

Emotional Availability and Parent-Child Interaction Quality in Families of Children with Autism Spectrum Disorder: A Transactional Perspective

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ABSTRACT:

Parent-child interaction quality is a critical determinant of socio-emotional development in children with Autism Spectrum Disorder (ASD). Emotional availability (EA) encompassing parental sensitivity, structuring, non-intrusiveness, and non-hostility alongside child responsiveness and involvement offers a theoretically robust framework for understanding the emotional quality of these interactions. The present study examined associations between all four parental EA dimensions and parent-child interaction quality (closeness and conflict) in a sample of 551 mother-father dyads of children with ASD recruited from clinical settings across Delhi and the National Capital Region, India. A transactional perspective was adopted to additionally examine whether child responsiveness and involvement predicted each parental EA dimension, supporting bidirectional influence. Pearson's correlations and simple linear regression analyses were employed separately for mothers and fathers. All four parental EA dimensions sensitivity, structuring, non-intrusiveness, and non-hostility were significantly and strongly associated with closeness (positive) and conflict (negative) for both parents. Effect sizes were substantially larger for mothers than fathers. Child responsiveness and involvement significantly predicted all four parental EA dimensions in regression analyses, supporting a transactional model of caregiving. These findings position EA as a central, bidirectionally constituted mechanism of parent-child relationship quality in ASD and carry direct implications for parent-mediated intervention design in clinical and community settings.

Keywords: emotional availability, parent-child interaction, autism spectrum disorder, transactional model, parental sensitivity, non-intrusiveness, non-hostility, India.

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterised by persistent deficits in social communication and interaction and by restricted, repetitive patterns of behaviour, interests, and activities (American Psychiatric Association [APA], 2022). Its global

prevalence has risen substantially in recent decades; the World Health Organization (2022) currently estimates 1 in 100 children worldwide to be affected, while recent Indian epidemiological data suggest a prevalence of approximately 1 in 65 children aged two to nine

years (Uke et al., 2024). The economic, psychological, and relational demands placed on families of children with ASD are well documented, encompassing elevated parenting stress, reduced quality of life, and systemic barriers to professional support barriers that are particularly pronounced in low- and middle-income countries such as India (Divan et al., 2012).

Contemporary intervention frameworks for ASD accord a pivotal role to the quality of the parent-child relationship. Developmental relationship-based approaches including Floortime, the Early Start Denver Model (ESDM), and JASPER conceptualise the early parent-child dyad as the primary vehicle through which social communication competencies are scaffolded and consolidated in autistic children (Greenspan & Wieder, 2006; Rogers & Dawson, 2010; Kasari et al., 2015). Accordingly, understanding what determines the quality of parent-child interactions in this population is both a theoretical and a clinical priority.

Emotional availability (EA) offers a particularly rich conceptual lens for this purpose. Defined by Biringen and colleagues (1998) as the quality of the emotional connection between parent and child during shared interaction, EA encompasses four parental dimensions Sensitivity, Structuring, Non-Intrusiveness, and Non-Hostility and two child-directed dimensions Child Responsiveness and Child Involvement (Biringen & Easterbrooks, 2012). This bidimensional structure makes EA uniquely suited to capturing the transactional nature of parent-child interactions in ASD, where both parental and child characteristics mutually shape interactional quality over time (Sameroff, 2009).

Despite the theoretical relevance of EA, empirical research specifically examining associations between all four parental EA dimensions and parent-child interaction quality in families of children with ASD remains limited, and almost no Indian studies have investigated these relationships. The Indian sociocultural context introduces distinctive parameters including collectivistic family structures, gender-

differentiated caregiving roles, social stigma, and limited professional support infrastructure that may substantially shape how EA is expressed and how it relates to parent-child relationship quality (Kumar et al., 2006; Kaur et al., 2019). The present study addresses this gap directly.

Emotional Availability and Its Dimensions

The EAS framework (Biringen et al., 1998) assesses EA through structured observation of parent-child interaction. Sensitivity reflects the accuracy and contingency of parental responses to the child's emotional and communicative cues. Structuring captures the quality of parental scaffolding guiding and organising the child's activity in a supportive, developmentally appropriate manner without over-controlling. Non-Intrusiveness reflects the parent's restraint from overriding the child's autonomous engagement; non-intrusive parents follow the child's lead and avoid over-stimulation. Non-Hostility assesses the absence of overt anger, covert rejection, and emotional dysregulation in the parent's behaviour. Child Responsiveness reflects the child's active emotional reply to parental overtures, and Child Involvement the degree to which the child initiates engagement with the parent.

High EA particularly high parental Sensitivity has been consistently linked to secure attachment, interactional synchrony, and positive child socioemotional outcomes across developmental contexts (Biringen & Easterbrooks, 2012; Bakermans-Kranenburg et al., 2003). In ASD specifically, research documents that children's atypical affective expression and limited reciprocal communication challenge parental Sensitivity and increase the risk of intrusive or disengaged caregiving (Van IJzendoorn et al., 1999; Dolev et al., 2009; Wan et al., 2013). Understanding associations between all EA dimensions not merely Sensitivity and interaction quality outcomes is therefore essential.

Parent-Child Interaction Quality in ASD

Parent-child interaction quality in the present study was indexed using the Child-Parent Relationship Scale (CPRS; Pianta, 1992), which assesses Closeness (emotional warmth, affection,

and affective sharing) and Conflict (negativity, tension, and relational discord) as perceived by the caregiver. These dimensions capture complementary aspects of relationship quality: Closeness reflects the positive, mutually rewarding aspects of the parent-child bond, while Conflict reflects its stressful, discordant aspects.

The parent-child relationship in ASD is frequently characterised by elevated Conflict and reduced Closeness relative to families of typically developing children (Hastings, 2003; Davis & Carter, 2008). Longitudinal evidence indicates that poorer early parent-child relationship quality predicts less favourable developmental trajectories in domains including language, social cognition, and adaptive behaviour (Siller & Sigman, 2002; Fenning et

al., 2019). Identifying the EA dimensions that sustain Closeness and buffer against Conflict is therefore of direct clinical importance.

Transactional Processes in ASD Caregiving

The transactional model of development (Sameroff, 2009) holds that parent and child behaviours represent mutually influencing inputs to a developmental system that evolves through cycles of reciprocal influence. Applied to EA, this perspective posits that emotionally available parenting elicits greater child responsiveness and involvement, which in turn sustains and reinforces parental EA, creating self-amplifying positive relational cycles. In ASD, this transactional dynamic is particularly salient: children's variability in social engagement reflecting ASD severity, developmental stage, and individual communicative profile may substantially modulate parental EA over time (Fan et al., 2025; Dolev et al., 2009).

Testing whether child responsiveness and involvement predict each parental EA dimension not merely Sensitivity extends prior research and provides a more comprehensive account of the transactional system. If child engagement predicts Structuring, Non-Intrusiveness, and Non-Hostility as well as Sensitivity, this implies that intervention targets aimed at enhancing child social engagement may generate broad

improvements across the full profile of parental EA, with downstream benefits for relationship quality.

Gender Differences in EA and the Indian Context

Research consistently documents that mothers assume primary caregiving responsibility in ASD, displaying higher EA engagement than fathers, and experiencing greater interactional intensity and stress (Davis & Carter, 2008; Flippin & Crais, 2011). In India, these gender disparities are amplified by sociocultural norms that assign therapeutic and relational management of children with ASD overwhelmingly to mothers (Kaur et al., 2019). Examining EA-interaction quality associations separately for mothers and fathers is therefore essential for generating ecologically valid insights applicable to Indian family contexts.

Objectives and Hypotheses

The present study pursued three objectives: (1) to examine associations between all four maternal and paternal EA dimensions Sensitivity, Structuring, Non-Intrusiveness, and Non-Hostility and parent-child interaction quality (Closeness and Conflict); (2) to examine associations between parental EA dimensions and child-directed EA (Child Responsiveness and Child Involvement); and (3) to test transactional associations in which Child Responsiveness and Child Involvement predict each parental EA dimension, supporting bidirectional influence.

Three hypotheses were formulated. H1: All four parental EA dimensions will be significantly and positively associated with Closeness and negatively associated with Conflict, for both mothers and fathers. H2: All four parental EA dimensions will be positively associated with Child Responsiveness and Child Involvement. H3: Child Responsiveness and Child Involvement will significantly predict each of

the four parental EA dimensions, supporting a transactional bidirectional model.

Method

Research Design

A cross-sectional, correlational research design with supplementary simple regression analyses was employed. Mothers and fathers were treated as independent analytical samples.

Participants

The sample comprised 551 mother-father dyads recruited from paediatric neurology outpatient departments, ASD rehabilitation centres, and special education settings across Delhi and the National Capital Region, India. Inclusion criteria required: (a) a formal DSM-5 ASD diagnosis confirmed by a licensed specialist; (b) co-residence of both biological parents; (c) parental age 30-60 years; (d) minimum Class 8 educational attainment. The child sample was predominantly male (74.6%; $n = 411$), consistent with the established epidemiological sex ratio in ASD (Maenner et al., 2023). Mean child age was 6.84 years ($SD = 3.56$, range 0.3-16.9). Mean maternal age was 36.65 years ($SD = 6.97$) and mean paternal age was 39.08 years ($SD = 7.44$). Ethical approval was obtained from the Institutional Ethics Committee of SGT University, and written informed consent was obtained from all participants prior to data collection.

Measures

Emotional Availability Scales (EAS)

Parental EA was assessed using the Emotional Availability Scales (Biringen et al., 1998) via 20-minute structured free-play observation sessions video-recorded with each parent and child individually. Four parental subscales were scored: Sensitivity (range 1-9), Structuring (1-9), Non-Intrusiveness (1-9), and Non-Hostility (1-9). Two child-directed subscales were also scored: Child Responsiveness (1-4) and Child Involvement (1-4). Higher scores on all subscales indicate more adaptive EA. Three trained postgraduate raters independently coded 30% of sessions; interrater reliability was $ICC = .76$ for Sensitivity and $ICC = .65$ for Non-Intrusiveness. Written permission

for EAS use was obtained from the scale developer (Z. Biringen).

Child-Parent Relationship Scale (CPRS)

Parent-child interaction quality was assessed using the Child-Parent Relationship Scale (Pianta, 1992), a self-report instrument completed independently by each parent. The CPRS yields two subscale scores: Closeness (15 items; emotional warmth and affective sharing) and Conflict (8 items; negativity and relational tension). Higher Closeness scores indicate more positive interactions; higher Conflict scores indicate greater interactional difficulty. Written permission was obtained from the scale developer (R. C. Pianta).

Procedure

All data were collected in a single research visit of approximately 90 minutes. Each parent first independently completed the CPRS. Each parent then individually participated in a 20-minute structured free-play observation session with the child, which was video-recorded for subsequent EAS coding. Order of parent participation was counterbalanced. All identifying information was replaced with numerical codes prior to analysis.

Statistical Analysis

Pearson's correlation coefficients were computed to examine bivariate associations among EAS dimensions and CPRS subscales for mothers and fathers separately (Hypotheses 1 and 2). Simple linear regression analyses were conducted to quantify the proportion of variance in each parental EA dimension accounted for by Child Responsiveness and Child Involvement (Hypothesis 3). The significance threshold was set at $\alpha = .05$ (two-tailed). All analyses were conducted using IBM SPSS Statistics Version 26.

Results

Descriptive Statistics

Descriptive statistics for all study variables are presented in Table 1. Mothers demonstrated substantially higher mean EA scores than fathers across all four parental subscales. Mean maternal Sensitivity was 5.36 ($SD = 1.37$) compared with 3.82 ($SD = 1.09$) for fathers a difference of

approximately 1.4 standard deviations. Mean maternal Structuring, Non-Intrusiveness, and Non-Hostility were 5.44 (SD = 1.32), 5.33 (SD = 1.42), and 5.34 (SD =

1.35) respectively, compared with 3.68 (SD = 1.05), 3.60 (SD = 1.11), and 3.52 (SD = 1.08) for

fathers. Child Responsiveness and Child Involvement were also higher in the maternal interactional context, suggesting that children exhibited greater emotional and behavioural engagement with their mothers. CPRS Closeness and Conflict scores were comparable across mothers and fathers.

Table 1 Descriptive Statistics for Emotional Availability Dimensions and Parent-Child Interaction Quality (N = 551)

Variable	N	M	SD	Min	Max
Emotional Availability Scales (EAS) —					
Mother					
Sensitivity	551	5.36	1.37	2.0	7.0
Structuring	551	5.44	1.32	1.0	7.0
Non-Intrusiveness	551	5.33	1.42	2.0	7.0
Non-Hostility	551	5.34	1.35	2.0	7.0
Child Responsiveness	551	2.94	0.82	1.0	4.0
Child Involvement	551	3.0	0.86	1.0	4.0
Emotional Availability Scales (EAS) —					
Father					
Sensitivity	551	3.82	1.09	1.0	6.0
Structuring	551	3.68	1.05	1.0	6.0
Non-Intrusiveness	551	3.6	1.11	1.0	6.0
Non-Hostility	551	3.52	1.08	1.0	6.0
Child Responsiveness	551	1.86	0.67	1.0	3.0
Child Involvement	551	2.14	0.69	1.0	4.0
Father					
Sensitivity	551	3.82	1.09	1.0	6.0
Structuring	551	3.68	1.05	1.0	6.0
Non-Intrusiveness	551	3.6	1.11	1.0	6.0
Non-Hostility	551	3.52	1.08	1.0	6.0
Child Responsiveness	551	1.86	0.67	1.0	3.0

Child Involvement	551	2.14	0.69	1.0	4.0
Parent-Child Interaction Quality (CPRS)					
Closeness — Mother	551	22.31	6.14	10.0	33.0
Conflict — Mother	551	24.31	6.22	14.0	35.0
Closeness — Father	551	21.74	4.51	12.0	33.0
Conflict — Father	551	24.23	7.2	11.0	36.0

Note. EAS = Emotional Availability Scales; CPRS = Child-Parent Relationship Scale (Pianta, 1992). All EAS ratings derived from 20-minute video-coded free-play observation sessions.

Hypothesis 1: Parental EA Dimensions and Parent-Child Interaction Quality

Pearson's correlations between all EAS dimensions and CPRS subscales are presented in Table 2. H1 was fully supported. For mothers, all four parental EA dimensions were significantly and strongly positively associated with Closeness and negatively associated with Conflict (all $ps < .001$). Sensitivity showed the strongest associations (Closeness: $r = .893$; Conflict: $r = -.761$), followed by Non-Intrusiveness (Closeness: $r = .850$; Conflict: $r = -.702$), Non-Hostility (Closeness: $r = .837$; Conflict: $r = -.687$), and Structuring (Closeness: $r = .819$; Conflict: $r = -.697$). Child-directed EA dimensions also showed significant large associations: Child Responsiveness (Closeness: $r = .768$; Conflict: $r = -.684$) and Child Involvement (Closeness: $r =$

$.735$; Conflict: $r = -.646$). For fathers, all four parental EA dimensions were significantly associated with both paternal CPRS subscales (all $ps < .001$), though effect sizes were substantially smaller than those for mothers. Child Responsiveness showed the strongest paternal association with Closeness ($r = .614$), followed by Sensitivity ($r = .544$), Non-Intrusiveness ($r = .519$), Non-Hostility ($r = .517$), and Structuring ($r = .480$). For Conflict, Sensitivity showed the strongest negative association ($r = -.599$), followed by Non-Intrusiveness ($r = -.545$), Child Involvement ($r = -.537$), Structuring ($r = -.534$), Non-Hostility ($r = -.522$), and Child Responsiveness ($r = -.456$).

Table 2 Pearson Correlations Between EAS Dimensions and Parent-Child Interaction Quality (CPRS) for Mothers and Fathers (N = 551)**Dimensions**

other EAS Dimensions (N =551)	Closeness (Mother)	Conflict (Mother)	Closeness (Father)	Conflict (Father)
Sensitivity	.893**	-.761**	—	—
Structuring	.819**	-.697**	—	—
Non-Intrusiveness	.850**	-.702**	—	—
Non-Hostility	.837**	-.687**	—	—
Child Responsiveness	.768**	-.684**	—	—
Child Involvement	.735**	-.646**	—	—
Father EAS Dimensions (N = 551)				
Sensitivity	—	—	.544**	-.599**
Structuring	—	—	.480**	-.534**
Non-Intrusiveness	—	—	.519**	-.545**
Non-Hostility	—	—	.517**	-.522**
Child Responsiveness	—	—	.614**	-.456**

Hypothesis 2: Parental EA Dimensions and Child Responsiveness and Involvement

To examine H2, Pearson correlations were computed between all four parental EA dimensions and Child Responsiveness (CR) and Child Involvement (CI) for mothers and fathers separately. All associations were significant and positive (all $ps < .001$), supporting H2. Results are summarised in Table 3. For mothers, Sensitivity showed the strongest associations

with CR ($r = .789$) and CI ($r = .746$). Non-Intrusiveness showed particularly strong associations with CI ($r = .772$), as did Non-Hostility with CR ($r = .722$) and CI ($r = .722$). For fathers, Sensitivity again showed the strongest associations (CR: $r = .689$; CI: $r = .530$), followed by Non-Intrusiveness (CR: $r = .609$; CI: $r = .548$), Non-Hostility (CR: $r = .517$; CI: $r = .443$), and Structuring (CR: $r = .542$; CI: $r = .500$). Effect sizes were consistently larger for mothers than fathers across all comparisons.

Table 3 Pearson Correlations Between Parental EA Dimensions and Child Responsiveness and Involvement for Mothers and Fathers (N = 551)

EAS Parental Dimension	Mother CR	Mother CI	CR Father	Father CI
Sensitivity				
r	.789**	.746**	.689**	.530**
	<	.001		
Structuring				
r	.714**	.743**	.542**	.500**
	<	.001		
Non-Intrusiveness				
R	.708**	.772**	.609**	.548**
	<	.001		
Non-Hostility				
r	.722**	.722**	.517**	.443**
	<	.001		

Note. ** $p < .001$ (two-tailed). CR = Child Responsiveness; CI = Child Involvement. All correlations reported within the respective parental interactional context.

Hypothesis 3: Transactional Associations-Child Behaviour Predicting Parental EA Dimensions

Simple regression analyses testing H3 are presented in Table 4. Child Responsiveness and Child Involvement significantly predicted all four parental EA dimensions in both the maternal and paternal datasets (all $ps < .001$), supporting H3 comprehensively. For mothers, Child Responsiveness accounted for the largest proportion of variance in maternal Sensitivity ($R^2 = .622$, $F(1, 549) = 905.26$, $p < .001$; $\eta^2 = 1.31$), followed by Non-Intrusiveness ($R^2 = .502$), Structuring ($R^2 = .510$), and Non-Hostility ($R^2 = .522$). Child Involvement similarly

predicted all four maternal EA dimensions, with the strongest prediction of Non-Intrusiveness ($R^2 = .596$, $F(1,549) = 808.52$, $p < .001$; $\eta^2 = 1.28$). For fathers, Child Responsiveness predicted Sensitivity most strongly ($R^2 = .475$, $F(1, 549) = 496.13$, $p < .001$; $\eta^2 = 1.11$), followed by Non-Intrusiveness ($R^2 = .371$), Non-Hostility ($R^2 = .298$), and Structuring ($R^2 = .293$). Child Involvement predicted paternal EA dimensions with smaller effect sizes, with Sensitivity showing the strongest prediction ($R^2 = .281$, $F(1, 549) = 214.79$, $p < .001$; $\eta^2 = 0.84$). Across all models, Child Responsiveness consistently accounted for more variance in parental EA than Child Involvement, particularly for fathers.

Table 4 Simple Regression Analyses: Child Responsiveness and Child Involvement Predicting Parental EA Dimensions for Mothers and Fathers (N = 551)

Predictor	Outcome	SE	R ²	F (1,549)	p
Mother					
Child Responsiveness	Sensitivity	1.31	0.04	.622 905.26	< .001
Child Responsiveness	Structuring	1.15	0.05	.510 571.44	< .001
Child Responsiveness	Non-Intrusiveness	1.15	0.05	.502 553.07	< .001
Child Responsiveness	Non-Hostility	1.20	0.04	.522 600.32	< .001
Child Involvement	Sensitivity	1.19	0.05	.556 686.51	< .001
Child Involvement	Structuring	1.15	0.05	.552 677.45	< .001

Child Involvement □ Non-Intrusiveness	1.28	0.06	.596 808.52	< .001
Child Involvement □ Non-Hostility	1.10	0.05	.521 597.89	< .001
Father				
Child Responsiveness □ Sensitivity	1.11	0.05	.475 496.13	< .001
Child Responsiveness □ Structuring	0.85	0.06	.293 228.07	< .001
Child Responsiveness □ Non-Intrusiveness		0.06	.371 324.50	< .001
Intrusiveness	0.90	0.06	.298 232.87	< .001
Child Responsiveness □ Non-Hostility				
Child Involvement □ Sensitivity	0.84	0.06	.281 214.79	< .001
Child Involvement □ Structuring	0.76	0.06	.250 183.44	< .001
Child Involvement □ Non-Intrusiveness	0.88	0.06	.301 237.00	< .001
Child Involvement □ Non-Hostility	0.82	0.06	.265 198.12	< .001

Note. □ = unstandardised regression coefficient; R^2 = coefficient of determination; all models $df = 1, 549$. All F-tests $p < .001$.

Discussion

The present study examined associations between all four parental EA dimensions and parent-child interaction quality in a large Indian sample of families of children with ASD, and tested transactional associations in which child responsiveness and involvement predicted each parental EA dimension. The findings provide robust support for all three hypotheses and contribute to the literature across four substantive dimensions: the comprehensive role of all EA dimensions including Non-Intrusiveness and Non-Hostility in shaping interaction quality, gender differences in EA profiles and their relational consequences, the transactional nature of the EA-interaction quality system, and implications for parent-mediated intervention in Indian ASD contexts.

All Four Parental EA Dimensions and Interaction Quality

A central contribution of the present study is its demonstration that Non-Intrusiveness and Non-Hostility not merely Sensitivity are strongly associated with parent-child Closeness and Conflict. For mothers, Non-Intrusiveness correlated with Closeness at $r = .850$, a magnitude comparable to that of Sensitivity ($r = .893$), and showed a strong negative association with Conflict ($r = -.702$). Non-Hostility similarly showed large associations with Closeness ($r =$

$.837$) and Conflict ($r = -.687$). These effect sizes, comparable to those typically reported for Sensitivity alone in Western EAS studies, position Non-Intrusiveness and Non-Hostility as near-equivalent determinants of relationship quality in this sample.

The salience of Non-Intrusiveness as a predictor of Closeness and Conflict is theoretically significant in the ASD context. Parents of children with ASD frequently adopt directive, over-managing interaction styles as compensatory strategies for their children's limited self-initiation and communicative unpredictability (Freeman & Kasari, 2013; Spiker et al., 2002). While such strategies may be motivated by genuine therapeutic intent, the present findings suggest that intrusive interaction patterns overriding the child's autonomous engagement, excessive direction, and failure to follow the child's lead are strongly associated with reduced relational Closeness and elevated Conflict. This finding aligns with attachment theory's emphasis on autonomy support as a foundation of secure parent-child bonding (Ainsworth et al., 1978) and has direct implications for intervention: parents of children with ASD should be supported to develop non-intrusive, child-led interaction styles rather than

directive therapeutic approaches within naturalistic caregiving contexts.

Non-Hostility's strong association with Closeness reflects the critical importance of parental emotional regulation in ASD caregiving. Parents of children with ASD frequently experience frustration, grief, and emotional exhaustion arising from the chronicity of caregiving demands, social isolation, and the challenges of navigating complex service systems (Seltzer et al., 2004; Divan et al., 2012). The present findings confirm that parents who are able to regulate these emotional responses maintaining warm, non-angry, and non-rejecting engagement with their child despite these pressures sustain significantly higher levels of relational Closeness. Structuring, while showing somewhat smaller associations than Sensitivity, Non-Intrusiveness, and Non-Hostility, also contributed significantly to both CPRS dimensions, confirming the importance of developmentally appropriate scaffolding as a component of positive interaction quality.

Gender Differences in EA Profiles and Relational Consequences

Mothers demonstrated substantially higher EA across all dimensions than fathers, with differences of approximately 1.4 standard deviations in mean Sensitivity and 1.5 SDs in Non-Hostility. These differences are consistent with the primary caregiving burden borne by mothers in Indian ASD families (Kaur et al., 2019) and reflect the greater quantity of time, emotional investment, and interactional calibration that primary caregiving affords. The higher mean child-directed EA dimensions (Child Responsiveness and Child Involvement) in the maternal context further suggest that children engage more richly with their mothers, likely reflecting both the greater familiarity and the higher emotional availability that mothers bring to interactions.

The substantially attenuated EA-interaction quality associations for fathers (e.g., Sensitivity $\times$ Closeness: $r = .544$ versus $r = .893$ for mothers) are consistent with the more episodic and activity-focused nature of paternal interaction in

Indian families (Flippin & Crais, 2011). In such contexts, the interactional configurations within which fathers engage with their children afford fewer opportunities for the full expression of EA dimensions such as Sensitivity and Non-Intrusiveness, diluting the magnitude of their associations with CPRS outcomes. Importantly, however, all associations for fathers remained statistically significant and in the hypothesised direction, confirming that paternal EA contributes meaningfully to relationship quality. Notably, Child Responsiveness showed the strongest paternal association with Closeness ($r = .614$), exceeding Sensitivity ($r = .544$) suggesting that for fathers, the child's active behavioural engagement is a particularly important driver of relational warmth, possibly because activity-based interaction places greater weight on the child's reciprocal participation.

Comprehensive Transactional Effects: Child Behaviour Predicting All EA Dimensions

The regression analyses examining Child Responsiveness and Child Involvement as predictors of all four parental EA dimensions represent a key extension of prior transactional research in ASD (Dolev et al., 2009; Siller & Sigman, 2002). Critically, the present findings demonstrate that the transactional principle extends uniformly across the full profile of parental EA: child responsiveness predicted not only parental Sensitivity (the dimension most typically studied) but also Structuring ($R^2 = .510$), Non-Intrusiveness ($R^2 = .502$), and Non-Hostility ($R^2 = .522$) in mothers, and equivalent patterns for fathers. These findings imply that children's emotional and behavioural engagement shapes the entire architecture of parental emotional availability not merely its attentional-sensitivity component.

The particularly strong prediction of maternal Non-Intrusiveness by Child Involvement ($R^2 = .596$) is noteworthy. Children who are more actively engaged and involved in interaction may create the conditions that allow parents to follow rather than lead, reducing intrusiveness by providing the child-led opportunities that non-intrusive parenting requires. Conversely, children

with limited engagement may inadvertently elicit intrusive parenting as parents attempt to initiate and sustain interaction in the face of reduced child-initiated activity. This interpretation aligns with the transactional model (Sameroff, 2009) and highlights child engagement as a modifiable target whose improvement may generate autonomous reductions in parental intrusiveness a pathway of particular clinical relevance in ASD.

The consistently larger transactional regression coefficients for mothers than fathers (e.g., Child Responsiveness $\square$ maternal Sensitivity $R^2 = .622$ versus paternal $R^2 = .475$) further confirm the greater sensitivity of the maternal EA system to child behavioural input. This differential likely reflects the more continuous and intensive nature of maternal interaction in Indian ASD families, in which the moment-to-moment contingency between child behaviour and parental EA is both more frequent and more tightly calibrated than in the episodic paternal context.

Clinical and Policy Implications

The present findings carry several implications for clinical practice and intervention in Indian ASD contexts. First, EA assessment using video-coded EAS methodology should be integrated into routine ASD family evaluation. The comprehensive associations between all four parental EA dimensions and CPRS outcomes suggest that EA profiles capturing Sensitivity, Structuring, Non-Intrusiveness, and Non-Hostility together provide a far richer picture of interaction quality risk than Sensitivity alone. Parents showing elevated intrusiveness or hostility alongside lower Sensitivity require comprehensively targeted EA interventions.

Second, parent-mediated interventions in Indian ASD contexts should explicitly target all four parental EA dimensions, with particular emphasis on Non-Intrusiveness and emotional regulation (Non-Hostility). Video-feedback interventions such as VIPP (Juffer et al., 2008), which use review of recorded parent-child interaction to build awareness of non-intrusive, child-contingent responsiveness, are well-suited to addressing the full EA profile identified in the present study. Cultural adaptation of such

programmes incorporating Indian family structures, caregiver role norms, and language-accessible delivery is an immediate priority.

Third, the comprehensive transactional findings support the integration of child-directed social engagement interventions (e.g., JASPER, Pivotal Response Treatment) alongside parental EA training. The present data suggest that even modest improvements in child responsiveness and involvement achievable through evidence-based child-focused intervention may generate autonomous improvements in all four parental EA dimensions through natural transactional processes, potentially amplifying the benefits of combined parent-child intervention approaches.

Finally, the ADIP Scheme and related Indian government disability support frameworks should explicitly incorporate family-level EA assessment and relational support components. The finding that all four parental EA dimensions strongly predict parent-child relationship quality indicates that relational difficulties in ASD families are substantially modifiable through targeted intervention, justifying investment in the professional training infrastructure necessary for EA-based assessment and support.

Limitations and Future Directions

Several limitations warrant consideration. The cross-sectional design precludes causal inference regarding the directionality of EA-interaction quality associations. Future longitudinal and observational studies should examine how EA profiles evolve over time and how changes in parental EA dimensions predict changes in CPRS outcomes. Self-report CPRS data may introduce response bias and social desirability effects; multi-method assessment incorporating independent observer ratings of interaction quality would strengthen validity. The clinical community-recruited sample may not be representative of all Indian ASD families. Future research should examine moderating effects of child ASD severity, age, and communication profile, and test the efficacy of comprehensive

EA-focused interventions in randomised trials targeting Indian ASD families.

Conclusion

The present study provides comprehensive empirical evidence that all four parental EA dimensions Sensitivity, Structuring, Non-Intrusiveness, and Non-Hostility are strong, significant determinants of parent-child interaction quality in families of children with ASD in India. Using a large, clinically recruited sample of 551 mother-father dyads and robust correlational and regression analyses with exact SPSS-derived values, the study demonstrates that higher levels of each parental EA dimension are associated with greater relational Closeness and reduced Conflict for both mothers and fathers.

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Critically, Child Responsiveness and Child Involvement significantly predicted all four parental EA dimensions in both parental datasets, confirming the comprehensive bidirectional, transactional architecture of the EA-interaction quality system in ASD. These findings underscore the importance of EA as a holistic, dynamically constituted mechanism of relationship quality, and position all four parental EA dimensions not merely Sensitivity as priority targets for parent-mediated intervention in Indian ASD contexts. Fostering emotionally available, non-intrusive, and emotionally regulated caregiving across the full EA profile is essential for promoting healthier parent-child relationships and more adaptive developmental trajectories for children with ASD.

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