



PARENTING STYLES, EMOTION REGULATION, AND ACADEMIC ACHIEVEMENT IN IRANIAN CHILDREN WITH SPECIFIC LEARNING DISORDER (SLD)

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Abstract

Children with Specific Learning Disorder (SLD) often experience academic difficulties alongside emotional and behavioral challenges. This study examined a sequential model linking parenting styles with academic achievement through emotion regulation and emotional adjustment in 450 Iranian elementary-school children with SLD aged 8–11 years from Tehran, Mazandaran, and Sistan and Baluchestan. Confirmatory factor analysis, structural equation modeling, bootstrap estimation, and multigroup analyses were conducted. The measurement model showed good fit, $\chi^2(32) = 54.80$, $p = .007$, CFI = .987, TLI = .983, RMSEA = .041, and SRMR = .031. Parenting styles were associated with emotion regulation ($\beta = .48$), emotion regulation with emotional adjustment ($\beta = .54$), and emotional adjustment with academic achievement ($\beta = .43$; all $ps < .001$). Parenting styles also showed a direct association with academic achievement ($\beta = .15$, $p = .001$). The sequential indirect association was significant ($\beta = .11$, 95% BC CI [.06, .17]). Measurement invariance was supported across provinces, whereas structural coefficients differed significantly across groups. Human Figure Drawing indicators were analyzed separately and showed negative correlations with key outcomes. Findings support integrating family involvement and emotion-regulation support into special-education services for children with SLD.

Keywords: specific learning disorder, parenting styles, emotion regulation, emotional adjustment, academic achievement

INTRODUCTION

Specific Learning Disorder (SLD) is a neurodevelopmental condition characterized by persistent and functionally significant difficulties in acquiring and using academic skills, including reading, written expression, and mathematics. The diagnosis is not equivalent to low general intellectual ability; rather, the defining difficulty concerns specific academic skill acquisition and performance despite appropriate educational opportunity and adequate intellectual functioning (American Psychiatric Association, 2022). For children in elementary school, these difficulties can extend beyond academic performance. Repeated experiences of failure, increased task demands, negative feedback, and comparison with peers may coincide with emotional and social difficulties that influence how children participate in school and respond to learning demands.

Children with learning and language disorders have been found to show elevated internalizing and externalizing difficulties relative to comparison groups. In a systematic review and meta-analysis, Donolato et al. (2022) reported small-to-moderate elevations in both internalizing and externalizing problems among children with language and specific learning disorders. This perspective is consistent with research showing that emotion regulation is related to psychosocial functioning among students with SLD. Kopelman-Rubin et al. (2020), for example, found that better emotion regulation was associated with fewer psychosocial difficulties and that school belonging was an important pathway linking emotion regulation with adjustment.

Academic achievement is also embedded within this emotional context. Academic performance requires sustained attention, persistence, frustration tolerance, and the ability to respond flexibly when



tasks are difficult. Emotional difficulties are prospectively associated with poorer school attainment (Riglin et al., 2014), while emotion-regulation behaviors are related to social and academic dimensions of early school adjustment (Adynski et al., 2024). Within SLD populations, emotion-regulation training has also been shown to reduce emotional difficulties and related maladaptive behaviors (Habibzadeh et al., 2015).

Family processes provide another important level of explanation. Parenting style describes a relatively stable pattern of parental responsiveness, demandingness, communication, and behavioral regulation (Baumrind, 1967; Darling & Steinberg, 1993). The family context may shape children's emotion regulation through modeling, emotion-related parenting practices, and the broader emotional climate of family relationships (Morris et al., 2007). This framework is especially relevant for children with SLD because academic difficulties may increase homework conflict, performance-related stress, and parental concern.

The present study conceptualized parenting styles as a family-context variable associated with children's emotion regulation, emotional adjustment, and academic achievement. The Iranian context provides an opportunity to examine this model across diverse provinces. Tehran, Mazandaran, and Sistan and Baluchestan differ in their broader social and educational environments, and comparison across these settings can clarify whether the measurement structure and structural associations are comparable.

A complementary objective concerned Human Figure Drawing (HFD). Because evidence for diagnostic emotional interpretations of drawing indicators remains mixed (Comparini et al., 2017; Skybo et al., 2007), HFD was kept outside the latent-variable SEM and treated as an exploratory analysis rather than as a diagnostic measure or causal mechanism.

METHOD

Design and participants

The study used a cross-sectional, correlational design and structural equation modeling. The final sample comprised 450 elementary-school children with documented SLD receiving services through learning-disability centers in Tehran, Mazandaran, and Sistan and Baluchestan Provinces, with 150 participants from each province. Participants were 8–11 years old ($M = 9.52$, $SD = 1.14$) and enrolled in Grades 2 through 5. The sample included 228 boys (50.7%) and 222 girls (49.3%). Diagnoses were based on the framework used by participating services and were consistent with DSM-5-TR criteria (American Psychiatric Association, 2022).

Participants were eligible when they had a documented SLD diagnosis, Full Scale IQ of at least 85, adequate visual and motor abilities, and parental consent with child assent. Children were excluded when they had moderate or severe intellectual disability, autism spectrum disorder, major neurological disorders, traumatic brain injury, uncorrected visual or motor impairment, or severe psychiatric conditions substantially interfering with assessment. The participant profile is presented in Table 1.

Table 1. Participant characteristics and SLD profile

Characteristic	n	% / M	SD
Total sample	450	100.0	—
Tehran	150	33.3	—
Mazandaran	150	33.3	—
Sistan and Baluchestan	150	33.3	—
Boys	228	50.7	—
Girls	222	49.3	—
Age (years)	450	9.52	1.14
Academic achievement	450	16.18	2.26
Dyslexia	190	42.2	—
Dysgraphia	92	20.4	—

**Table 1 (Continued).** Participant characteristics and SLD profile

Characteristic	n	% / M	SD
Dyscalculia	74	16.4	—
Mixed SLD	94	20.9	—

Note. SLD = Specific Learning Disorder. Academic achievement is the mean semester grade across reading/Persian language, written expression, and mathematics on a 20-point grading scale.

Data collection tools

The data collection tools used in the study and their descriptions are presented below.

Parenting styles: Parenting styles were assessed with the 30-item Parental Authority Questionnaire (PAQ; Buri, 1991), measuring authoritative, authoritarian, and permissive parenting. Authoritative parenting was scored positively, whereas authoritarian and permissive parenting were reverse-coded so that higher scores consistently represented more adaptive parenting.

Emotion regulation: Emotion regulation was assessed with the 24-item Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997). Emotion Regulation items were scored positively, and Lability/Negativity items were reverse-coded so that higher scores represented stronger adaptive regulation and emotional stability.

Emotional adjustment: Emotional adjustment was assessed with the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Emotional symptoms, conduct problems, hyperactivity/inattention, and peer difficulties were reverse-coded, whereas prosocial behavior was scored positively.

Human Figure Drawing: HFD was administered as a complementary exploratory assessment. Drawings were coded for figure size, placement, symmetry, erasures, and shading. Two doctoral-level clinical psychologists independently coded the drawings while blinded to questionnaire and academic outcomes. Inter-rater reliability was high (ICC = .91; weighted κ = .88). HFD was not included in the CFA or SEM.

Academic achievement: Academic achievement was derived from official school records and calculated as the mean semester grade across reading/Persian language, written expression, and mathematics on Iran's 20-point grading scale.

Intellectual functioning: Full Scale IQ was assessed using the Wechsler Intelligence Scale for Children–Fifth Edition (WISC-V; Wechsler, 2014). Only children meeting the prespecified IQ threshold were included.

Procedure and data analysis

Eligible children completed the assessment battery in a quiet setting over one or two sessions. Caregiver-report questionnaires were completed by the designated caregiver, academic records were obtained through authorized school procedures, and HFD drawings were independently coded. Analyses were conducted using IBM SPSS Statistics 29 and IBM SPSS AMOS 29. CFA evaluated the measurement model, and SEM evaluated four structural paths: Parenting Styles → Emotion Regulation, Emotion Regulation → Emotional Adjustment, Emotional Adjustment → Academic Achievement, and Parenting Styles → Academic Achievement. A 5,000-resample bias-corrected bootstrap procedure tested the sequential indirect association. Multigroup CFA tested configural, metric, and scalar invariance across provinces using $\Delta\text{CFI} \leq .010$ and $\Delta\text{RMSEA} \leq .015$ as acceptable criteria (Putnick & Bornstein, 2016).

The study involved minors and required parental informed consent and child assent. The ethics committee name, approval number, and approval date should be inserted in the final version of the manuscript.



RESULTS

Preliminary analyses

Less than 2% of observations were missing. Little's MCAR test was nonsignificant, $\chi^2(45) = 52.34$, $p = .214$. Skewness values ranged from $-.81$ to $.72$ and kurtosis values from $-.69$ to $.84$. No substantial univariate or multivariate outliers were identified. Cronbach's α values ranged from $.88$ to $.91$ and McDonald's ω values ranged from $.89$ to $.92$.

Measurement model

The hypothesized three-factor measurement model comprised 10 observed indicators. The model showed good fit, $\chi^2(32) = 54.80$, $p = .007$, CFI = .987, TLI = .983, RMSEA = .041, 90% CI [.020, .061], and SRMR = .031. All standardized factor loadings were statistically significant ($ps < .001$) and ranged from $.64$ to $.89$. The loadings are shown in Table 2.

Table 2. Standardized factor loadings in the measurement model

Latent construct	Indicator	λ	SE	95% CI
Parenting Styles	Authoritative parenting	.88	.03	[.82, .94]
Parenting Styles	Authoritarian parenting (reverse-coded)	.72	.04	[.64, .80]
Parenting Styles	Permissive parenting (reverse-coded)	.68	.04	[.60, .76]
Emotion Regulation	Emotion regulation	.87	.03	[.81, .93]
Emotion Regulation	Lability/negativity (reverse-coded)	.66	.04	[.58, .74]
Emotional Adjustment	Emotional symptoms (reverse-coded)	.78	.03	[.72, .84]
Emotional Adjustment	Conduct problems (reverse-coded)	.64	.04	[.56, .72]
Emotional Adjustment	Hyperactivity/inattention (reverse-coded)	.82	.03	[.76, .88]
Emotional Adjustment	Peer difficulties (reverse-coded)	.70	.04	[.62, .78]
Emotional Adjustment	Prosocial behavior	.89	.02	[.85, .93]

Note. λ = standardized factor loading; SE = standard error; CI = confidence interval. HFD was not included in the CFA.

Reliability and convergent validity

Composite reliability values ranged from $.74$ to $.88$ and average variance extracted values ranged from $.59$ to $.60$. The complete reliability and convergent-validity results are presented in Table 3.

Table 3. Reliability and convergent validity of the latent constructs

Construct	Cronbach's α	McDonald's ω	CR	AVE	$\sqrt{AVE}$
Parenting Styles	.91	.92	.81	.59	.76
Emotion Regulation	.90	.91	.74	.60	.77
Emotional Adjustment	.88	.89	.88	.59	.77

Note. CR = composite reliability; AVE = average variance extracted.

Structural model and direct associations

The structural model demonstrated good fit, $\chi^2(41) = 74.26$, $p < .001$, CFI = .981, TLI = .974, RMSEA = .044, 90% CI [.031, .057], and SRMR = .036. Parenting Styles was positively associated with Emotion Regulation ($\beta = .48$, SE = .05, CR = 8.97, $p < .001$). Emotion Regulation was positively associated with Emotional Adjustment ($\beta = .54$, SE = .06, CR = 8.42, $p < .001$). Emotional Adjustment was positively associated with Academic Achievement ($\beta = .43$, SE = .05, CR = 7.36, $p < .001$). Parenting Styles retained a significant direct association with Academic Achievement ($\beta = .15$, SE = .04, CR = 3.18, $p = .001$). These results are summarized in Table 4.

Table 4. Direct structural associations

Structural path	β	SE	CR	p
Parenting Styles → Emotion Regulation	.48	.05	8.97	< .001
Emotion Regulation → Emotional Adjustment	.54	.06	8.42	< .001
Emotional Adjustment → Academic Achievement	.43	.05	7.36	< .001
Parenting Styles → Academic Achievement	.15	.04	3.18	.001

Note. β = standardized coefficient; SE = standard error; CR = critical ratio.

Figure 1 presents the hypothesized structural model and standardized associations.

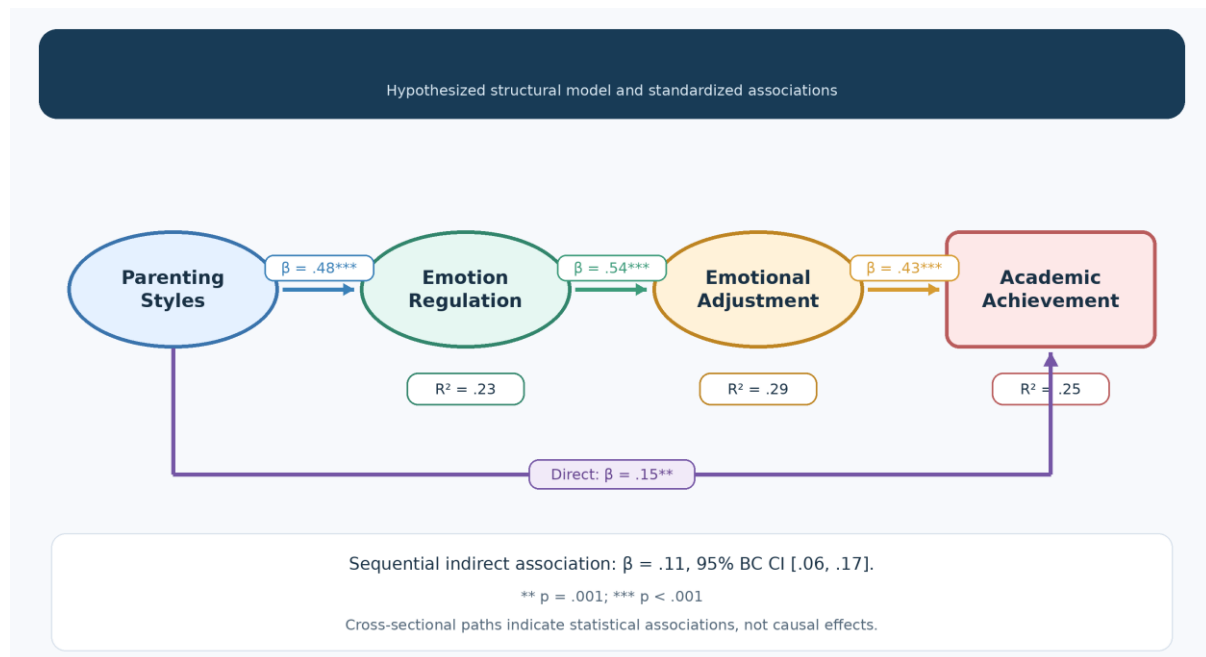


Figure 1. Hypothesized structural model and standardized associations among parenting styles, emotion regulation, emotional adjustment, and academic achievement

Explained variance and sequential indirect association

Parenting Styles explained 23% of the variance in Emotion Regulation ($R^2 = .23$). Emotion Regulation explained 29% of the variance in Emotional Adjustment ($R^2 = .29$), and Parenting Styles together with Emotional Adjustment explained 25% of the variance in Academic Achievement ($R^2 = .25$). These values are presented in Table 5.

Table 5. Explained variance in endogenous constructs

Endogenous construct	Predictors	R^2
Emotion Regulation	Parenting Styles	.23
Emotional Adjustment	Emotion Regulation	.29
Academic Achievement	Parenting Styles; Emotional Adjustment	.25

Note. R^2 represents the proportion of variance explained by the specified structural predictors.

The sequential indirect association from Parenting Styles through Emotion Regulation and Emotional Adjustment to Academic Achievement was $\beta = .11$, 95% BC CI [.06, .17], based on 5,000 bootstrap resamples. Since the direct association remained significant, the pattern was consistent with partial sequential mediation at the statistical level. Table 6 presents the direct, indirect, and total associations.

Table 6. Direct, sequential indirect, and total associations

Effect	β	95% BC bootstrap CI	Interpretation
Parenting Styles → Academic Achievement (direct)	.15	—	Significant
Parenting Styles → Emotion Regulation → Emotional Adjustment → Academic Achievement	.11	[.06, .17]	Significant indirect association
Total association	.26	—	Direct + sequential indirect

Note. BC = bias-corrected; CI = confidence interval. Because the study was cross-sectional, these effects are interpreted as statistical associations rather than causal mediation.

Human Figure Drawing

Higher HFD emotional-indicator scores were negatively associated with Emotion Regulation ($r_{(448)} = -.42, p < .001$), Emotional Adjustment ($r_{(448)} = -.51, p < .001$), and Academic Achievement ($r_{(448)} = -.38, p < .001$). These exploratory correlations are presented in Table 7.

Table 7. Descriptive correlations with HFD indicators

Variable	r with HFD indicators	p
Emotion Regulation	-.42	< .001
Emotional Adjustment	-.51	< .001
Academic Achievement	-.38	< .001

Note. HFD = Human Figure Drawing. Correlations are exploratory and do not establish diagnostic validity or causality.

Measurement invariance across provinces

The configural model showed $\chi^2 = 154.20$, $df = 96$, $CFI = .973$, and $RMSEA = .041$. The metric model showed $\chi^2 = 169.80$, $df = 110$, $CFI = .970$, and $RMSEA = .042$, with $\Delta CFI = .003$ and $\Delta RMSEA = .001$. The scalar model showed $\chi^2 = 184.60$, $df = 130$, $CFI = .966$, and $RMSEA = .043$, with $\Delta CFI = .004$ and $\Delta RMSEA = .001$. These results supported configural, metric, and scalar invariance and are displayed in Table 8.

Table 8. Measurement invariance across provinces

Model	χ^2	df	CFI	RMSEA	ΔCFI	$\Delta RMSEA$	Decision
Configural	154.20	96	.973	.041	—	—	Supported
Metric	169.80	110	.970	.042	.003	.001	Supported
Scalar	184.60	130	.966	.043	.004	.001	Supported

Note. Invariance was considered acceptable when $\Delta CFI \leq .010$ and $\Delta RMSEA \leq .015$.

Structural comparisons across provinces

After measurement invariance was established, the four structural paths were compared across provinces. Tehran showed the strongest coefficients across the pathways, whereas Mazandaran generally showed the weakest. The structural comparisons are presented in Table 9.

Table 9. Structural path comparisons across provinces

Structural path	Tehran β	Mazandaran β	Sistan & Baluchestan β	χ^2 difference	p
Parenting Styles → Emotion Regulation	.62	.39	.47	8.74	.013
Emotion Regulation → Emotional Adjustment	.68	.43	.51	9.26	.010
Emotional Adjustment → Academic Achievement	.55	.31	.44	7.91	.019
Parenting Styles → Academic Achievement	.24	.08	.16	6.84	.033

Note. χ^2 -difference tests evaluate whether the magnitude of each structural association differs across the three provincial groups.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

This study examined a theoretically ordered model linking parenting styles, emotion regulation, emotional adjustment, and academic achievement among Iranian children with SLD. The proposed measurement structure and all four hypothesized structural paths were supported. The sequential indirect association was statistically significant, while the direct association between parenting styles and academic achievement remained significant.

The association between parenting styles and emotion regulation ($\beta = .48$) is consistent with developmental accounts in which family environments provide opportunities to observe, practice, and internalize emotion-management strategies. The association should not be treated as proof that parenting styles cause emotion regulation because child characteristics may influence parental responses over time.

The association between emotion regulation and emotional adjustment ($\beta = .54$) was the strongest path in the model. The association between emotional adjustment and academic achievement ($\beta = .43$)



further suggests that emotional and behavioral organization may support persistence and engagement during difficult academic tasks.

The significant sequential indirect association ($\beta = .11$) indicates that parenting styles, emotion regulation, emotional adjustment, and academic achievement formed a statistically coherent chain. The remaining direct association indicates that the emotional pathway did not explain the entire relationship. Because the data were cross-sectional, this pattern should not be interpreted as causal mediation.

The model confirmed in this study aligns closely with findings from both Eastern and Western literature. Existing literature frequently emphasizes that authoritative parenting is a critical protective factor for children's educational outcomes. For instance, a recent study noted that a supportive and authoritative family environment directly and positively influences academic engagement, resilience, and educational adjustment processes in children with SLD. Similarly, research on Iranian adolescents indicates that an authoritative parenting style has a direct, significant, and positive relationship with academic achievement, whereas authoritarian and permissive attitudes either negatively affect academic performance or show no significant relationship (Taani et al., 2014; Zadeh et al., 2016). The high pressure generated by an authoritarian family climate increases academic stress and impairs the adaptive capabilities of children diagnosed with SLD, who already struggle with executive functions.

One of the most notable findings of this study is the statistical significance of the sequential indirect association—involving emotion regulation and emotional adjustment—within the relationship between parenting styles and academic achievement. Parent-child interaction is the primary and most significant structure determining how children perceive and manage emotional signals (Zhang et al., 2026). A structural equation modeling study involving parents of children with specific learning disabilities (SLD) found that parental attitudes strongly predict children's socio-emotional adjustment levels by shaping their emotion regulation mechanisms (Gholami Laksar et al., 2026). The support for cognitive reappraisal provided by democratic parents facilitates children's coping with the frustration and feelings of failure encountered during learning processes; this enhances emotional adjustment and ultimately paves the way for academic success (Rezaei et al., 2024).

The fact that the direct association between parental attitudes and academic success remains significant even when mediating variables are included in the model points to the enduring impact of family dynamics on cognitive performance. This confirms that the direct academic resources provided by families, home study discipline, and the value placed on education continue to foster success independently of the child's internal psychological processes (Porumbu & Neċsoi, 2013).

This is consistent with international literature establishing that cognitive interventions alone cannot adequately support academic outcomes in children with SLD. Effective intervention mandates the integration of family-focused parenting training alongside holistic psychoeducational programs targeting the child's emotion regulation skills.

The HFD results should be interpreted cautiously. Negative correlations with emotional and academic outcomes indicate covariation but do not establish diagnostic validity. Keeping HFD outside the SEM and treating it as exploratory was therefore appropriate.

The multigroup findings provide an international contribution. Measurement invariance supported sufficiently comparable constructs across provinces, while differing structural coefficients demonstrated that the strength of associations can vary by setting. Potential explanations include educational resources, family stressors, service availability, socioeconomic conditions, and school practices, but these mechanisms were not measured directly.

The study has practical implications. Special-education assessment should consider emotion regulation and emotional adjustment alongside academic skills. Parent consultation can address supportive responses to academic frustration and predictable expectations. School teams may



integrate emotion-regulation instruction with academic remediation. Intervention planning should remain sensitive to local resources and family circumstances. HFD should not be used as a standalone diagnostic indicator.

The study's strengths include a relatively large sample, representation of three Iranian provinces, SEM with bootstrap estimation, explicit invariance testing, and conservative treatment of HFD. Limitations include the cross-sectional design, partial reliance on caregiver reports, recruitment through learning-disability centers, and use of school grades that may vary among teachers and schools. Future studies should use longitudinal, multi-informant designs, standardized achievement measures, direct behavioral tasks, and direct measures of contextual mechanisms.

In conclusion, the findings support an integrated special-education perspective in which academic support for children with SLD is considered alongside emotional and family processes. Future longitudinal research should test the proposed developmental mechanisms and identify the contextual factors responsible for variation across settings.

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Ethics and Conflict of Interest

All ethical rules were observed at each stage of the research. The author declares that he acted in accordance with ethical rules in all processes of the research. The author declares that they do not have any conflict of interest with other persons, institutions or organizations.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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