reasons why the factor score model is preferable to using the bifactor model when interpreting scale responses. Indeed, prior research suggests that while a bifactor model may evidence better statistical "fit" to the data, there is a need to balance the

Table 3 Correlations of new DERS model subscales in sample 2

	1	2	3	4	5
1. Identification	--				
2. Non-Acceptance	0.064*	--			
3. Impulse	0.128**	0.502**	--		
4. Goals	0.121**	0.305**	0.509**	--	
5. Clarity	0.197**	0.488**	0.401**	0.299**	--

Note Difficulties in Emotion Regulation Scale (DERS); Factor 1 (Identification): Difficulty Identifying Emotions; Factor 2 (Non-Acceptance): Non-acceptance of Emotional Responses; Factor 3 (Impulse): Impulse Control Difficulties; Factor 4 (Goals): Difficulties Engaging in Goal Directed Behavior; Factor 5 (Clarity): Lack of Emotional Clarity

* $p < 0.05$, ** $p < 0.001$

statistical solution with both the conceptual and functional utility of the measure (Reise et al., 2010). The degree to which the items load primarily onto the general factor, with low loadings on the specific factors, make little sense. Conversely, when items have sufficiently high loadings on both the general and specific factors, a researcher should consider computation of factor scores for all factors (Reise et al., 2010). Our work suggests that the DERS measure provides evidence of sufficiently high loadings on both a general factor as well as the individual factor scores. Thus, is it recommended that researchers use factor scores. This approach to using factor scores versus a general factor score yields additional specificity in research. For example, DERS subscale scores may evidence differential associations with negative affect and substance use, which could inform more nuanced and targeted intervention development. Second, within a developmental context, examination of subscales can also provide meaningful information about how various aspects of emotion regulation *change* throughout development. Lastly, the DERS subscale could be leveraged in a clinical setting to aid in identifying an adolescent's specific strengths and deficits in emotion regulation to inform idiographic treatment planning.

Findings from the current work should be interpreted with the following limitations in mind. The early adolescent cohort recruited for this study were a subset of the broader ABCD study. Participants of this subset were recruited from 5 of the 21 ABCD sites which potentially limits the generalizability of these results. However, this is still the largest study to our knowledge to examine the factor structure of the DERS in a community sample of early adolescents. Future studies are needed to replicate and empirically evaluate the revised factor model among early adolescents, ideally with pubertal stage taken into consideration. Relatedly, the racial and ethnic composition in the current sample, although more diverse compared to other studies (Charak et al., 2019; McVey et al., 2022; Perez et al., 2012), was still primarily comprised of adolescents who identified as White and/or Non-Hispanic. Thus, additional validation studies with more diverse samples are needed, including adolescents with minoritized racial, ethnic, and gender identities, as well as those with marginalized sexual orientations. In addition, we did not assess the relation of the DERS structure to other emotional and behavioral health outcomes that frequently correlate with emotion regulation ability, which remains an important area of future investigation. Future work would benefit from testing the convergent and discriminant validity, as well as the predictive validity, of both the original and alternative DERS structures with other metrics frequently implicated in early adolescent health. Lastly, we did not test for any sex differences in DERS scores in our modified five-factor model. Future work in this vein is especially important given the array of pubertal changes that occur during adolescence and may influence individual differences in emotion regulation abilities (Bailen et al., 2019; Haas et al., 2019).

Taken together, the findings from this investigation support the use of a 26-item, five-factor model of the DERS in this large sample of community-recruited early adolescents. Such factor solutions appear more developmentally appropriate for this sample of early adolescents and their growing emotion regulation capacities. Use of this modified factor structure could lead to improved specificity in empirical findings and subsequent tailored clinical interventions. Future research should also continue to examine the latent structure of the DERS, and other measures that purportedly tap into aspects of emotion regulation, among other populations of interest to ensure optimal psychometric functioning.

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Declarations

Conflict of Interest >The authors have no conflicts of interest to declare.

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