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ORIGINAL PAPER

Child temperament profiles and maternal parenting practices in Brazilian mother–child dyads: A cluster-analytic study with children aged 3 to 11 years

Perfis de temperamento infantil e práticas parentais maternas em díades mãe–criança brasileiras: Um estudo de análise de clusters com crianças dos 3 aos 11 anos

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Abstract

Background and Aim: Child temperament and parenting are reciprocally linked, yet evidence from Brazilian and Latin American contexts remains limited. This study examined associations between maternal parenting practices and child temperament in Brazilian families with children aged 3 to 11 years. **Method**: This quantitative, cross-sectional study used a comparative and person-centered analytic approach. A total of 229 mothers completed questionnaires assessing parenting dimensions (Coregulation, Positive Reinforcement Discipline, and Coercion) and child temperament (Surgency/Extraversion, Negative Affectivity, and Effortful Control). Hierarchical cluster analysis was used to derive temperament profiles. **Results**: No statistically significant sex differences emerged for temperament or maternal parenting dimensions. Hierarchical cluster analysis identified four temperament profiles. Maternal Coregulation and Positive Reinforcement Discipline did not differ significantly across profiles. In contrast, maternal Coercion differed significantly, with a small effect size; the highest Coercion scores occurred in the profile characterized by elevated Negative Affectivity and elevated Effortful Control. **Conclusions**: The findings are consistent with a transactional, profile-based interpretation of temperament–parenting associations and suggest that specific temperament configurations may be more informative for understanding coercive than supportive maternal practices. The results may inform culturally sensitive and developmentally differentiated parenting interventions in Brazilian contexts.

Keywords: Childrearing Practices; Cluster Analysis; Mother–Child Relations; Temperament.

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Resumo

Contexto e Objetivo: O temperamento infantil e a parentalidade estão reciprocamente vinculados; no entanto, as evidências provenientes dos contextos brasileiro e latino-americano ainda são limitadas. Este estudo examinou associações entre práticas parentais maternas e temperamento infantil em famílias brasileiras com crianças de 3 a 11 anos. **Método**: Este estudo quantitativo e transversal utilizou uma abordagem analítica comparativa e centrada na pessoa. Ao todo, 229 mães responderam a questionários que avaliaram dimensões das práticas parentais (Corregulação, Disciplina por Reforço Positivo e Coerção) e do temperamento infantil (Surgência/Extroversão, Afetividade Negativa e Controle com Esforço). A análise hierárquica de clusters foi utilizada para derivar perfis de temperamento. **Resultados**: Não foram observadas diferenças estatisticamente significativas em função do sexo nas dimensões do temperamento ou das práticas parentais maternas. A análise hierárquica de clusters identificou quatro perfis de temperamento. A Corregulação e a Disciplina por Reforço Positivo maternas não diferiram significativamente entre os perfis. Em contraste, a Coerção materna diferiu significativamente, com tamanho de efeito pequeno; os escores mais elevados de Coerção ocorreram no perfil caracterizado por Afetividade Negativa elevada e Controle com Esforço elevado. **Conclusões**: Os achados são consistentes com uma interpretação transacional e baseada em perfis das associações entre temperamento e parentalidade, e sugerem que configurações específicas de temperamento podem ser mais informativas para compreender práticas maternas coercitivas do que práticas maternas de suporte. Os resultados podem subsidiar intervenções parentais culturalmente sensíveis e diferenciadas em termos desenvolvimentais nos contextos brasileiros.

Palavras-Chave: Análise de Clusters; Práticas parentais; Relações Mãe-Filho; Temperamento.

Introduction

Bioecological theory and Sameroff's unified theory of development posit that child development emerges from reciprocal interactions between children's characteristics and the ecological systems in which they are raised, with particular emphasis on the family system (Bronfenbrenner, 2011; Sameroff, 2010). Parenting is embedded within this system and refers to the set of caregiving practices aimed at promoting children's safety, survival, socialization, and autonomy (Sanders & Turner, 2018). Caregiver–child interactions may support or constrain child development depending on the quality of the relational patterns established (Bornstein, 2019; Cabrera & Volling, 2019; Ong et al., 2018). Positive parenting practices can promote emotion regulation (Goagoses et al., 2023), minimize internalizing issues (Manuele et al., 2023), and improve parent–child communication (Nascimento et al., 2022), whereas negative parenting practices are associated with externalizing problems (Pinquart, 2017) and lower self-esteem (Zhang & Hwang, 2023), with potential implications across the lifespan (Reis et al., 2024).

According to Belsky's process model of the determinants of parenting (Belsky, 1984; Taraban & Shaw, 2018), parental behavior is shaped by parent characteristics (e.g., personality and developmental history; Belsky, 1984; Reis et al., 2024; Silva et al., 2023), contextual aspects (e.g., social support and interparental relationship; Altenburger et al., 2018; Coltro et al., 2020; Reis et al., 2025), and child characteristics (e.g., temperament; Schmidt et al., 2019). With regard to child characteristics, diathesis–stress models propose that predispositional vulnerabilities, when combined with stressors, may increase the risk of psychopathology across development (Monroe & Simons, 1991). The differential susceptibility perspective extends this framework by proposing that some children, including those with specific temperamental characteristics, may be more susceptible to both adverse and supportive caregiving environments (Belsky, 1997; Belsky & Pluess, 2009; Slagt et al., 2016).

The growing interest in differential susceptibility in research on interactions between parenting practices and child characteristics is grounded in the premise that parenting strategies that promote adaptive development—or prevent maladaptive outcomes—for some children may not be equally effective for others. Identifying the conditions under which child characteristics and caregiving environments jointly confer risk or protection may therefore help map particularly harmful constellations of risk factors and inform interventions tailored to the needs of parent–child dyads (Belsky, 2013; Belsky & Pluess, 2009; Kiff et al., 2011; Slagt et al., 2016).

Temperament is one of the most frequently examined child-level markers of differential susceptibility in child–environment interactions. It is also a salient child characteristic in transactional accounts of parenting, with evidence of reciprocal and interactive associations between children's temperament and parenting practices (Kiff et al., 2011; Lunkes et al., 2023). Child temperament has been approached through several classic frameworks, including the behavioral/clinical approach of Thomas and Chess (1977), the trait-based emotionality, activity, and sociability/EAS model of Buss and Plomin (1984), Kagan's behavioral-inhibition model (Kagan et al., 1987), and Rothbart's psychobiological model (Rothbart, 1981). Contemporary research on child temperament has largely adopted Rothbart's psychobiological model, which organizes temperament around reactivity and self-regulation (Kopala-Sibley et al., 2018; Linhares et al., 2013; Lunkes et al., 2023; Rothbart & Bates, 2006).

The psychobiological model defines temperament as constitutionally based individual differences in reactivity and self-regulation that are influenced over time by heredity, maturation, and experience (Linhares et al., 2013; Rothbart & Bates, 2006). Within this approach, reactivity refers to individual differences in emotional, motor, and attentional responsivity to internal or external stimuli, whereas self-regulation refers to processes that modulate this reactivity, including attentional and inhibitory control. In the Children's Behavior Questionnaire (CBQ) framework, these dimensions are operationalized through three broad temperament factors: negative affectivity (tendency to experience fear, anger/frustration, sadness, and discomfort), surgency/extraversion (high activity, approach, impulsivity, and preference for high-intensity stimulation), and effortful control (attentional focusing, inhibitory control, perceptual sensitivity, and enjoyment of low-intensity activities; Putnam & Rothbart, 2006; Rothbart et al., 2001). In a recent Brazilian psychometric study with 438 caregivers, Reis et al. (2025) found that the CBQ (Very Short Form) temperament dimensions were associated with child behavioral indicators, with higher negative affectivity linked to more behavioral and emotional difficulties, whereas effortful control and surgency/extraversion were associated with fewer difficulties and higher prosocial behavior.

Child sex has been examined as a source of variation in the development and expression of temperamental characteristics. In a meta-analysis, Else-Quest et al. (2006) found that girls scored higher than boys in effortful control, whereas boys scored higher in surgency/extraversion, particularly activity and high-intensity pleasure. Similarly, the systematic review by Cosentino-Rocha and Linhares (2013)

reported higher scores among boys in negative emotionality, impulsivity, activity, and approach behavior, whereas girls showed higher scores in fear, cooperation, and positive mood. Both reviews emphasize that these differences are generally small and may be shaped or amplified by contextual factors such as gender stereotypes, socialization processes, parenting practices, and age.

Empirical studies indicate that children's self-regulatory abilities are embedded in reciprocal associations with parenting practices. Positive parenting behaviors, including parent–child communication and involvement (Ato et al., 2015), as well as warmth, responsiveness, scaffolding, and consistent limit setting (Klein et al., 2018), have been associated with children's effortful control and broader self-regulatory functioning. Conversely, lower effortful control and self-regulation difficulties have been linked to more negative parenting behaviors, including maternal negativity and coercive or punitive discipline (Klein et al., 2018; Lee et al., 2024; Linhares & Martins, 2015). Review evidence further indicates that parenting competencies such as sensitivity, responsivity, emotional support, and environmental stress management are central to children's socioemotional and regulatory development (Lunkes et al., 2023; Ndengeyingoma et al., 2024; Wagner et al., 2025). Overall, these findings support a bidirectional interpretation in which children's self-regulatory abilities may be associated with more positive parenting practices and lower reliance on negative discipline, while parenting practices also contribute to children's regulatory development.

In addition to biological maturation, caregiving environments play a central role in the development and expression of temperament. Primary caregivers function as coregulators of children's self-regulatory development (Linhares & Martins, 2015; Sameroff, 2010), with parental responsiveness, supportive parenting, and inductive discipline contributing to more adaptive regulatory processes (Linhares & Martins, 2015; Slagt et al., 2016; Zhang et al., 2022). Child temperament, in turn, may moderate the effects of caregiving environments, making some children more susceptible than others to both supportive and adverse parenting practices. In their meta-analysis, Slagt et al. (2016) showed that temperament characteristics, particularly difficult temperament and negative emotionality, can amplify the effects of parenting on developmental outcomes. The systematic review by Lunkes et al. (2023) further indicates that temperament characteristics may also shape caregiver practices, reinforcing an interactionist and transactional perspective on the temperament–parenting relationship.

Among the reactive components of temperament, negative affectivity and surgency/extraversion have been recurrently linked to coercive or negative parenting practices (Lunkes et al., 2023). Bates and Pettit (2015) reviewed evidence indicating that children with high negative emotionality may show greater difficulties in social development when exposed to high negative parenting or low positive parenting. In a study with 328 caregivers, Wittig and Rodriguez (2019) found that surgency/extraversion moderated associations between authoritarian and permissive parenting practices and child behavior problems. Accordingly, supportive parenting practices may play an important role in promoting adaptive developmental processes and reducing risk for socioemotional and behavioral difficulties, particularly among children with more reactive or difficult temperament profiles (Kiff et al., 2011; Zhang et al., 2022).

Although children's behavioral manifestations vary considerably across development, longitudinal studies suggest that temperament traits and profiles show meaningful continuity over time. Stability appears to be detectable by the preschool years and may increase across childhood, although changes in temperament expression remain possible as children mature and interact with their caregiving environments. This pattern indicates that, from approximately three years of age, consistent individual differences can already be identified and followed developmentally (Kopala-Sibley et al., 2018; Martin et al., 2020; Murillo et al., 2024). Parenting practices have also been associated with stability and change in temperament traits and profiles over time, particularly in studies examining children's trajectories in relation to positive and negative parenting environments (Lovato et al., 2022; van den Akker et al., 2010).

Despite its theoretical and practical relevance, the systematic review by Lunkes et al. (2023) identified a scarcity of Brazilian and Latin American studies on the temperament–parenting relationship. Examining child temperament through profile-based configurations of traits proposed by the psychobiological approach, together with maternal parenting practices that may function as promotive or detrimental relational factors, may inform parenting interventions and actions aimed at promoting child development. Accordingly, the present study aimed to examine associations between maternal parenting practices and child temperament in Brazilian children aged 3 to 11 years, through three operational objectives: (a) compare temperament and maternal parenting dimensions between girls and boys; (b) identify temperament profiles through hierarchical cluster analysis; and (c) compare maternal parenting practices across the identified temperament profiles.

Method

Participants

The study included 229 mothers (M_{age} = 37.5 years, SD = 5.72) and 229 children. Most children were girls (52.0%), and children's ages ranged from 3 to 11 years (M_{age} = 6.20, SD = 2.45). Regarding age distribution, 46.3% of the children were aged 3 to 5 years, 34.0% were aged 6 to 8 years, and 19.7% were aged 9 to 11 years. Most families were biparental (83.0%) and were described as different-sex-parent families (87.0%); 76.0% resided in the southern region of Brazil. The sample was composed of highly educated mothers, with 87.0% having completed higher education and 61.0% holding postgraduate qualifications. Regarding income, 47.2% reported a monthly family income between R$3,300 and R$8,000, and 21.8% reported an income between R$8,000 and R$24,800. Additionally, 79.9% of the mothers self-identified as White. Inclusion criteria required that participants had become mothers at 18 years of age or older and that their children were between 3 and 11 years old. Mothers and/or children with developmental disabilities identified by caregiver report were excluded.

Instruments

Sociodemographic Questionnaire

This questionnaire was developed by the authors to characterize mothers, children, and family context. It assessed maternal age, education, marital status, family income, racial self-identification, region of residence, family structure, and child age and sex. The questionnaire was used for sample characterization and eligibility description; no total score was computed.

Multidimensional Parenting Inventory (IMP)

The IMP (Paraventi, 2018, 2022) is a Brazilian caregiver-report questionnaire designed to assess parenting behaviors across seven domains. The long version comprises 57 items rated on a 6-point frequency scale ranging from 1 (*never*) to 6 (*very frequently*). Dimension scores are calculated as mean item scores, with higher scores indicating greater frequency of the respective parenting behavior. In the validation study, the 57-item IMP model showed adequate psychometric properties, with Cronbach's α values ranging from .63 to .88 and a satisfactory factor structure, $\chi^2(1490) = 3{,}125.796$; $p < .01$; CFI = .949; RMSEA = .040; SRMR = .057. The present study used three IMP dimensions: Coregulation (12 items; assertive communication, identification and expression of emotions, reflection, provision of explanations and guidance, discussion of rules and behavioral consequences, and limit setting; α = .88); Positive Reinforcement Discipline (13 items; reinforcement of adaptive child responses; α = .74); and Coercion (5 items; power assertion, punishment, physical or verbal aggression, withdrawal of affection, guilt induction, emotional outbursts, domination and restriction, strict and arbitrary rules, shouting, and criticism; α = .79).

Children's Behavior Questionnaire–Very Short Form (CBQ-VSF)

The CBQ–VSF (Putnam & Rothbart, 2006) is a 36-item caregiver-report measure of child temperament derived from the Children's Behavior Questionnaire (Rothbart et al., 2001) and was developed to assess three broad temperament domains: Surgency/Extraversion, Negative Affectivity, and Effortful Control. In the present study, the 36-item CBQ–VSF was administered, but temperament scores were computed using the 15 items retained in the Brazilian revised three-factor solution. The Brazilian version used in the present study was translated by Klein et al. (2009), and Reis et al. (2025) subsequently psychometrically evaluated the CBQ–VSF in Brazilian caregivers of children aged 3 to 7 years, retaining a 15-item three-factor solution, CFI = .93, TLI = .92, RMSEA = .05, SRMR = .06. Caregivers rated how well each item described the child's behavior on a 7-point scale ranging from 1 (*extremely untrue*) to 7 (*extremely true*), with a *not applicable* option when the behavior has not been observed. Following CBQ scoring conventions, scores were computed as mean applicable item scores for each dimension, with higher scores indicating greater expression of the corresponding temperament factor. In the revised 15-item Brazilian solution, Surgency/Extraversion was represented by retained shyness-related items, Negative Affectivity by retained items reflecting anger/frustration, discomfort, sadness, fear, and soothability/falling reactivity, and Effortful Control by retained items reflecting attentional focusing and inhibitory control. Because the present sample included children aged 3 to 11 years, a confirmatory factor

analysis was conducted to evaluate the internal structure, with CFI = .93, TLI = .91, SRMR = .07, and RMSEA = .04. Cronbach's alpha coefficients in the present sample were α = .68 for Surgency/Extraversion, α = .78 for Negative Affectivity, and α = .68 for Effortful Control.

Data Collection

Data were collected between June 2020 and April 2021 through a self-administered online questionnaire, which participants accessed after reading the study information and accepting the consent form. Participants were recruited through WhatsApp, Instagram, Facebook, and email because of restrictions imposed during the COVID-19 pandemic. No predefined regional focus was adopted, and no pre-existing participant database or institutional registry was used. The study employed convenience sampling, with invitations broadly disseminated across different regions of Brazil through research groups and social media networks. Participation was voluntary, and individuals self-selected into the study after accessing the survey link.

Ethical Considerations

The study is part of a larger research project entitled "Parenting and Child Socioemotional Development" and was approved by the Human Research Ethics Committee of the Federal University of Santa Catarina (CEPSH/UFSC; Approval No. 4.452.803). The research followed the ethical standards outlined in Resolution No. 510/2016 of the National Health Council (CNS), the Psychologists' Professional Code of Ethics (CFP Resolution No. 010/2005), and CFP Resolution No. 11/2018, applicable at the time of data collection to psychological services delivered through information and communication technologies. The electronic informed consent form was developed in accordance with CNS Resolution No. 510/2016.

Data Analysis

Data were analyzed using IBM SPSS Statistics, version 22.0. Descriptive statistics (frequencies, means, standard deviations, skewness, and kurtosis) were computed to characterize the study variables and inspect distributional properties. Before inferential analyses, the approximate normality of the temperament and parenting dimensions was evaluated through skewness and kurtosis values, visual inspection of histograms and Q–Q plots, and Shapiro-Wilk test; no severe departures from normality were identified. Given the sample size, the similar size of the comparison groups, and the robustness of *t* tests to moderate deviations from normality in samples of this size (Lumley et al., 2002), independent-samples *t* tests were used to compare mean temperament and parenting scores between girls and boys. Homogeneity of variance was evaluated using Levene's test, and Student's *t* tests were reported as appropriate.

Hierarchical agglomerative cluster analysis was then conducted to group children according to their temperament characteristics (Surgency/Extraversion, Negative Affectivity, and Effortful Control). Scores were entered in their original metric. Ward's minimum variance method was used with squared Euclidean distances, and the dendrogram and agglomeration schedule were inspected to determine the

final cluster solution. Because the analysis was exploratory, the number of clusters was not specified a priori (James et al., 2013). The final solution was selected based on the dendrogram structure, with the aim of maximizing within-cluster homogeneity and between-cluster separation. The final cluster sizes were evaluated in relation to methodological recommendations for cluster analysis (Dalmaijer et al., 2022).

After the temperament profiles were identified, one-way analyses of variance were conducted to compare the profiles on the input temperament dimensions and on maternal parenting practices. Between-profile comparisons of the temperament dimensions were used to characterize and validate the cluster solution descriptively, whereas comparisons of Coregulation, Positive Reinforcement Discipline, and Coercion were used to examine whether maternal parenting practices differed across temperament profiles. Effect sizes were reported using eta-squared (η^2), using Cohen's (1992) conventional benchmarks: small (≈ .01), medium (≈ .06), and large (≈ .14). When omnibus tests were statistically significant, post hoc comparisons were conducted using Bonferroni correction.

Statistical significance was evaluated at $p < .05$, two-tailed.

Results

Descriptive Statistics and Between-Sex Comparisons

Descriptive statistics and between-sex comparisons for the temperament and maternal parenting dimensions are presented in Table 1.

Table 1

Descriptive Statistics for Temperament and Maternal Parenting Dimensions in the Total Sample and Between-Sex Comparisons

Variable	Total sample (N = 229)	Girls (n = 119)	Boys (n = 110)	$t(227)$	p	Cohen's d [95% CI]
	M (SD)	M (SD)	M (SD)			
Temperament						
Surgency/Extraversion	4.47 (1.02)	4.49 (1.34)	4.43 (1.38)	0.36	.713	0.132 [−0.23, 0.29]
Negative Affectivity	4.38 (1.09)	4.30 (1.09)	4.46 (1.08)	−1.08	.273	−0.133 [−0.40, 0.11]
Effortful Control	4.72 (1.01)	4.82 (0.98)	4.61 (1.04)	1.55	.128	0.134 [−0.09, 0.61]
Maternal parenting						
Coregulation	4.93 (0.64)	4.91 (0.68)	4.97 (0.60)	−0.963	.489	−0.092 [−0.35, 0.17]
Positive Reinforcement Discipline	5.03 (0.63)	5.02 (0.72)	5.06 (0.53)	−1.280	.202	−0.163 [−0.52, 0.11]
Coercion	2.85 (0.72)	2.85 (0.73)	2.85 (0.73)	0.723	.470	0.162 [−0.21, 0.43]

Note. Between-sex comparisons were conducted with Student's t tests.

Mothers scored higher on positive parenting practices than on coercive practices, with the highest mean observed for Positive Reinforcement Discipline and the lowest for Coercion. Among the temperament dimensions, Effortful Control showed the highest mean, followed by Negative Affectivity and Surgency/Extraversion. Between-sex comparisons did not indicate statistically significant differences in any temperament dimension or maternal parenting dimension.

Temperament Profiles and Maternal Parenting Practices across Profiles

Hierarchical cluster analysis based on the three temperament dimensions identified four profiles. The descriptive characteristics of these profiles, together with the corresponding maternal parenting dimensions, are presented in Table 2.

Table 2

Sample Characteristics, Temperament and Maternal Parenting Dimensions by Temperament Profile

Variable	Profile 1 (n = 81)	Profile 2 (n = 52)	Profile 3 (n = 52)	Profile 4 (n = 44)	$F(3, 225)$	η^2
	M (SD)	M (SD)	M (SD)	M (SD)		
Age	6.21 (1.05)	5.96 (1.16)	6.87 (1.87)	5.43 (1.09)	10.09*	.11
Temperament						
Surgency/Extraversion	5.84 (0.63)	2.68 (0.67)	4.04 (0.51)	4.53 (0.73)	271.18***	.78
Negative Affectivity	4.30 (0.96)	4.62 (0.93)	4.92 (1.12)	3.63 (1.05)	14.21***	.16
Effortful Control	4.63 (1.03)	4.56 (0.90)	5.96 (0.51)	3.92 (0.62)	52.55***	.41
Maternal parenting						
Coregulation	5.00 (0.63)	4.87 (0.63)	5.06 (0.66)	4.76 (0.64)	2.22	.03
Positive Reinforcement Discipline	5.16 (0.60)	4.97 (0.55)	5.04 (0.70)	4.90 (0.68)	1.92	.02
Coercion	2.81 (0.71)	2.70 (0.62)	3.11 (0.84)	2.78 (0.67)	3.27*	.04

Note. Profile sizes and child sex distribution were as follows: Profile 1, n = 81 (35.4%; 37 girls, 44 boys); Profile 2, n = 52 (22.7%; 30 girls, 22 boys); Profile 3, n = 52 (22.7%; 28 girls, 24 boys); and Profile 4, n = 44 (19.2%; 24 girls, 20 boys).

*$p < .05$. ***$p < .001$.

Profile 1: Elevated Surgency/Extraversion and Predominantly Positive Parenting

Profile 1 constituted the largest subgroup (Table 2). Children in this profile showed the highest mean in Surgency/Extraversion and intermediate levels of Negative Affectivity and Effortful Control. Mothers reported the highest mean in Positive Reinforcement Discipline across all profiles, alongside high Coregulation and relatively low Coercion.

Profile 2: Low Surgency/Extraversion with Predominantly Positive Parenting

Profile 2 represented a subgroup characterized by the lowest mean in Surgency/Extraversion (Table 2). Negative Affectivity and Effortful Control were similar to each other and fell within the intermediate range across profiles. Mothers in this profile reported the lowest mean in Coercion and intermediate levels of Coregulation and Positive Reinforcement Discipline.

Profile 3: High Negative Affectivity and Effortful Control with Elevated Coercion

Profile 3 comprised the oldest children in the sample (Table 2). Children in this profile showed the highest means in both Negative Affectivity and Effortful Control. Mothers reported the highest means in Coregulation and Coercion across profiles, alongside high Positive Reinforcement Discipline.

Profile 4: Low Negative Affectivity and Effortful Control with Lower Positive Parenting

Profile 4 constituted the smallest subgroup and comprised the youngest children in the sample (Table 2). Children in this profile showed the lowest means in both Negative Affectivity and Effortful Control. Mothers reported the lowest means in Coregulation and Positive Reinforcement Discipline across profiles, alongside relatively low Coercion.

Between-profile comparisons indicated that the four temperament profiles differed markedly on the temperament dimensions used to derive the clusters (Table 2). Regarding maternal parenting practices, the profiles did not differ significantly in Coregulation or Positive Reinforcement Discipline. A statistically significant between-profile difference was observed for Coercion, with a small effect size. Bonferroni post hoc comparisons revealed that children in Profile 3 showed significantly higher levels of maternal Coercion than those in Profile 2 ($p = 0.03$).

Discussion

The present study examined associations between maternal parenting practices and child temperament in Brazilian families with children aged 3 to 11 years, with three operational objectives: (a) to compare temperament and maternal parenting dimensions between girls and boys; (b) to identify temperament profiles through hierarchical cluster analysis; and (c) to compare maternal parenting practices across the identified temperament profiles. Three main findings emerged. First, the between-sex comparisons did not indicate statistically significant differences in child temperament or maternal parenting dimensions. Second, four temperament profiles were identified and differentiated across the three input dimensions: Surgency/Extraversion, Negative Affectivity, and Effortful Control. Third, maternal parenting practices varied only partially across temperament profiles: Coercion differed significantly across profiles, whereas Coregulation and Positive Reinforcement Discipline did not show statistically significant between-profile variation. These findings are discussed below in the order of the study objectives, considering their theoretical and practical implications.

The absence of statistically significant between-sex differences in the temperament dimensions converges with prior meta-analytic and review evidence indicating that sex differences in child temperament are often small, domain-specific, and partly shaped by developmental and contextual factors rather than reflecting broad trait-level distinctions (Cosentino-Rocha & Linhares, 2013; Else-Quest et al., 2006). Data collection during the COVID-19 pandemic may have constrained children's peer interaction and school-based socialization opportunities, which may have limited contexts in which sex-typed behavioral expectations and peer-based socialization processes are typically reinforced. This interpretation remains tentative because peer interaction, school attendance, and gendered socialization practices were not directly measured. Regarding maternal parenting, the literature presents divergent findings on differential parenting based on child sex, with some studies reporting differences (e.g., Nunes et al., 2013; Weber et al., 2004) and others reporting similar parenting toward girls and boys (e.g., Bolsoni-Silva, 2017; Moon & Hoffman, 2008; Sabbag & Bolsoni-Silva, 2011; Wright et al., 2013). Meta-analytic and review evidence further suggests that supportive and controlling parenting practices generally show small or limited differences according to child sex or gendered socialization domains (Endendijk et al., 2016; Morawska, 2020; Sampaio, 2007). From the perspective of Belsky's process model of the determinants of parenting, child characteristics such as Negative Affectivity and Effortful Control may therefore be more informative for understanding variation in parenting practices than child sex alone (Belsky, 1984). Hierarchical cluster analysis identified four temperament profiles capturing systematic configurations of Surgency/Extraversion, Negative Affectivity, and Effortful Control. Across these profiles, maternal parenting practices varied selectively: Coercion differed significantly, whereas Coregulation and Positive Reinforcement Discipline did not show statistically significant between-profile variation. This pattern suggests that supportive parenting practices were relatively homogeneous across temperament profiles in this sample, whereas coercive practices varied more clearly across child temperament configurations. This finding is consistent with person-centered developmental approaches showing that temperament and parenting should be considered in combination when examining child adjustment, while also indicating that, in the present study, parenting practices were examined as external characteristics of temperament-derived profiles rather than as indicators used to create the profiles (van den Akker et al., 2010; Zhou et al., 2025). The relevance of this approach lies in its capacity to identify temperament configurations that may be differentially associated with caregiving practices of developmental and clinical relevance, in line with differential susceptibility and transactional accounts of caregiver–child interactions (Belsky, 1997; Belsky & Pluess, 2009; Sameroff, 2010; Slagt et al., 2016).

The four-profile solution provided a person-centered representation of child temperament configurations in this sample. Profile 1, the largest subgroup, combined elevated Surgency/Extraversion with intermediate Negative Affectivity and Effortful Control. Mothers in this profile reported the highest level of Positive Reinforcement Discipline and relatively high Coregulation, alongside comparatively low Coercion. This configuration may reflect a child temperament pattern marked by behavioral approach and activity within a generally supportive parenting context. However, because Coregulation and Positive Reinforcement Discipline did not differ statistically across profiles, these supportive practices should be

interpreted as descriptively elevated rather than as profile-defining differences. The pattern is nevertheless compatible with transactional accounts suggesting that children's behavioral and regulatory characteristics and caregiving practices are mutually embedded across development (Kiff et al., 2011; Sameroff, 2010).

Profile 2 was characterized by the lowest Surgency/Extraversion and intermediate levels of Negative Affectivity and Effortful Control. Mothers in this profile reported the lowest descriptive level of Coercion and relatively high levels of Coregulation and Positive Reinforcement Discipline. This configuration suggests a lower-approach temperament profile embedded in a predominantly supportive maternal parenting context.

Profile 3 comprised the oldest children in the sample and showed the highest means in both Negative Affectivity and Effortful Control, alongside the highest descriptive level of maternal Coercion. This configuration is clinically and developmentally relevant because it combines elevated emotional reactivity with elevated regulatory capacity, suggesting that high Negative Affectivity and high Effortful Control may coexist rather than represent opposite temperament patterns. The pattern is consistent with transactional models in which emotionally reactive child characteristics and coercive or negative parenting practices may become mutually involved over time, without implying causal direction in a cross-sectional design (Belsky, 1984; Kiff et al., 2011; Sameroff, 2010; Slagt et al., 2016).

Profile 4, the smallest and youngest subgroup, showed the lowest means in both Negative Affectivity and Effortful Control. The lower Effortful Control observed in this profile may partly reflect developmental positioning, because self-regulatory components of temperament continue to mature across the preschool and early school years (Linhares & Martins, 2015; Rothbart & Bates, 2006). Mothers in this profile reported the lowest descriptive levels of Coregulation and Positive Reinforcement Discipline, alongside relatively low Coercion. Because the supportive parenting dimensions did not differ statistically across profiles, these lower levels should be interpreted descriptively rather than as evidence of a distinct parenting pattern. From a person-centered perspective, this profile is useful because it shows that low Negative Affectivity and low Effortful Control may co-occur, underscoring the importance of considering temperament configurations rather than isolated dimensions.

Taken together, the four profiles suggest that child temperament can be usefully examined through configurations of reactivity and regulation rather than through isolated dimensions. The clearest parenting-related finding was the selective between-profile difference in Coercion, whereas Coregulation and Positive Reinforcement Discipline did not show statistically significant variation across profiles. This pattern suggests that, in this sample, coercive practices were more closely associated with temperament configurations involving emotional reactivity and regulatory demands than were supportive parenting practices. However, this interpretation remains associative and should not be read as evidence that child temperament elicited coercive parenting or that coercive parenting shaped temperament. The findings are broadly consistent with transactional and differential susceptibility perspectives, which emphasize that children's temperament characteristics and caregiving contexts may be linked in complex, developmentally contingent ways (Belsky, 1984; Belsky & Pluess, 2009; Kiff et al., 2011; Sameroff, 2010; Slagt et al., 2016).

Strengths, Limitations, and Future Directions

These findings should be interpreted in light of several strengths and limitations. Strengths of the study include its contribution to the limited Brazilian and Latin American evidence base on child temperament and maternal parenting, the application of a person-centered profile-based approach to examine how maternal parenting practices vary across configurations of Surgency/Extraversion, Negative Affectivity, and Effortful Control, and the use of psychometrically evaluated Brazilian instruments, including the recently validated 15-item revised Brazilian solution of the CBQ–VSF (Reis et al., 2025).

Nevertheless, the cross-sectional design precludes conclusions about directionality. Future longitudinal and observational studies are needed to clarify whether child temperament contributes to variation in parenting practices, whether parenting practices shape temperament expression and stability, or whether both processes unfold reciprocally over time.

The sociodemographic profile of the sample also limits generalizability. Participants were predominantly highly educated mothers with higher household income, living in largely biparental families, concentrated in the southern region of Brazil, and mostly self-identified as White. These characteristics may be associated with greater access to economic, educational, and social resources relevant to parenting and child development, meaning that the patterns observed here may not extend to families with different socioeconomic, racial, regional, or family-structure profiles. Although family structure is relevant in parenting research, the present findings should not be attributed to biparental family structure alone; broader contextual conditions, including socioeconomic resources, parental stress, and access to support, may be more informative for understanding variation in parenting practices.

Additional methodological limitations should also be considered. Temperament and parenting were both reported by mothers, increasing the possibility of common method variance and informant-related bias. The study did not assess residential context, such as urban or rural residence, limiting a more detailed characterization of the sample and of contextual variation across families. The age range of the children also requires caution because it included preschool- and school-age children, spanning developmental periods in which temperament expression and parenting demands may differ. Although temperament traits show some continuity across childhood, age-stratified analyses could provide a more fine-grained understanding of whether the profile structure and maternal parenting practices vary across developmental stages. The CBQ–VSF was originally developed for children aged 3 to 7 years. In the present study, the original 36-item version was administered, but temperament scores were computed according to the Brazilian revised 15-item solution. Although the factor structure of this scoring solution was examined in the present 3- to 11-year-old sample, other sources of validity evidence were not extensively investigated for this broader age range. In addition, the internal consistency estimates for Surgency/Extraversion and Effortful Control were below conventional thresholds, requiring caution when interpreting the profile solution and any between-profile comparisons involving these dimensions.

Future research should incorporate multi-informant and observational methods, examine paternal parenting and coparental processes, test age-stratified models, and include caregiver characteristics such as mental health, personality, emotion regulation, and parental stress. Further studies should also

consider family configuration, residential context, and regional diversity more explicitly, as well as continue developing psychometrically robust tools for assessing child temperament in Brazilian children.

Implications

Notwithstanding these limitations, the findings have implications for parenting interventions and developmental science. The profile-based approach may help identify temperament configurations that are relevant for tailoring parenting support, particularly when children present combinations of emotional reactivity and regulatory demands. The selective between-profile difference in Coercion suggests that intervention programs should attend not only to supportive parenting practices but also to caregivers' responses to child behaviors that may be experienced as emotionally or behaviorally challenging. Interventions that strengthen parental emotion regulation, reduce coercive disciplinary responses, and support children's developing self-regulatory capacities may be especially relevant. These implications are consistent with the contemporary literature on positive parenting programs and transactional models of development, which emphasize the importance of dyadic regulation, developmentally sensitive caregiving, and contextually adapted intervention strategies (Kiff et al., 2011; Sanders & Turner, 2018; Zhang et al., 2022).

Conclusions

This profile-based study of Brazilian children aged 3 to 11 years and their mothers identified four temperament configurations derived from Surgency/Extraversion, Negative Affectivity, and Effortful Control. Between-sex comparisons did not indicate statistically significant differences in temperament dimensions, and maternal parenting practices were differentiated across temperament profiles mainly by Coercion, whereas Coregulation and Positive Reinforcement Discipline did not show statistically significant between-profile variation. These findings support a transactional, profile-based reading of the temperament–parenting relationship, suggesting that child temperament configurations may be particularly informative for understanding variation in coercive parenting practices. Within the constraints of the cross-sectional design, single-informant assessment, and specific sociodemographic composition of the sample, the study contributes to the limited Latin American evidence base on temperament and parenting and provides a foundation for future longitudinal, observational, multi-informant, and intervention research (Kiff et al., 2011; Lunkes et al., 2023; Sameroff, 2010; Slagt et al., 2016).

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